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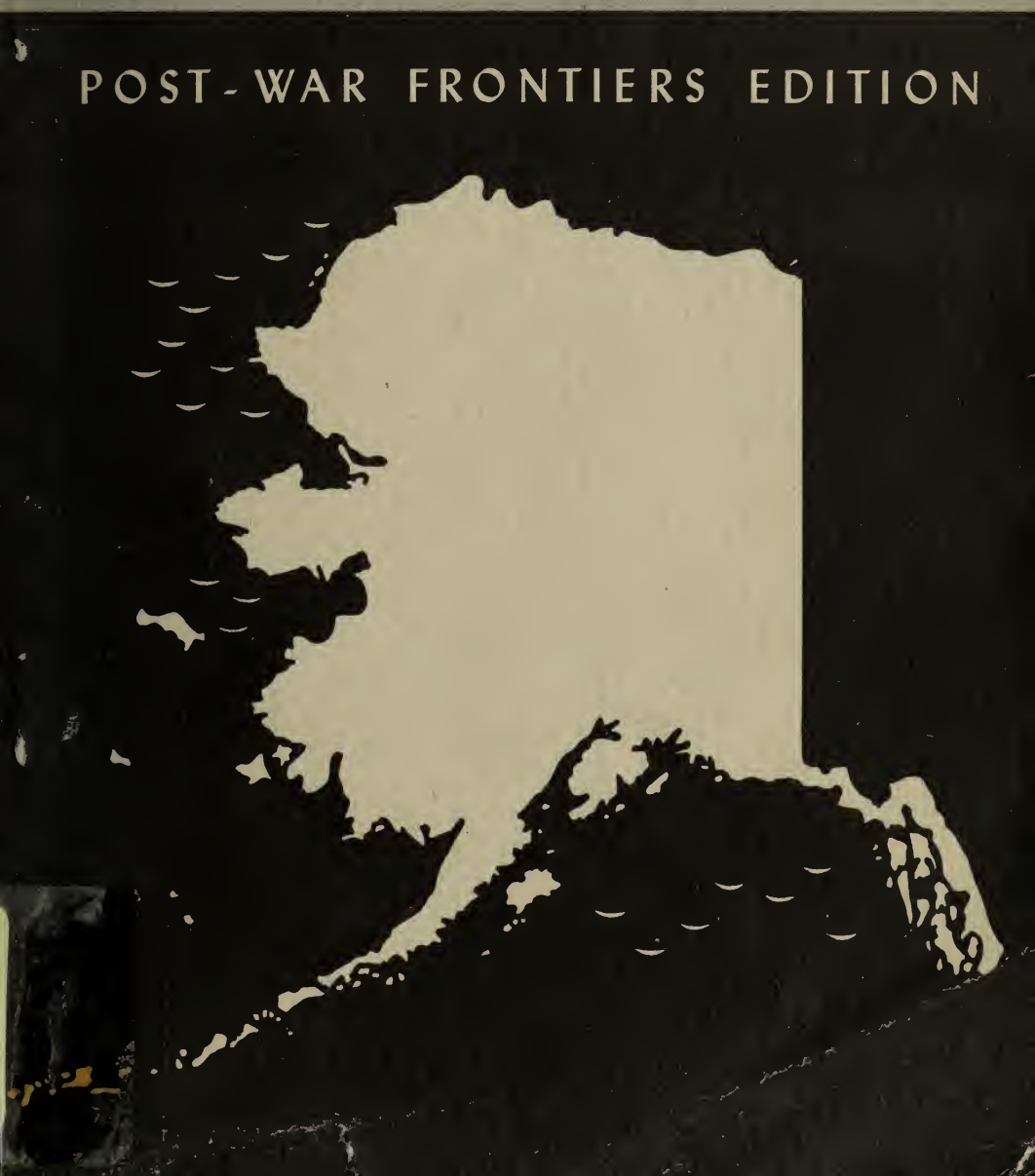
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Annual Report

OF THE SECRETARY OF THE INTERIOR

1944

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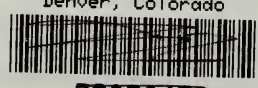


Annual REPORT

*of the Secretary of the Interior
for the Fiscal Year Ended June 30*

1944

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UNITED STATES
DEPARTMENT OF THE
INTERIOR

HAROLD L. ICKES

Secretary

UNITED STATES GOVERNMENT PRINTING OFFICE, WASHINGTON, D. C.
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Secretaries of the Interior

from March 8, 1849 to June 30, 1944

Harold L. Ickes

Mar. 4, 1933, continuing in office
June 30, 1944

Ray Lyman Wilbur

Mar. 5, 1929 to Mar. 4, 1933

Roy O. West

July 25, 1928 to Mar. 4, 1929

Hubert Work

Mar. 5, 1923 to July 24, 1928

Albert B. Fall

Mar. 5, 1921 to Mar. 4, 1923

John Barton Payne

Mar. 15, 1920 to Mar. 4, 1921

Franklin K. Lane

Mar. 6, 1913 to Feb. 29, 1920

Walter L. Fisher

Mar. 13, 1911 to Mar. 5, 1913

Richard A. Ballinger

Mar. 6, 1909 to Mar. 12, 1911

James Rudolph Garfield

Mar. 5, 1907 to Mar. 5, 1909

Ethan A. Hitchcock

Feb. 20, 1899 to Mar. 4, 1907

Cornelius N. Bliss

Mar. 6, 1897 to Feb. 20, 1899

David R. Francis

Sept. 3, 1896 to Mar. 5, 1897

Hoke Smith

Mar. 6, 1893 to Sept. 2, 1896

John W. Noble

Mar. 4, 1889 to Mar. 6, 1893

William F. Vilas

Jan. 16, 1888 to Mar. 3, 1889

Lucius Q. C. Lamar

Mar. 5, 1885 to Jan. 15, 1888

Henry M. Teller

Apr. 7, 1882 to Mar. 4, 1885

Samuel J. Kirkwood

Mar. 5, 1881 to Apr. 6, 1882

Carl Schurz

Mar. 4, 1877 to Mar. 4, 1881

Zachariah Chandler

Oct. 19, 1875 to Mar. 3, 1877

Columbus Delano

Nov. 1, 1870 to Oct. 18, 1875

Jacob D. Cox

Mar. 5, 1869 to Oct. 31, 1870

Orville H. Browning

July 27, 1866 to Mar. 4, 1869

James Harlan

May 15, 1865 to July 26, 1866

John P. Usher

Jan. 8, 1863 to May 14, 1865

Caleb B. Smith

Mar. 5, 1861 to Jan. 7, 1863

Jacob Thompson

Mar. 5, 1857 to Mar. 4, 1861

Robert McClelland

Mar. 8, 1853 to Mar. 4, 1857

Alexander H. H. Stuart

Sept. 12, 1850 to Mar. 7, 1853

Thomas M. T. McKennan

July 10, 1850 to Sept. 11, 1850

Thomas Ewing

Mar. 8, 1849 to July 9, 1850

Letter of Transmittal

The Secretary of the Interior

Harold L. Ickes, Secretary



MY DEAR MR. PRESIDENT: The time approaches when the Nation will cease to produce for war, obliging us to find new and stable uses for the facilities which we have developed in the greatest proportions in order to hasten victory.

During the past fiscal year, we have concentrated upon those facilities that provide the necessities of war from the natural resources. We have hastened the construction of huge dams and the installation of generators to furnish power for war production plants. We have extended our irrigation facilities to increase the production of food for war. We have developed and improved technological processes to account for more fuels and minerals for war and to produce them faster.

If we could lump together as "power" the final results of such developments, then the Department of the Interior would be the steward of an accumulation of power which is probably the greatest that was ever administered under one jurisdiction.

A glance at a few of this Department's developments indicates how enormous they are in the aggregate. The Department's installed capacity for the generation of hydroelectricity at the end of the fiscal year was nearly 2,500,000 kilowatts, roughly three times the entire developed capacity in South America in 1935, or one-half of that in Asia (including Soviet Asia), at the same time. We generated 13,747,000,000 kilowatt-hours of electricity during the past fiscal year, about four times the amount that was used in Michigan in the manufacture of automobiles and automobile parts in 1939. We irrigated more than 4,000,000 acres of land, equivalent to the acreage that is planted to crops in Louisiana in a normal year. We have affirmed the presence of so many large deposits of essential ores that the effect would not be different if we had annexed a couple of mineral-rich States.

Our job soon will be to turn this vast block of power from war to peace. It is a Herculean job but I think that we can master it by shifting, gradually if possible, from war to its nearest economic equivalent in the field of conservation; namely, regional development. But it must be regional development at its boldest. The program must embrace entire areas, usually the basins of great rivers and their tributaries; it must provide for full and unified development of all of the resources within the region, and an ideal program would call for simultaneous attack upon all phases of the job.

There is scarcely a facility of ours that is now producing for war that could not be put to use in such an undertaking. It would absorb such material developments as dams and such tributary activities as surveys and metallurgical processes. The benefits of such a project would be so widespread that, in my estimation, they could easily hold community interest and effort together in the post-war years.

Working in a typical region under a program for unified and simultaneous development, we would provide for irrigation at the upper reaches of a river, for deep-water navigation as far upstream as would be practicable, for barge transportation above that point, and for flood control wherever floods occur. We would impound water for municipal supply, generate hydroelectric power and transmit it for use in factories and homes and on farms. We would determine the location and volume of the ores and the bases of plastics that are amenable to processing or manufacture by means of electricity, and improve the means of processing them. We would forestall or ameliorate the pollution of streams, safeguard the soil against erosion, protect wildlife, and develop recreational areas.

Considered as a means of transition from war to peace, conservation unitized on a great scale, is especially timely, but I think that it is to be commended as well for other reasons. In the long view it is the most economic procedure. When we plan all phases of the job as one we foresee some of the frictions that might develop between one facility and another, and dispose of them in the planning stage. That is where alterations are cheapest. We discover others and correct them at the next cheapest point—early in our operations. By committing ourselves to the development of all of the resources of a region we preclude those conflicts that result from a commitment to half measures; conflicts, for example, between those who would profit and those who would suffer if we generated power for industry without providing against the pollution of the rivers. We reap another advantage in the tendency of each phase in a large-scale development to assist each other phase and to assure its success. A navigable river may join with power in attracting industries that need cheap transportation for raw materials and heavy output.

The advantage of reciprocal benefits among facilities was demonstrated, as on a prearranged proving ground, in the Pacific Northwest where the demands of war production—not our own independent planning—drew our numerous, large, and dissimilar developments into a close-knit unit. The primary need was for hydroelectric power to energize the region's war production plants. But plants needed more ores and deposits that were easy of access. They required water for processing and for municipal supply in the new communities that grew up around new industries. They required improved metallurgical processes and pilot plants and laboratories in which these processes might be proved. In response, we affirmed the presence of iron ores that were a thousand miles nearer than the usual supply, and, as nearby as Arkansas, we disclosed huge new additional deposits of bauxite for urgently needed aluminum which, otherwise, would have had to be shipped from Dutch New Guinea. In many other ways we responded to the region's needs by unitizing our facilities. We have been justified already by a magnificent record in war production in the Pacific Northwest, and we may be justified again by that region's readiness to seize any opportunity that peace may offer for continued functioning. It is ready precisely because its developments are a unit. The functioning of no facility would be delayed for lack of supporting facilities.

Other regions are equally in need of coordinated development of their natural resources. The hurried demands of war production merely dramatized the need in the Pacific Northwest. There are vast areas throughout all of the West in which great potentials would be realized by similar coordination. If we launched a program of full measure to make actualities of these potentials, we might require stronger implementation, but we would not have to strike out on new lines in the field of conservation. From its beginnings this Administration has proceeded in that direction. We have sought better coordination in the development of our resources, and we have assumed increasingly greater responsibility for the equitable distribution of the resulting benefits among the greatest possible number of persons.

You will recall that we requested the return of the Bureau of Mines to the Department to team with the Geological Survey, and that under your second and third Reorganization Plans we brought in the Bureau of Biological Survey and the Bureau of Fisheries, and consolidated them as the Fish and Wildlife Service, the better to unify our conservation program. We proceeded toward the same goal in establishing such new agencies as the petroleum Conservation Division, and in organizing centralized controls such as the Office of Land Utilization. We have consistently shaped our policies toward an equitable use of the natural resources. We have rejected the old conception of a dam

as principally an irrigation project which yields some incidental by-products. We plan each dam with the maximum development of all of its potentials in mind. We have discarded the policy of selling the power from our dams at the busbar and thereafter washing our hands of the deal. Instead we coordinate the production and the transmission of power, carrying electricity over our own transmission lines, and only to those distributors who agree to relay the benefits of large-scale development to the consumers. When we assumed the new function of improving the Federal Range under the Taylor Grazing Act we also provided for the equitable distribution of the resulting benefits by the regulation of grazing on the improved lands.

If we have not been able to unify our facilities at the rapid rate at which we have developed them throughout the emergencies of defense, and war, we have at least prepared for their later unification to the extent that such effort has been possible. We have carried power for war production by preference to points at which it is most likely to be used tomorrow for industrial production. We have established relationships with industry that will facilitate the employment of our metallurgical process and our studies in peacetime pursuits. By means of surveys we have amassed a great volume of data that will assist industry in picking up our hydroelectric power for use when war production ends.

We have also shaped our program to respond to the Nation's needs outside of the field of conservation, mainly by devising a large-scale work program to reemploy returning service men and demobilized war workers. But, in addition, we have sought to provide settlement opportunities in the West and in Alaska. We have carried on research that will give settlers a better chance than their predecessors to succeed on the public lands, and we have asked, or are preparing to ask, for specific legislation that will assure the successful settlement of Alaska where we are committed by circumstance to the most rapid development that has ever occurred there.

We have accumulated these vast assets at a minimum cost when it is considered that we return to the Government in cash receipts about 70 percent of the sums which are appropriated to us. We are tending toward an even greater return, and we have an excellent chance of achieving it if the Congress will appropriate for us relatively small sums with which to complete certain facilities that will earn revenues when they are finished and put to use.

A number of our developments that are well under way, and which represent an investment of about \$100,000,000, are not earning revenues now because we lack relatively small additional funds to pay for completing them. The money which the people have invested in these developments is lying idle when it might be paying dividends in both service and earnings.

Often the lack of a small appropriation to complete a large development does more than merely defer the earning power of an investment: it results in seriously diminishing the investment. To take a specific instance, we have expended about \$25,000,000 on the Marshall Ford Dam, but for lack of about \$126,000, which the House refused to appropriate, we are unable to safeguard the equipment and machinery of that project. The electrical equipment and some other facilities have been damaged by the condensation of moist air in the galleries of the dam, and other equipment and machinery is endangered.

Despite these crippling handicaps and others, our Bureaus have worked together as one department to clear a course for the future while meeting the exacting demands of the moment.

THE BUREAU OF RECLAMATION

Working within the Bureau of Reclamation we contributed mightily to the needs of both war and peace. We provided the power that started many critical shiploads of matériel from assembly lines toward battle fronts where those supplies spelled the difference between victory and defeat. Our service men and women have been better clothed and better fed as a result of foods and fibers that were grown on land which we irrigated. And many returning service men will find a well-planned reclamation program that will help them to reestablish themselves in civilian life—provided that funds and legislative authority are granted.

The framework for that post-war program was completed during this fiscal year. It consists of an inventory of more than 236 irrigation and multiple-purpose projects which can be constructed to create emergency employment and homes on self-sustaining irrigated farms for war veterans and others.

The Bureau carried forward the preparation of the inventory while greatly increasing the production of its 31 power plants on projects in 12 western States and while increasing the crops that were essential to the war program on the 4,000,000 acres which our irrigation systems serve. The outline was presented to the Senate Committee on Post-war Economic Policy and Planning which is seeking the means for a smooth transition from the economy of war to an economy of peace. While the program was prepared to assist in this transition the development of western land and water resources which it proposes would result in lasting benefits—new farms, new homes, new industries, and new cities.

The construction contemplated would provide employment equivalent to 1,250,000 men working for a year—44 percent of them at the site of construction, and 56 percent in the manufacture and transportation of equipment and supplies in every State in the Union. Ap-

proximately 135,000 new irrigated farms would be created and the livelihood of more than 150,000 additional families would be stabilized in regions in which a maximum crop production is uncertain because of a deficient water supply.

The new irrigation systems would serve 6,705,000 acres of new land and furnish supplemental water for an additional 9,364,000 acres of land, now without adequate irrigation supplies. The same reservoirs that would impound the storage water for this irrigation would make possible the addition of 1,765,000 kilowatts of power on existing or authorized projects and would make available 2,579,000 kilowatts of firm power capacity, on projects that are under investigation.

The inventory, surpassing in scope any other program that the Bureau has presented in its 42-year history, was prepared in recognition of the fact that approximately 3,000,000 returning service men, demobilized war workers and others in the West will seek employment. More than 260,000 of this number will be fitted by training and experience to undertake farming on irrigated land.

Furthermore, the program is well suited to meet the need for intensified reclamation in the West. In the 11 far-western States the population increased about 60 percent from 1920 to 1940, while the increase in irrigation has been less than 10 percent. The extension of irrigation, as outlined in the inventory, would increase the purchasing power of the West for products that are produced elsewhere by \$1,250,000,000 annually.

The construction cost of all of the projects in the program would be nearly \$3,000,000,000 on the basis of 1940 prices. An expenditure of \$793,000,000 would be required to complete the 40 projects that are authorized or under construction, so that work on them could be undertaken or intensified immediately. Most of the program consists of potential projects, many of which would require special legislation before construction could be undertaken. Substitutions may be made in the list as surveys of projects and basins are completed.

Approximately 170 irrigation and multiple-purpose projects, and 50 river basins and sub-basins, were under study during the year. Seventy-eight detailed field reports which involve construction that would cost \$547,000,000 are ready to put into effect.

The Bureau's peacetime planning for the orderly agricultural and industrial development of the West and for its accelerated wartime activity continued to bear fruit in the field of power and crop production. There were spectacular additions in our power installation in the fiscal years 1942 and 1943, but achievements during 1944 surpassed even the records of those years. More than 500,000 kilowatts of new power capacity—exceeding the total pre-war installation of the State of Nebraska—were added during the year, the greatest expansion of this kind by a single organization in a single year. Our total

installation of approximately 2,360,000 kilowatts exceeds Reclamation's pre-Pearl Harbor capacity by 1,330,000 kilowatts. The additions that the Bureau made during the war in the 11 far-western States constitute 84 percent of the expansion made in the area by all systems.

The power output matched the unparalleled increases in rated capacity. Approximately 14,500,000,000 kilowatt-hours of energy—a 52 percent increase over the preceding year—were produced. Nearly all of the new energy made available played a direct part in war production. The war industries in the Pacific Southwest were dependent for 50 percent of their power on Boulder, Parker, and other Reclamation installations. The world's largest magnesium plant used a fourth of Boulder's huge 6,333,000-kilowatt-hour output, and aluminum plants took a major portion of the power of Grand Coulee Dam in the Pacific Northwest.

Gross revenues from the sale of Reclamation power reached a new high of \$18,992,000, an increase of \$4,438,000 over the fiscal year 1943. These returns are highly significant to the Reclamation program. Power revenues will repay half of the investment in projects that were outlined at the beginning of the war.

Reclamation's contribution of food for war was increasingly impressive. Increases in 2 basic crops indicated the spirit in which the Bureau and the farmers on its 44 irrigation projects responded to the threat of a food shortage. Potato production in the calendar year of 1943 increased by 52 percent over 1942, and bean production increased by 23 percent.

The potato output was sufficient to provide a year's supply for 31,000,000 persons, and the bean yield to serve 30,000,000. Alfalfa production was also at an unprecedented high. This crop, fed to beef and dairy herds, would provide annual rations of milk for 4,800,000 persons and a yearly supply of beef for 5,500,000 persons.

The acreage in production, the total volume of crops, and the crop values also increased. A total of 4,055,329 acres was served a full or partial supply of water by Bureau systems. These lands produced 10,660,000 tons of food and forage crops, which were valued at \$388,670,969. Eighty-three percent of the area for which the Bureau was prepared to supply water was in cultivation.

Despite the continued restrictions on critical materials, and on manpower for irrigation construction, the Bureau made progress in bringing water to land on which agricultural production could be increased. Under the war food program, the War Production Board issued clearances that will bring under irrigation 243,657 acres of new land and will provide supplemental water to 1,022,125 acres that are handicapped by shortages in moisture. All authorizations were granted in

the fiscal year except for four projects on which work had previously been cleared.

The Reclamation service of providing municipal-industrial water also aided in the prosecution of the war. Supplemental supplies were served to important municipalities, in which the demand was increased by an influx of industrial workers, and to major war industries, including a \$200,000,000 steel plant near Provo, Utah, and the world's largest magnesium plant at Basic, Nev.

At the close of the year the Bureau had in operation, under construction, or authorized, 78 projects in 16 western States. In nearly all of this area rainfall is inadequate for sustained crop production and hydroelectric power is the main driving force in industry. The area that was served by the 52 Bureau projects that delivered water or produced power is populated by more than 5,000,000 persons.

DIVISION OF POWER

As we enlarged our hydroelectric installations and increased our flow of power, new complexities arose in the fields of operation and marketing. The increase in our own installation and production was, in itself, enormous; and on September 1, 1943, the power from the Grand River, Norfolk, and Denison dams was added to our own, bringing the total of more than 3,000,000 kilowatts of installed capacity.

Consequently, we assumed a heavier burden of work and responsibility in the Division of Power. Here we strove, in operating our system and in marketing our power, to prepare for transition to a peacetime economy while meeting the immediate interests of a Nation at war.

This Division organized the Southwestern Power Administration to operate the Grand River Dam and to market the power from the three dams that added their output to ours. This agency, created by authority of Executive order as a wartime measure, is now in full operation.

In the Division of Power as a whole our activities were especially directed toward the establishment of rate schedules and the negotiation of power sales contracts. The Division reviewed or participated in the establishment of a number of rate schedules and in the negotiation of various contracts for the sale of power by the Bonneville Power Administration, by the Southwestern Power Administration, and by the Bureau of Reclamation, and helped to establish rates for the sale of power from the Fort Peck Dam, which was turned over to the Bureau of Reclamation for marketing. Most of the contracts were negotiated on a war duration basis.

The Division also took an active part in determining the allocation of the costs of the Grand Coulee Dam as one step in the ultimate establishment of rates for the sale of Grand Coulee power. Closely allied

to the Coulee allocation are the studies, participated in by the Division, regarding the Central Valley project of California. These were undertaken to determine the best method and the rates at which benefits from the project will be made available to the people of California.

In anticipation of the time when the need of power for war will cease and industry can return to peacetime production, the Division has given considerable attention to the preparation of post-war plans and programs. It has participated in studies that concern the further development of the river resources of the Nation, and in this pursuit it has given much assistance to congressional committees and to individual members of Congress. Attention has been devoted to the problem of the conversion and disposition of Government-owned war plants, and to the establishment of peacetime industrial economies which would be based upon the liberal use of low-cost power. Discussions also have been initiated concerning the disposition of fuel-operated power plants that were constructed during the war for use of Military Establishments. The objective is the incorporation of these fuel plants into the facilities of Federally owned hydroelectric plants as a means of economically providing peaking power or standby power which must now be purchased. In the event that Congress passes legislation authorizing the delivery of power to the Secretary of the Interior for marketing from dams constructed by the United States Corps of Engineers, it is also anticipated that the Division will be called upon to undertake the organization of additional marketing units to dispose of such power.

THE BONNEVILLE POWER ADMINISTRATION

In the Bonneville Power Administration we have also worked toward the restoration of the Nation's industrial balance after the war. The wartime industrialization of the Pacific Northwest has contributed much toward this end. It is widely recognized both throughout this region and the Nation that these gains must be fostered in the interest of a sound economic posterity.

From its inception the Bonneville Power Administration's activities have been planned upon the fundamental idea of regional development. Through the war years, the acceleration of the Government's transmission grid construction program to serve war industries at the same time has provided, some years in advance of schedule, a potent tool for both reconstruction and regional development. In making available low-cost hydroelectric power to the people of the Pacific Northwest, the Bonneville Power Administration is earning both the confidence of the people of the region and a sound position of leadership in regional developmental programs.

Conscious of the responsibilities which attend such a position of leadership, and in order that the policies set forth by Congress in the Bonneville Act might be carried out to the fullest possible degree, the

Administration has established certain guiding principles or objectives in the interest of securing the greatest possible benefit from the resources of the region for the greatest number of people. Briefly, these objectives are as follows:

To make power a tool for true development.—The cheap and abundant electric power of the region must become the means for opening new opportunities for investment, enterprise, and employment—for agriculture, for new industries, for small business and for the home owner.

To provide larger quantities of power at lower rates, thereby increasing over-all consumption. The development of the resources of the region through the use of power as a public enterprise provides a vital ingredient for establishing a sound economic base for private enterprise.

To create new jobs in enduring projects for returned servicemen, demobilized war workers, and others. There will exist a readjustment problem for some 500,000 workers in the Pacific Northwest alone when the war is finished.

To add new wealth creating activities to the taxable wealth of the community. In the final analysis, the economically secure community is the very foundation for solvent national Government.

To establish a higher general standard of living.—With the distribution of abundant low-cost hydroelectric power throughout the region, living can become more enjoyable and work can be made easier for farm dwellers and city dwellers alike.

To insure the national investment in developmental projects of the region. The multiple benefits of the dams and the transmission system which the Federal Government has built—reclamation and irrigation of thousands of acres of formerly unused farm lands, widespread distribution and sale of facilities for bulk freight movement on our rivers—will provide full protection for the taxpayers and full payment of their investment, besides accomplishing the basic objectives of regional development and the enhancement of our national economic position.

As to the feasibility of proceeding toward the foregoing objectives, a recapitulation of the progress that the Bonneville Power Administration had made at the end of the fiscal year affords substantial demonstration:

Approximately 45 percent of all of the electric energy that was consumed in the five Pacific Northwest States of Oregon, Washington, Idaho, Montana, and Utah during the 12-month period ending June 30, 1944, was supplied by the two Federal power plants at Bonneville and Grand Coulee Dams.

During fiscal year 1944, the Bonneville Administration sold 8,741,106,000 kilowatt-hours of electric energy at a total cost to its customers

of \$20,893,363, or an average of 2.39 mills a kilowatt-hour. The rapid growth of the Bonneville Power Administration to its present position as one of the three largest power marketing agencies in the Nation is shown clearly by a comparison with fiscal year 1939 power sales, which totaled only 30,042,911 kilowatt-hours at a cost of \$49,835. The output of the Bonneville and Grand Coulee power plants is averaging between 25,000,000 and 30,000,000 kilowatt-hours a day, or approximately 10,000,000,000 kilowatt-hours a year.

During the 6 years beginning in the fiscal year 1939, when the first generators at Bonneville dam were placed in operation, the Bonneville Power Administration had sold 17,927,787,000 kilowatt-hours with revenues amounting to \$40,885,633. This record of service evidences not only a material contribution to the progress of the war but also a substantial participation in strengthening the industrial and economic base of the region.

THE SOUTHWESTERN POWER ADMINISTRATION

Our war and post-war policy has been further reflected in the work of the Southwestern Power Administration. Although conditions may change before we are able to foresee them, this Administration is designing a construction program to provide carrying capacity which will be essential to our post-war operations. Changes in the program may be necessary before it can be carried out. But the basic plan is being drawn in anticipation of a definite need.

Through the year this Administration provided adequate power and continuity of service at the lowest rates that were consistent with reasonable economic requirements. The average rate was 4.21 mills per kilowatt-hour, and, since approximately 95 percent of the power delivered went to war industries, this low rate has resulted in a decided saving to the tax payer. It has enabled industries to provide essential war needs more economically.

Power continued to flow to the great aluminum reduction plant near Lake Catherine, Ark. In this service to the aluminum plant this Administration continued to operate and maintain 200 miles of transmission lines, constructed and owned by the Ark-La Cooperative of the Rural Electrification Administration. Delivery of power was continued to the Oklahoma Ordnance Works for the manufacture of explosives and also to Camp Gruber, an Army cantonment near Braggs, Okla. The Administration furnished power, as we had previously, to municipalities and Rural Electrification Administration Cooperatives which, in turn, furnish it to war industries.

The Administration pursued its system-interconnection policy with private utilities which aided them in fulfilling their power commitments without service interruptions.

Construction progressed on the Grand River Dam project. A new field headquarters building was erected at a central point, reducing operation and maintenance requirements to a minimum. Considerable protective work was performed in the area below the Pensacola Dam and transmission and substation facilities were extended to accommodate increasing war loads. A transmission line was built to serve a new rubber plant and telemetering with load control was installed for the project itself and for interconnection with the Southwest Power Pool. Under Presidential authority the flood control pool elevation was raised 5 feet at a cost of approximately \$2,000,000.

BUREAU OF MINES

Industry could scarcely be expected to put to immediate post-war use the power which we have generated for war if it had to proceed with prewar materials and prewar knowledge. The sources of some metals would be too distant from the source of power for economic use. Many of the techniques for mass production of heavy equipment by electricity would be undeveloped, and other formidable barriers would stand between our newly developed power and industry's ability to use it. The work that we have done this year in the Bureau of Mines has broken down many such barriers.

We affirmed the presence of mineral deposits that are near our biggest projects and we developed metallurgical processes. We adapted known resources and methods to meet the peculiar emergency needs for certain mineral substances, and we extended the collection and economic analyses of mineral market data.

The information obtained in these endeavors will find wide future application in peacetime, and so will the results of our studies and of our searches for metals, to which I already have referred. But these aids to our transition period resulted mainly, of course, from our response to the demands of war.

The prodigious outpouring of war equipment from the United States to foreign shores—which was assembled in Britain on D-Day and in many remote places at other times—was an enterprise in which the Bureau of Mines may justly claim a share of credit.

In the basic munitions-making field of iron, steel, and ferro-alloys, the Bureau added millions of additional tons of iron ore as reserves, and found deposits of steel-toughening ferroalloys such as tungsten and chromium, and important reserves of fluorspar for the flux that was needed in blast and open-hearth furnaces. The steel industry called for high-quality coke of uniform grade, and coke-oven operators, with technical assistance from the Bureau, provided it. The industry needed vast quantities of scrap metal, and the Bureau not only conducted extensive surveys to assist in scrap procurement, but

its field men helped to find it at abandoned and active mines and mills throughout the country. In addition, extensive research was conducted on sponge iron as a possible substitute for steel scrap.

In the important province of nonferrous minerals, the Bureau's exploratory crews added to the Nation's recoverable mineral resources several million tons of lead-zinc and copper ores, and a year's supply of mercury and commercially exploitable quantities of pegmatite minerals, including strategic mica, beryl, lithium, and tantalum.

We explored workable deposits of corundum, optical calcite, kyanite, sillimanite, celestite, barite, and block talc as the need for these minerals became acute.

Further exploration for the ores of aluminum added substantial tonnages of bauxite, alunite, and aluminous clays to the country's reserves.

Through intensive research in its experiment stations, demonstration plants, and pilot plants, the Bureau developed processes for utilizing ores from deposits that it explored and from other domestic reserves. Advancements were made in the methods of producing vanadium, manganese, chromium, zinc, lead, aluminum, and the various pegmatites and nonmetallics from ores and materials which often were of low-grade and complex nature. Other achievements of the year included the development of a process for producing titanium, a strong, corrosion-resistant metal; a method for producing magnesia, nickel, chromite, and silica gel from olivine, an abundant material which had defied utilization; and a procedure for obtaining magnesium compounds from dolomite.

Thousands of ore samples were analyzed for prospectors, claim owners, and industries, and a consulting service was maintained to advise those concerned on the feasibility of exploiting doubtful deposits. Cooperative research was conducted with industry. When significant discoveries or advancements were made in any of the Bureau's many fields of experimental work, they were reported at once to war agencies and industries concerned with procurement and production.

As coal shortages became acute, the Bureau made technical advice available to industry on the problems of coal mining—preparation, procurement, storage, and combustion. Coal-mine and coke-oven operators particularly were aided in improving their products. Large sums of money were saved for the Army, Navy, and other Government agencies, by analyzing samples to guide them in awarding contracts for fuel. The Bureau also trained Army personnel in coal sampling at posts throughout the country, and tripled its boiler feed water analyses to protect Army camp boiler plants. A national fuel efficiency program was undertaken to combat waste in the commercial and industrial use of all types of fuel and heat energy.

With military requirements dipping deep into domestic petroleum reserves and discoveries of new oil fields declining, the Bureau mapped out a long-range program of research in the production of synthetic liquid fuels from coal, oil shale, and other materials. This will involve the construction and operation of demonstration plants to provide a blueprint for private industry. Meanwhile the Bureau continued laboratory-scale investigations of the various synthetic fuel-making processes and gained widespread attention as the war rationing of gasoline made American motorists conscious of motor-fuel shortages. One pilot plant for the complete gasification of sub-bituminous coal and lignite was designed, built, and successfully tested in 1944, and another was under construction.

The completion of three new helium plants increased the total to five, enabling the Bureau to meet every demand of the armed forces and to release large quantities of this lightweight, nonburning "miracle gas" to scientific, medical, and industrial consumers. The United States enjoys a world monopoly of helium, but the supply is not inexhaustible. However, an adequate reserve for the future is assured by the Bureau's conservation plan in which helium, extracted from natural gas going to the commercial fuel market, is returned to the original subterranean vaults for storage until it is needed. Official recognition of the Bureau's extraordinary achievements in helium production for war came in January 1944, when the Army-Navy "E" was awarded to the plants at Amarillo and Exell, Tex.

Charged with the seemingly paradoxical tasks of helping supply more oil for war and prolonging the life of the Nation's natural crude-oil deposits, the Bureau achieved both. Research disclosed new sources and improved the quality of ingredients that were needed to increase the production of high-octane fuel for war planes, toluene for explosives, and other petroleum products. At the same time, application of the modern engineering principles of secondary recovery extended the period in which the United States can depend upon petroleum reserves as its main source of liquid fuels. A number of surveys were made of oil field practices and reservoir components, and more than 40 engineering reports were submitted to the Petroleum Administration for War, operators, and others who were concerned with meeting the war needs for special lubricants, fuels, and chemicals.

Wartime shortages of labor and equipment, longer working hours, and the need for greater production called for increased emphasis on the Bureau's health and safety programs in the mineral industries. Safety experts trained thousands of workers in first aid and in mine-rescue and accident-prevention procedures. Approximately 3,000 coal mines in the United States and Alaska had been surveyed for safety conditions and practices, many for the second time, and Federal inspectors reported thousands of improvements that protect life and

property. The effect of these precautions was demonstrated as accident-frequency rates in reinspected operations declined about 6 per cent and as the industry's fatality rate reached the lowest point in coal-mining history. Achieved despite adverse conditions related to the war, these gains foretold greater attainments after victory. The opposition expressed by many operators to the legislation and the early phases of the coal mine inspection program turned to praise and wholehearted cooperation.

Cooperating with the Bureau's wartime plant-security programs, the mineral industries' record was not blemished by a single clear-cut case of sabotage. Under the Federal Explosives Act, the Bureau inspected stores of nonmilitary explosives and licensed the manufacturers, distributors, and users of nonmilitary explosives and their ingredients. The mineral production security program was so effective that it was curtailed after Bureau engineers, trained in the prevention of sabotage and of subversive activities, examined mines, mills, and smelters to suggest suitable precautions.

Thousands of chemical analyses and explosives control tests were made in the Bureau's laboratories, the majority of them for the Army and Navy. To promote safety in the manufacture and handling of explosive and inflammable materials, experiments were conducted to determine the characteristics of military pyrotechnics, explosives, powdered metals and plastics, coal dust, vapors, gases, and liquids. Gas masks and other respiratory devices were tested, and inspections were made to improve hygienic conditions in mines, plants, and some Army Establishments.

Increasing requests from war agencies and industries for factual reports on minerals to guide their programs resulted in a further step-up in the Bureau's statistical services which already had been operating at high speed. The Bureau compiled up-to-date information on such subjects as domestic and foreign production, consumption, requirements, trade, uses, and stocks of mineral commodities. Many special studies were undertaken for the War and Navy Departments, War Production Board, Solid Fuels Administration for War, and Petroleum Administration for War, and many more will be required in the solution of national and international post-war problems.

THE GEOLOGICAL SURVEY

The Geological Survey prepared plans within the fiscal year for two related but distinct programs—one for the investigations and mapping that it should promptly undertake to provide the fundamental information required by the agencies that are now laying out plans for post-war construction and development projects, and the other for the long-range investigative and mapping program that it should undertake after peace returns.

The Geologic Branch has continued to devote itself very largely to studying deposits of minerals and ores that are needed in war, and to estimating the reserves and grades of these materials. Many thousands of deposits have now been examined, and the information obtained constitutes an inventory of the Nation's reserves of metals and minerals which is essential to peacetime industry as well as to the conduct of the war. A number of minerals at first considered critical in the war program are now known to be adequate in quantity, at least for the present, but the accelerated use of minerals to meet the war demands has resulted in a serious depletion of the reserves of many of the more common metals. A wise policy, therefore, demands that the national inventory of mineral reserves be intensified and kept current as new deposits are discovered and older ones become exhausted.

Among the outstanding war projects carried on by the Alaskan Branch was the continued compilation of aeronautical maps and charts for the Army air forces. The method of compilation from air photographs was largely devised by civilian members of its staff. By this trimetrogen method, so named from the camera lenses used, the Survey has furnished planimetric maps covering about 5,300,000 square miles of strategic area widely distributed throughout the world. The Branch has also prepared reconnaissance topographic maps of selected areas totaling more than 500,000 square miles.

Another important project has been the attempt to unify many of the activities concerned with the search for or development of Alaskan oil resources. Although these negotiations are still in progress, the Alaskan Branch has made a start on carrying out its part of such a program by sending five parties into the field to conduct such preliminary work as can be done within the limits of its regular appropriations.

Adequate topographic maps showing woodland coverage and highway facilities are a necessity in the successful waging of any war. The Topographic Branch has bent every effort to the making of such maps of vast areas of strategic importance within the United States and also in Europe and other theaters of war. Special topographic maps were made for Army maneuvers; for the investigation of critical minerals which are indispensable to successful military operations; for coal explorations; and for river utilization and flood control. Of great importance for the defense of our island possessions was the completion of the topographic mapping of Puerto Rico and Vieques.

The importance of water to both war and post-war activities has been emphasized by more than 5,000 requests made of the Geological Survey within the year for special reports on water in relation to problems that have arisen in the construction and operation of military, naval, and industrial establishments and in post-war planning.

These problems have involved the quantity and quality of the surface and ground water that was available or could be made available for use at hundreds of different sites in every State and in the Territories of Alaska and Hawaii. This important public service by the Water Resources Branch has been possible because of its mass of published and unpublished information which has been collected regularly for many years and supplemented by numerous special field investigations. The staff is decentralized, and it operates from about 100 field headquarters. Much of the work was done in cooperation with Federal, State, and municipal officials, who have aided materially in the solving of special problems. Water experts of the Survey have continued to serve with the armed forces, either as officers or civilians, in obtaining water for the Armies in the field.

The Conservation Branch has two principal functions. The first is to make surveys and investigations of the water and mineral resources of the public domain and to apply the results to public-land administration. The second is to supervise operations for the development of power and the production of minerals, including oil, gas, coal, potash, sodium, lead, and zinc, from public lands, Indian lands, and naval petroleum reserves. Additional funds, made available to the Conservation Branch during the year, provided extra assistance and equipment necessary for initiating war-related field investigations and the preparation of reports dealing with power and fuels and with minerals essential to the national war program. This activity, if maintained on the present scale, will reveal new reserves of such resources and will provide engineering information that is essential to the elimination of waste.

THE SOLIDS FUEL ADMINISTRATION FOR WAR

Our work in the Solid Fuels Administration for War helped to strengthen the coal industry for this emergency, but no legislation has been designed specifically to help us to stabilize the industry after victory.

We so regulated the distribution of coal that war industries, first of all, might receive their necessary supplies, and, after them, other consumers were taken care of according to their relative needs. This helped to stabilize war manufacture in coal-burning plants, and to facilitate the operations of railroads and public utilities.

By establishing relative needs for other than production use, and by regulating distribution accordingly, we forestalled widespread suffering among householders.

The distribution of coal was so arranged that we developed and put into effect over-all distribution programs which fully related the anticipated supply to estimated requirements, and the programs were

designed to assure an equitable distribution of all of the coal which can be produced under present conditions.

We helped to maintain maximum production at the mines, striving to retain mine manpower and to increase working hours and the number of days of work in the pits. We helped to furnish additional machinery and equipment and in the development and extension of mines.

All of these measures were carried out with the cooperation of the coal industry and of coal consumers.

The SFAW encountered a coal supply crisis only a few days after its establishment, when the first in a series of widespread mine strikes occurred. These strikes cost an estimated 40,000,000 tons of potential production in 1943. Thereafter, through 1943 and into early 1944, we dealt with a series of major and minor crises caused by coal shortages. While meeting the demands of the day, we enlarged the SFAW staff, formed advisory committees of experienced leaders of the coal industry, and began the development of long-range plans to avert further difficulties.

The programs that are now in effect cover coal distribution from the mine to the industrial plant and to the household consumer, and take into account differences in grades, kinds, and sizes of coal and the varying requirements of consumers. These programs will continue, subject to any modifications which changes in the coal supply may dictate, until March 31, 1945. Then they may be extended if necessary. They allocate scarce hard and soft coals among users in accordance with their needs and essentiality, encourage the use of alternative coals, where available, and spread the supply by limiting the amounts of the scarce coals that domestic consumers may receive. This will necessitate the extensive use of alternative fuels by such consumers and the practice of rigid conservation.

The SFAW was given the added responsibility during the year of distributing equitably the limited supply of coke available for domestic consumption.

A Nation-wide network of industry committees has been established to keep the SFAW informed of conditions in retail distribution and supply in order to avert local emergencies. If unavoidable crises occur, the committees will function to pool the resources of their communities, thus mitigating the distress of individual consumers.

The major production problem has been a growing shortage of manpower in the mines. This has placed a definite limit upon the productive capacity of the Nation's mines. Operators and miners have performed a difficult task in producing coal in spite of handicaps.

Much of the increased production has been in the strip-mined coal from temporary operations, and in low-grade coals which are suitable only for certain industrial uses. However, industrial consumers who are able to utilize these coals have been required to accept them so far

as possible, thus freeing the scarcer coals for use by industries which cannot shift, and for the use of domestic consumers.

Consumption of coal, in view of the production losses during the strikes and the impossibility of increasing production because of manpower shortages, would have been severely curtailed in the fiscal year except for the millions of tons of bituminous coal in consumer storage piles. This supply was accumulated in 1941 and 1942 against apparent emergencies. By compelling users with adequate stocks to draw upon them for part of their current consumption, the SFAW freed large tonnages of newly mined coal for the use of industries with insufficient stock piles and for distribution by retail dealers.

With the production lag in some coals that are most essential to industry and to domestic users, it is evident that the Nation's coal problems are not solved. Nevertheless, a smooth-functioning mechanism now exists to lessen the impact of difficulties and to facilitate the flow of coal for essential uses.

THE COAL MINES ADMINISTRATION

As a result of our work in the Coal Mines Administration the strike-bound coal industry was brought back to full production without our resorting to force. Before the end of the year we were able to return to private possession and control all except two of the Nation's anthracite and bituminous coal mines of which we took possession under your orders when the industry was paralyzed by strikes.

By the time the mines were returned, harmony had been restored between management and labor, firm wage contracts were in effect, bituminous coal production had increased to the largest volume it has ever reached, and anthracite output was at its wartime peak.

Under a Government-mine-workers' contract, which provided for no increase in the basic rate of pay specified in the miners' pre-war contracts with the operators, but which called for substantially increased working time, the men improved their efforts to augment coal output.

This contract served as the model for the operators and miners who, as a result of our intercession, were brought together by mutually acceptable wage contracts within the terms of the national stabilization program.

For years the industry has failed to operate in the absence of a contract between its owners and employees. As rapidly as the new industry contracts were effectuated, we began to return the mines to their private owners, and by June 21, 1944, all of the mining properties had been returned, except the two mines of one bituminous coal company which was engaged in a legal test of the portal-to-portal compensation which was provided for under the industry-mine-workers' agreement.

The Government first took possession of the mines on May 1, 1943. All of the mines that were involved were returned to their owners by

October 12, 1943. On November 1, 1943, possession was taken for the second time.

During the 13 months that the mines were in the possession of the Government, production per man was the highest on record, and the mine fatality rate from November 1943 through May 1944, was the lowest for any comparable period in our mining industry.

We organized the Coal Mines Administration early in July 1943, to administer Government possession of the mines. Its personnel was kept at a minimum by utilizing, in large measure, the trained workers in existing Bureaus of the Department of the Interior. The Coal Mines Administration, having done its work, is now being liquidated.

THE GENERAL LAND OFFICE

In the General Land Office we have worked as hard to fit ourselves for the best post-war land administration as we have worked to make our great contributions to the war program.

One of our big post-war jobs will be the administration of a carefully developed system of stabilized-land settlement in Alaska. Settlement in the Territory has a strong appeal, particularly to those vigorous and adventurous citizens who seek the opportunity to pioneer. We must do our utmost to foster that undertaking, for through such a spirit America has grown great. It is equally essential that the disastrous ghost-town experiences of earlier settler days on the mainland be avoided in the development of Alaska. Plans already laid by the General Land Office for the attainment of that objective can be facilitated by congressional authority to extend to Alaska the requirement that public land, before disposal, must be classified as suited to the use for which it is sought.

Land settlement in the United States by returned service men constitutes another high priority problem. We could assist greatly in its solution by the establishment and maintenance of an inventory of all Federal lands, in order that a fresh determination may be made of the locations of the comparatively few tracts on the public domain which may still be suitable for homesteading.

Increasingly mechanized armies require greater amounts of minerals for war and call for the highest degree of efficacy in our national mineral economy. But we cannot achieve that efficiency without a rejuvenation of our Federal mining laws. Vast areas of public lands, and lands acquired under many Federal laws, constitute a storehouse of essential minerals, yet, under present statutes, no method exists by which the United States may catalog and, in cooperation with private initiative, develop the resources on those lands through leases based on sound principles of conservation. Legislation that would provide for the marshalling our full complement of mineral resources is a necessary adjunct to adequate stockpiling.

The soundness of this Administration's conservation policies was clearly demonstrated by the accomplishments of the General Land Office in the administration of the public domain during the past fiscal period. Although a full realization of the program for maximum benefits to the people from the use of natural resources, particularly minerals, was blocked by opposition to a much-needed revision of the Federal mining laws, there were other distinct gains registered during the year. For example, operations for the 12-month period were featured by the highest bid ever received by the Government for the privilege of drilling for oil on a single acre of Federal land, when \$26,216.21 per acre were offered as a bonus for leased land in the Elk Basin field in Wyoming. Moreover, the cash receipts from the activities of the office were the largest in 20 years, exceeding expenditures for its maintenance at a ratio of \$6.18 to \$1, and producing a total cash return of more than \$14,000,000.

In addition to furnishing minerals for war through the administration of the mining and mineral leasing laws, the office made a greater aggregate contribution of public land and resources for war uses than ever before. More than 15,400,000 acres of the public domain have been made available for training areas, target ranges, and other military uses during the emergency period, and approximately 70,000,000 other acres were set aside to permit the exploration and development of minerals for war. Timber for war uses was furnished from the re-vested Oregon and California railroad grant lands under its jurisdiction. Stability for industries and communities in that region will result from the wider establishment, contemplated for the near future, of economic units for sustained yield forestry operations.

THE OFFICE OF LAND UTILIZATION

In the Office of Land Utilization we placed special emphasis on plans for extending our land conservation and development programs after the war to furnish interim employment, if needed, during the demobilization and reconversion period.

A major forward step in administrative management was taken by the establishment of a Water Resources Committee in the Office of the Secretary, to assemble and disseminate essential information concerning water-development programs involving the Department; to review water-development projects proposed by the bureaus and offices of the Department; and to formulate such recommendations as will assure an all-inclusive departmental water conservation policy.

Although continuing to operate on reduced wartime budgets, the land-conservation programs which are coordinated by this office made satisfactory progress in the protection of resources and of strategic facilities on the public domain during the fiscal year. Forest and range fires were held to low levels. Excellent cooperation on the part

of range users increased the effectiveness of soil and moisture operations. The 11 conscientious objectors' camps operated by the Department continued to give first priority to conservation programs, including fire, insect, and disease control.

THE GRAZING SERVICE

Our post-war plans in the Grazing Service provide for the employment, on a 3-year basis, of 31,000 men on 60,000 projects of 16 major types, including soil, water, and forage improvements, in 200 western counties. This work would aid in the restoration and better use of the Federal range, and would condition these long-neglected lands to contribute their fair share to the local and national economy. Such projects would increase production on the range, and would protect the water and the soil on the public and other lands.

Although primarily concerned with the administration, protection, and development of the grazing and related resources on the 142,000,000 acres of Federal range in the 60 grazing districts in 10 western States, the work of the Grazing Service during the year just closed included many other activities relating to the war and after-war period.

The Grazing Service made available 14,428,919 acres of public land for maneuvers, precision bombing, gunnery ranges, training camps, airfields, and other military purposes. Grazing privileges were issued to 22,562 livestock producers for 10,694,305 head of livestock. Alternating military and grazing uses in large areas enabled range lands to serve two war uses.

Extensive range improvements were postponed to conserve man power and materials. Access roads of 788 miles were constructed, making a total of 1,570 miles in 2 years to tap 20 types of critical materials in 8 States.

THE FISH AND WILDLIFE SERVICE

Changes in administrative objectives and procedures necessitated by wartime economy surely will carry over into our post-war activities in the Fish and Wildlife Service. It has been necessary, for instance, to give rather close attention to labor problems in the fishery industries. As a result of the benefits obtained, it is planned to establish a labor unit, the operations of which will contribute to the solution of post-war problems in employment and social security.

Methods have changed through an increased adoption of scientific management principles in fish production, whether in the farm ponds that are now being built by the thousands, in the lakes and streams providing important recreational angling, or in the bays and seas which are the source of the greatest commercial yield of fishery products.

A 3-year development program in fish and wildlife conservation is ready to be put into action whenever required. This program will provide employment for thousands of persons and will benefit numerous industries which manufacture the supplies that will be needed.

A record take of fur seals brought returns expected to exceed \$4,500,000, and economic uses of the wildlife refuges yielded an income of \$244,700.

The Fish and Wildlife Service has put boats and buildings to war use, its refuge lands are used on a vast scale for military training and for actual fighting bases, and its personnel cooperates in observing enemy submarines and in guarding against sabotage and subversion.

THE OFFICE OF COORDINATOR OF FISHERIES

We have brought about the accomplishment, to an encouraging degree, of the primary tasks which we undertook in the Office of the Coordinator of Fisheries. This applies to the Nation's war and post-war needs.

With the demand for fishery products greatly increased by the war program, the most essential need was to halt the decline in production which set in early in 1942, and, if possible, to restore the yield to the pre-war level. Through the unceasing and closely coordinated efforts of industry and Government, this aim is now being accomplished. The total yield of fishery products in 1943 was slightly more than 4,000,000,000 pounds, a substantial increase over the 3,700,000,000 pounds landed in 1942, and approximately equivalent to the catch in 1940. While the yield in 1944 cannot be foreseen with accuracy at this point—June 30, 1944—the upward trend appears to be continuing and a total production of approximately 4,300,000,000 pounds is anticipated.

The restoration to the fishing industry of the greater part of its machinery of production is largely responsible for this improvement.

The requisitioning of 700 of the finest fishing boats for the Army and Navy caused a loss in productive capacity amounting to 50 percent or even more in certain fisheries. Restoration of the depleted fleet is proceeding rapidly. Total returns of requisitioned craft now amount to approximately 40 percent of those originally taken; while authorizations for the construction of new vessels totaled 1,010 by June 30. Of these, 661 were scheduled for completion by the middle of 1944. When construction of the authorized craft has been completed the fishing fleet will have regained its full strength and will consist of a larger proportion of new vessels than ever before. Similarly, the situation with respect to the repair and maintenance of vessels and shore plants shows further improvement over last year, while the gear situation is generally satisfactory.

Not all of the wartime problems of the fishing industry have been solved. There are not enough men to operate the vessels, the shortage of captains, mates, and other skilled personnel being especially serious. Labor is critically scarce in many processing plants. Operating programs administered by the coordinator's office are still required in the salmon and pilchard fisheries to obtain the maximum production and the most efficient utilization of the catch. Difficulties of refrigerating, storing, and transporting the products of the fisheries have not yet been satisfactorily resolved.

One of the most significant and gratifying facts, however, is the sound condition of the fishery resource. Because the precepts of wise conservation have been followed even while attempts were being made to increase production, many important commercial species are actually showing signs of an increase in abundance. Instead of being impaired by the heavy demands of war, the fisheries will be in excellent condition for post-war development.

THE NATIONAL PARK SERVICE

In the National Park Service we have contributed toward the Nation's post-war future by holding intact those priceless remnants of the American scene entrusted to our guardianship. Despite the issuance of more than 1,000 authorizations to war agencies for the use of park lands and facilities, there has been but little impairment of park features. They would have been impaired if we had yielded to organized group pressures, without questioning the alleged critical necessity for invading the parks, or if we had not helped to explore alternative courses of action, when the use of resources in the parks was proposed. Credit is due to the representatives of war agencies, military and otherwise, who have realized the value to the Nation of preserving the national parks unimpaired.

The National Park Service during the past year has been subjected to some unwarranted and unjust criticisms by interests that have seen in the war an opportunity to utilize, for their own gain, certain natural resources hitherto denied them because of well-established park policies. These resources include representative areas of virgin forest, the forage available for cattle and sheep in the meadows, water resources, and minerals. Although these do not bulk large in the total economic life of the Nation—the acreage of the Park System is only three-fourths of 1 percent of the land area of the United States—groups that stand to gain thereby have tried to reopen old issues as to exploitation of the parks under the pretext of war needs. These interests represent small, but vociferous, minorities.

Despite a country-wide campaign of misrepresentation, against designating the Jackson Hole as a national monument, I am convinced that the persons who have directed this campaign do not represent

public opinion nationally or in the region concerned. There recently was published in the *Congressional Record*, by the chairman of the Public Lands Committee of the House of Representatives, a petition signed by more than 100 leading citizens and business people of the Jackson Hole region, asking that this area, rich in scenery, wildlife, and historical interest, be preserved for park and recreational purposes, rather than allow it to go the way of unplanned exploitation.

Although we have stood ready to sacrifice the park spruce for Army aircraft construction, if absolutely necessary, the need was met without destroying the magnificent "rain forests" of Olympic National Park in the State of Washington. It has not been necessary, either, to open the national parks of California to cattle grazing. The situation that confronted the cattle industry in the State during the drought was serious, but the use of the meadows and uplands of the parks in the Sierra Nevada for grazing would have accommodated fewer than one-half of 1 percent of California's approximately 1,400,000 beef cattle, and that only for a brief period. This inconsiderable aid would have been out of proportion to the resultant damage to public properties.

Two important areas were added to the National Park System during the year—the 700,000-acre Big Bend National Park on the Rio Grande in Texas, through the donation of lands by that State, and the home of Franklin D. Roosevelt national historic site.

Since the attack on Pearl Harbor, 4,135,000 men and women in uniform have visited the national parks and allied areas, including scenes of important events in the Nation's history, and, as a result, they have the better appreciated the greatness of America.

THE OFFICE OF INDIAN AFFAIRS

The progress in the Office of Indian Affairs has been better than could have been expected considering the innumerable hampering restrictions that are placed upon our administrative procedures. Administration will be good, in my opinion, to the extent that a competent administrator is left free, within reasonable limits, to apply his energies and his funds as shifts of circumstance require. But the Indian Office is restricted to an uncommon degree in its activities and in the exercise of the Commissioner's judgment by means of limitations which are written into its appropriation bill.

The budget for this office is broken down into about 200 separate appropriations, each hedged with limitations—so much for salary to an Indian school superintendent, for instance, so much for his assistant, so much for drayage, so much for repairs, etc., and no matter how little money may be needed for these items nor how much may be required for a purpose that was unforeseeable when the budget was submitted, funds may not be used to defray any expenses for which they were not specifically appropriated. There is a specific appro-

priation for each of our many Indian boarding schools and while unforeseeable circumstances may cut the cost of conducting one of these and increase the cost of conducting another, still we are prohibited by legislation from diverting more than 10 percent of an appropriation from one school to another.

Some of the restrictions strike at the very base of our fundamental policies—for example, bills to issue patents in fee and to remove all restrictions on the sale of specific tracts of Indian lands. The enactment of such measures has the effect of removing our authority to protect the Indians' interests in the sale of their lands. Such bills are introduced ordinarily after the Office of Indian Affairs has determined that a proposed sale would not be in the best interest of an Indian who proposes to sell. More than 20 such bills were introduced before the Seventy-eighth Congress. Despite such limitations and restrictions the Office of Indian Affairs has accomplished much during the fiscal year.

Indians, in cooperation with field employees of the Office of Indian Affairs, began work on proposals for post-war programs to meet the needs of various reservations. Sixty-four detailed proposals, dealing with the problems of 120 tribes, have been submitted, and these are now being carefully analyzed. When approved in their final forms they will point the way to economic self-sufficiency and integration with the national life.

Increased interest in education on the part of Indians was in evidence, and a number of tribal councils passed compulsory education ordinances and enforced others that had been neglected. Indian communities have taken an active part in planning school programs and many throughout the country have requested that Indian Service schools be equipped for the training of home-coming soldiers who may wish to take advantage of the opportunities that are offered by the Servicemen's Readjustment Act. Plans are being made to meet these requests.

The contribution of Indians to the prosecution of the war has been most remarkable. On the first of April, 21,756 had joined the armed forces and were serving with conspicuous gallantry on all fronts. Indians have won all decorations, including the Congressional Medal of Honor and the Croix de Guerre.

Approximately 15,000 Indians are regularly employed in war industries, and in addition, 10,000 men, women, and children have left their homes for varying periods to work on farms and ranches.

Notwithstanding the great exodus from reservations, the total value of all Indian agricultural products last year was more than \$19,000,000, nearly \$2,000,000 more than in the fiscal year 1943. The production of food by the Indian schools was 50 percent greater than in the previous year. Fifty-eight thousand gallons of fruits and vegetables were

canned and 10 tons were dehydrated. In addition, 17,000 tons of stock feed were raised.

At the end of the year Indians owned 1,500,000 head of livestock—90,000 more than they owned in the fiscal year 1943.

It is estimated that war bond sales to Indians had reached a total of \$50,000,000 by the end of June.

The rebuilding of the Indian landed estate has continued, and approximately 700,000 acres were added within the United States proper. In Alaska, 6 new reservations, with a total of approximately 13,000 acres, were established, and proposals for 16 additional reserves, comprising nearly 4,000,000 acres, are under consideration.

The democratic approach to the solution of Indian problems has been emphasized during the year. On a number of reservations Indians have organized health councils for the purpose of combating communicable diseases, and these organizations are functioning with enthusiasm for the task. Further progress was made in solving the difficult problems of fractionated land ownership through inheritance. The Rosebud Tribal Land Enterprise is the latest organization to attack the problem.

Indian arts and crafts have not languished, despite the fact that many young craftsmen have left home. In many cases there has been an increase in production and sales, owing to the sponsorship of cooperative producing and distributing centers. Plans have been made for an expansion of craft activities after the war.

THE DIVISION OF TERRITORIES AND ISLAND POSSESSIONS

In the Division of Territories and Island Possessions we have been occupied with the economic and social adjustments in our offshore areas which are becoming more pressing as the end of the war approaches.

The key positions held by Alaska, Hawaii, and Puerto Rico in international travel and as way stations between the world's greatest production centers and the world's greatest markets have brought them into sharp focus and emphasized the urgency for preparing them for their post-war roles.

Owing to progressive reductions in its appropriations for personnel, however, the Division has been seriously hampered in trying to perform its duties effectively. If the Department is to be charged with responsibility for the territories we must be provided with funds that will be adequate for the purpose.

The importance of Alaska is universally recognized. Hundreds of letters from service men, indicating their interest in establishing themselves in Alaska after the war, have dramatized the need for a

well-integrated program of settlement. The Territory remained a "combat area" throughout the year, although the last Japanese were ejected last summer. Health and welfare problems that have been aggravated by war conditions continued to be serious. The Division has worked and will continue to work closely with other bureaus and Departments on these problems and on development programs for the Territory.

The Alaska Railroad for the second successive year has exceeded all previous records in its volume of freight and in passenger traffic. The manpower shortage has presented an acute problem, but despite this handicap, the railroad has continued its improvement program. To meet wartime demands much additional equipment and rolling stock were purchased, most of which was second-hand, due to immediate necessity which would not permit delays incident to the securing of new equipment.

The relaxation of military rule in Hawaii has been an important factor in relieving tension. Many conferences were held with the War Department looking to the termination of martial law, while maintaining such restrictions on civilian activities as may be necessary in view of the importance of Hawaii as an offensive base. Civilian shipping requirements, housing, and public health have had the attention of the Division.

Political advances in territorial areas should keep pace with the aspirations of the territorial people and with their skill in political self-management. During the past year, the concerted desire of the people of Puerto Rico for greater home-rule, expressed there by groups of every political shade, found response in your declaration that the Organic Act of Puerto Rico should be revised so that it would include the right of the people to elect their own governor, and in your appointment of four able and distinguished Puerto Ricans and four continentals, of whom I had the honor to be one, to draft recommendations for such action. The people of the island have the skill and ability to manage their local affairs. I believe that the enactment into law of the recommendations made by the advisory committee which you appointed would give substance to this Nation's declared policies, and that the Puerto Rican people would use this law to strengthen democratic self-government.

At the same time there has been in the island an upsurge of hope and an energetic striving among these people to cure the severe economic dislocations. Some parts of the program which they are executing may not work. They may find it necessary to discard certain features. This must certainly be a period of trial and error, but I believe that there will develop a measure of economic improvement which will at least give the masses of people some hope of a better standard of living.

Steady progress is being made by the Government of Puerto Rico in the introduction of new industries to supplement the island's agricultural economy.

The shipping situation has continued to improve so that food supplies, which reached a desperate state of depletion both in Puerto Rico and the Virgin Islands during the German submarine campaign, are now ample. Through the coordinated efforts of the Division of Territories of this Department, the Office of Distribution and the War Shipping Administration, distribution of the necessities of life throughout the island at stabilized prices has been maintained. It has been possible to return the responsibility for supplying all except a few basic articles to former importers, and it is hoped that the Government may soon be able to withdraw entirely.

An increase of approximately 178 percent in income taxes in the Virgin Islands materially improved the condition of the municipalities' treasuries. The Selective Service and Training Act of 1940 was applied for the first time to the Virgin Islands, and at the close of the fiscal year there were 3,660 registrants between the ages of 18 and 44 in St. Thomas and St. Croix. The Islands were handicapped by the elimination of the Federal appropriation for the position of Government Secretary. This, combined with the frequent absences of the Governor, whose duties by law devolve upon the Government Secretary, threw a very heavy burden on the small administrative staff.

In conformity with your letter of instructions of September 16, 1942, the Department has been engaged in an intensive study of the problems with which we will be faced in the Philippines after reoccupation. There is every reason to look forward to driving the enemy out of the Islands in the not too distant future, and when that time comes the loyalty of the great mass of people encourages the hope that a sound solution of their difficult problem will be found.

THE WAR RELOCATION AUTHORITY

On February 16, 1943, the War Relocation Authority was transferred to the Department of the Interior. This agency was created to assume responsibility for 110,000 persons of Japanese ancestry who had been evacuated from the West coast in the spring of 1942, and to resolve other difficulties that resulted from evacuating the Japanese from the coast.

Two major accomplishments have resulted from our work in this agency. We have segregated from the principal population of the relocation centers those persons who have declared a preference for the Japanese way of life, or who are not considered suitable for resettlement in outside communities. And we have developed an effective

program for returning the loyal and law-abiding majority of evacuees to the mainstream of American life.

At the close of the fiscal year, 18,672 persons who are not suitable for resettlement were residing in the Tule Lake segregation center in northern California. Segregation, however, had not proved satisfactory as a permanent measure. Among the segregants were approximately 3,300 children under 17 years of age and an additional 1,800 persons who were placed in the center solely to avoid disrupting family units. Careful studies of the segregants indicate that only a few of them are disloyal to the United States. Many older people sought to be segregated simply because segregation seemed to offer them a haven for the duration of the war. Others went to the center in protest against the evacuation and the restrictions that were placed upon them. They interpreted these restrictions as evidence of unfair discrimination. It is extremely doubtful that deportation after the war will dispose of the Tule Lake problem.

The conversion of Tule Lake into a segregation center left nine centers populated principally by individuals and families that are eligible for relocation. At the end of the year the progress of relocation had enabled us to close one of them—the Jerome center in southeastern Arkansas. A total of 16,846 persons departed from the centers on indefinite leave during the 12-month period, making a grand total of 23,693 to that date. Mainly, they were younger people without family responsibilities, though an encouraging increase in the relocation of older people and family groups occurred toward the end of the year.

The relocation of those who remain in the centers becomes more difficult as the younger people leave. Every departure increases the percentage among the residue of evacuees who, because of age, infirmities, unfamiliarity with English, and indigency, are less amenable to rehabilitation in strange environments. Many evacuees have developed a reluctance to leave the comparative security of the centers for the uncertainties of life outside. This reluctance is hard to combat, but we are working constantly to overcome it.

The departure of the younger, more able-bodied evacuees also has augmented the difficulty of recruiting evacuee-workers to maintain essential services at the centers. No essential service has been allowed to lapse, however, and no phase of the relocation program has been abated to hold workers in the centers. The full force of the War Relocation Authority has been exerted to relocate the evacuees as rapidly as possible.

On June 9, the War Relocation Authority was assigned to take charge of an emergency shelter that was to be established at Fort Ontario, N. Y., for approximately 1,000 European war refugees. Plans to receive the refugees were under way at the end of the fiscal year.

THE SOLICITOR'S OFFICE

Through the concerted work of the Solicitor's Office and the legal divisions of the bureaus and offices under the supervision of the Solicitor, the attorneys of the Department have done much during the past year to advance the Department's post-war programs, to support the fighting of the war, and to protect and conserve the Nation's resources for their best long-term use.

Since most of the Department's post-war programs require legislative authority, the Solicitor's Office and the legal divisions of the interested bureaus proceeded to put these programs into legislative form. Some of the bills were enacted. The most important legislative proposals provided for the opening up of greater homestead and industrial opportunities to veterans and other persons in the territories and in the continental United States through reclamation and power developments. Another important bill, prepared in anticipation of post-war liquidation problems, provided for the administration of surplus Federally owned real property.

Toward the winning of the war the attorneys of the Department originated the legal mechanisms for the equitable and beneficial allocation of supplies of coal and other solid fuels and of fishery resources. They prepared the necessary documents for the operation of the coal mines and for the termination of Government possession, undertaking extensive research to protect the Government. They drafted regulations for the storing, handling, and transporting of explosives and their ingredients by civilians, and for the operation of relocation camps for citizens and aliens of Japanese ancestry and for other persons who had been removed from military areas. They reviewed leases, permits, and other agreements whereby agricultural, grazing, timber, and mineral resources of the Nation were made available for military uses or for the greater production of food and other necessities of war. They gave attention to the legal problems that were involved in the application, under martial law, of military orders to civilians in Hawaii, and engaged in numerous conferences on such problems with the War Department and the Department of Justice. They also drafted contracts for the operation of experimental metallurgic laboratories.

In the field of a long-term conservation of resources, the attorneys helped to prepare Public Law 273, establishing the principle of sustained-yield to forest management on Federal lands, and Public Law 106, strengthening the Alaska game and fish protection law. They protected title to certain public lands that were subjected to invalid claims and passed upon the title to new acquisitions of grazing, timber, and park lands. They maintained Indian property rights on the Pyramid Lake and Allegheny Reservations through successful litigation and undertook the protection of Indian lands in Alaska through the

study of Indian land claims. They also devoted increased energy to the protection of the civil rights of various groups toward which the Federal Government has assumed special responsibilities, notably the inhabitants of Hawaii, Puerto Rico, and other Territories and possessions, as well as Indians and evacuees of Japanese descent.

To stimulate the interest of the Department's attorneys in the opportunities of Government service and in the possibilities for improvement in standards of work, the Solicitor put into effect a strict application of the Department's advancement from within policy and undertook the establishment of an in-service training program.

CONCLUSION

From all of the foregoing I conclude that we have so far advanced conservation that nearly every individual on this continent may improve his lot if only we have the will to make our gains serve their logical purpose—the advancement of human welfare. The consolidation within a brief time of gains that have been long in the making, is not new in our history. Steam propulsion spent a century in the toy and novelty stage, then developed enough in a decade to reshuffle our industrial processes. Electricity followed the same course to the point at which it revolutionized domestic economy. So did automotive transportation. The advent of hydroelectricity, so developed that it can revolutionize heavy industry, and accompanied by equally developed supporting facilities, serves mainly to introduce a new generation to an historic occurrence.

There are some differences, of course. One difference appears especially important to me. All of the other great additions to the world's power have reached the world-changing stage under divided ownership. Public will, no matter how united, could not have demanded the prompt development and the equitable use of the potential power in steam or in the internal combustion engine. The development of potential power usually has been delayed while individuals have warred over who should profit when the development occurred. The consumers eventually financed such wars.

The final results of conservation that I have referred to as power—the product of our dams, our irrigation projects and other developments—is the first great accumulation of new energy that ever belonged to all of us. In that there is a huge advantage and a corresponding responsibility. The advantage is that we can put our new acquisition of power to work for all of us, and do it promptly. The responsibility is that we must do these things for ourselves.

Sincerely yours,

Harold L. Iches

Secretary of the Interior.

Bureau of Reclamation

HARRY W BASHORE, Commissioner¹



PREPARATION to safeguard the western economy in the critical postwar transition period was emphasized in activities of the Bureau of Reclamation in the fiscal year 1944.

Reclamation developments have greatly increased food and power production for war, but today the Bureau is making ready to enable the people to utilize western water and land resources in a great peacetime expansion. Plans call for completion of irrigation and multiple-purpose projects now authorized, involving costs of more than three-quarters of a billion dollars, and for construction of 236 potential projects. These were described in an inventory placed before the Senate Committee on Postwar Economic Policy and Planning on June 6, 1944.

This presentation emphasized the fact that authority for projects which would not be entirely self-liquidating would have to stem from Congress, and that funds also would have to be voted before detailed plans could be completed.

In anticipation of approaching industrial reconversion, the Bureau is getting ready for quick employment of hundreds of thousands of demobilized servicemen and civilian war workers. Equally important is the objective of permanent homes for veterans and others on irrigated farms in 17 Western States—homes which will assure large new markets for products of eastern as well as western farms, and for factories in all parts of the Nation—a true expansion of our western frontier.

Planning was carried forward simultaneously with Bureau activities to increase food production and hydroelectric output to drive the wheels of a war industry which sprang up with incredible rapid-

¹ Mr. Bashore took office as Commissioner of Reclamation on August 3, 1943, having been appointed by President Roosevelt. From May 27, 1939, until his appointment, he had been Assistant Commissioner of Reclamation. William E. Warne, formerly Chief of Information of the Bureau, was appointed Assistant Commissioner by the Secretary of the Interior on August 3, 1943, and entered on his duties on August 9.

ity to pour forth aluminum, airplanes, warships, ammunition, and which without this power would have limped. Throughout this planning, there was intense awareness of the difficulties all will face—but particularly the West—in making the adjustment to peace.

But as a result of this foresight, it will be possible to put to work demobilized men at project sites in the Western States almost as soon as peace comes, provided enabling legislation is passed; and the benefits will spread to industries and transportation systems in the other 31 States as soon as orders are placed for equipment and supplies that will be needed in the construction of the Bureau's projects and in the creation of farms that will be established upon them.

For the discharged men who are qualified by previous training and experience to undertake irrigated farming, 135,000 new farms ultimately would be made available. In the wake of the new development would rise new cities and towns, having a population equal to that of the rural areas. Markets and production centers throughout the Nation would be stimulated by the enlarged western purchasing power.

Toward the integration of western industry and agriculture, which must be developed together if the region is to reach full economic maturity, the multiple-purpose projects in the program would offer large blocks of new low-cost electric power. Revenues from the sale of the new energy would pay for a sizable portion of the project construction costs which have been estimated, on the basis of 1940 prices, at nearly 3 billion dollars.

Reclamation construction is ideal as a postwar undertaking because the volume and speed of the construction can be readily geared to the volume of employment and settlement needs. And what is doubly important, the development and utilization of unused water supplies for the production of hydroelectric power and expansion of irrigation will permanently enrich the West.

Continued study of the land and water resources of the West during times of peace and throughout the war, have made it possible for the Bureau to present its concrete postwar blueprint. From the beginning of the war, it has advanced, as rapidly as emergency conditions permitted, investigations of more than 200 individual projects, and of approximately 70 river basins and subbasins.

The Bureau made notable progress in advancing postwar plans during the year without relaxing its war activities in the fields of power and food production. Outstanding records were made in both.

Reclamation generators delivered nearly 14½ billion kilowatt-hours of electric power, about 52 percent more than in the preceding fiscal year. The increase since the fiscal year ending a few months before Pearl Harbor is 400 percent. More than 90 percent of the new energy made available during war was consumed by war industries—alu-

minum and magnesium plants, airplane factories, shipyards, and munitions plants. The 3-year increase in production was about five or six times the percentage of increase in aggregate production recorded over the same period by all plants in the United States.

The expansion in output resulted from a highly accelerated program of hydro power installations. During the war a million and a third kilowatts of new installed capacity were added—about half a million this year—to bring the Reclamation installation to about 2,360,000 kilowatts. The Bureau's war power contribution constitutes 84 percent of the total new capacity made available in the 11 Far Western States since 1941.

No less spectacular were the achievements of farmers on Bureau projects in production of vital war food crops. The more than 4 million acres served in 15 Western States during the calendar year of 1943 produced 52 percent more potatoes than in 1942 and 23 percent more beans. The expansion in these basic food crops is indicative of the manner in which Reclamation helped forestall threatening food shortages.

Throughout the fiscal year the Bureau, in recognition of the great need for increased agricultural production, sought to construct new facilities to bring under cultivation additional areas of arid and semi-arid lands and to provide supplemental water for farms on which crop production was being reduced by an inadequate supply of water. Since the fall of 1942, when the Bureau's ability to expand irrigation was limited by diversion of critical materials to other war uses, it has requested the War Production Board to clear many projects on which food production could be expanded. On June 30, 1944, this agency, on recommendation of the War Food Administration, had approved construction of projects on which irrigation service is being extended to 1,265,782 acres.

Another significant Reclamation wartime service was the provision of municipal and industrial water to major war plants and cities and towns which were important in war activity. Municipal areas of 3 million population, including Los Angeles, depend on Bureau projects for supplemental supplies.

PEACETIME CONSERVATION PAYS WAR DIVIDEND

The wartime benefits of Federal Reclamation are the result of 42 years of activity by the Bureau of Reclamation in the field of land and water conservation in the West.

Under the Reclamation Act of 1902, the Bureau has put into operation, or has under construction or authorized, in the 17 States west of or bisected by the 100th Meridian, 78 irrigation and multiple-purpose projects. Fifty-two of these are producing food supplies, electric

energy, and furnishing municipal-industrial water. On several operating projects important features remain to be completed. On 9 projects that have been authorized, work has been deferred because of the war.

In the area to which the Bureau's activities are confined the rainfall is inadequate to support agriculture, and conservation of water for irrigation is essential for the maintenance of civilization. The need for low-cost power for irrigation pumping, industries, and other uses has given added emphasis to the importance of double and triple use of limited water resources. The Reclamation developments also provide, in addition to benefits mentioned earlier, flood control, river regulation, repulsion of salt water encroachment and reduction of clogging silt deposits. They aid fish propagation, and create recreational areas and waterfowl and wildlife refuges.

Nearly 5 million persons live in areas in which Bureau of Reclamation systems are operated. About 3½ million persons benefit from power and domestic water, and 1,257,395 live on the 91,120 farms or in cities and towns on Federal irrigation projects. These developments support 338 towns, 1,207 schools, 1,514 churches, and 137 banks (with deposits totaling half a billion dollars) (see table 3). When the construction program now authorized is completed, the various Bureau services will be extended to areas in which reside more than 10 million persons.

The Federal investment in Reclamation developments at the end of the year totaled \$930,000,000. (See table 5, p. 34.) More than 95 percent of the cost is reimbursable under Reclamation law. The remaining 5 percent is allocated to flood control, aid to navigation, and non-reimbursable labor costs.

POSTWAR INVENTORY COMPLETED

Mindful of the Secretary's words—"in time of war we must prepare for peace"—the Bureau laid a sizable portion of the foundation for a stabilized peacetime western economy, warped out of proportion by the dislocations of war.

Near the end of the fiscal year, it completed for the Senate Committee on Postwar Economic Policy and Planning an inventory of irrigation and multiple-purpose projects in the West, which could be included in a postwar public works program to provide employment for discharged veterans and war workers, and make available to those who are qualified, livelihoods on irrigated farms.

In the program are 40 projects already authorized for construction, and about 200 under study. On many of the projects authorized, work is in progress to advance the Bureau's war food and war power programs. Construction on others has been halted or deferred because of the war.

Carried out in full, the contemplated program would furnish employment equivalent to 1¼ million men working 1 year, and create an estimated 135,000 new farms. In addition, it would bring greater security to 150,000 additional families, now handicapped by inadequate water supplies which do not permit maximum crop production.

The need for postwar employment and settlement opportunities was indicated to the Bureau in a report by labor experts, which stated that 14½ million persons will be demobilized from the armed forces and war plants. About 3 million of those who will face reemployment problems live in the 17 Western States, and, what is of prime importance to the irrigation program, some 265,000 of this number will be equipped by previous training and experience to undertake irrigated farming.

While the proposed construction would be centered in the western half of the country, 56 percent of the employment—the equivalent of 698,000 men working for a year—would be provided in the mines, mills, and factories of the Midwest, East, and South. The remaining 44 percent, or 553,000 men, would be employed at the sites of construction.

The effectiveness of the Reclamation construction as a shock absorber in the postwar reconversion is enhanced by the fact that it permits a "quick get-a-way". Provided with funds and manpower to complete field investigations and preconstruction work, the Bureau could put more than 300,000 men to work the first year. A peak employment of 400,000 could be reached in the second year.

From the long-term point of view, the inventory is an important milestone toward the expansion of western irrigated agriculture in which lies the basic hope of the region for increased growth and prosperity. The dry-land farming potentialities of the West are virtually exhausted, but water is available for the irrigation of 22 million additional acres of land, approximately the acreage now served. The projects in the inventory would extend irrigation service to a third of the new area—6,705,000 acres—and, in addition, furnish supplemental water for 9,364,000 acres now inadequately watered. Construction of irrigation features on authorized projects alone would create 70,000 new farms and overcome the water deficiency of 100,000 existing farms.

The growing need for added agricultural production in the West is known to all who have analyzed the western economy. The area is becoming increasingly deficient in crop production to meet its own requirements. Expansion in cultivated acreage has not kept pace with population increases. While the number of people living in the Far Western States has increased 60 percent from 1920 to 1940, the irrigated acreage has been expanded but 10 percent.

Integrated industrial and agricultural development is one of the basic prerequisites for orderly economic growth of the West. The same reservoirs which will serve irrigation could provide 1,765,000

kilowatts of new power for industrial use, if the Bureau increased its installations, and 2,579,000 kilowatts of firm power capacity on projects under study. Through revenues derived from the sale of this energy, projects not otherwise economically feasible, can be made sound.

The full development of the new farms and the new communities will increase the purchasing power of the West for products manufactured elsewhere by $1\frac{1}{4}$ billion dollars, at 1940 prices. The estimated construction cost of the projects in the inventory, on the basis of pre-war prices, is \$2,952,393,000. About \$793,000,000 would be required to construct irrigation features on projects already authorized. The construction of most of the 196 potential projects included in the list would require special legislation by Congress. The inventory may be changed as basin surveys are completed, with additional projects added or substitutions made for those now included.

WAR POWER EXPANSION SPECTACULAR

The greatest expansion of electric power generating facilities ever made by a single agency in a single year was the wartime record established by the Bureau of Reclamation in fiscal year 1944 to meet emergency industrial demands. More than half a million kilowatts of hydro power were added in 31 plants on Reclamation projects in 12 Western States. The increase surpassed by about 55,000 kilowatts the additions made during the previous fiscal year, and by about 100,000 kilowatts, the capacity added in fiscal year 1942.

The new facilities, whose output was almost wholly consumed by airplane factories, aluminum and magnesium plants, shipyards, and other industries that made fighting equipment, brings to nearly 1,400,000 kilowatts the capacity made available since July 1, 1941—a few months before Pearl Harbor. Additional installations proposed by the Bureau, aggregating 865,000 kilowatts, were halted by the War Production Board in the fall of 1942 to conserve critical materials for other war uses. The present Reclamation installation totals about 2,360,000 kilowatts. When all generators on existing projects and on those authorized are placed into operation the capacity will be 4,863,075 kilowatts.

The rapid enlargement of power facilities on Bureau projects was the result of farsighted construction, in time of peace, of multiple-purpose projects designed to meet current and potential industrial and agricultural requirements of the growing West. On these projects, stored water serves both irrigation and power generation.

The output of Reclamation generators paralleled the great gain in capacity. During the fiscal year the plants produced $14\frac{1}{2}$ billion kilowatt hours, highest on record. This was an increase of more than 50 percent over the preceding period.

The new power developments during the fiscal year were confined to three projects. Early in the year the Bureau began transmitting power from Fort Peck Dam (Montana), constructed by the War Department. At Grand Coulee, three of the world's largest hydroelectric generators, each rated at more than 100,000 kilowatts, were put into operation. At the end of the fiscal period, two units, each of 75,000-kilowatt capacity, began service at Shasta Dam of the Central Valley project (California).

The immense blocks of Reclamation power made available in the West, particularly on the Pacific coast, have made possible its record-breaking increase of industrial production. Energy from Boulder Dam supplies the great aircraft plants in the Los Angeles area, the largest magnesium plant in the world near Boulder City, Nev., and other basic war industries, while power produced at Grand Coulee serves a half dozen large aluminum plants, the biggest carbide plant west of the Mississippi, large shipyards, and many other plants.

Gross revenues from the sale of electric power produced in plants operated by the Bureau reached an all-time high during the year of 1944, \$18,992,000. This was a \$4,438,000 increase over fiscal year 1943. Production of power, while regarded as incidental to the Bureau's major function—irrigation of arid and semiarid land—is highly important as a source of revenue for reimbursing the United States for the cost of Reclamation construction. Power will repay half the investment of the Reclamation program as outlined at the beginning of the war.

Boulder Dam's gross revenues are the largest of all Bureau plants. In its 7 years of operation, this development has returned to the United States Treasury \$25,200,000 in net revenues, and in addition, has paid the states of Arizona and Nevada, \$4,200,000, and the Colorado River development fund, through which potential projects in the Colorado River Basin are investigated, \$3,500,000.

Preparations for the sale and transmission to war industries of the output of two 75,000-kilowatt generators at Shasta Dam of the Central Valley project (California), were completed during the year. In September 1943, a wartime contract, guaranteeing the United States an annual payment of \$2,775,000 after January 1, 1945, was made with the Pacific Gas & Electric Co. The 97-mile Government transmission line over which the energy will be delivered to company facilities at Oroville was completed in July 1944.

RECLAMATION FOOD PRODUCTION AT NEW HIGH

Like their sons on the fighting fronts, reclamation farmers, through record-breaking increases in vital crops, brought the Allies closer to victory during the calendar year of 1943.

Toward meeting emergency food requirements, they increased potato production to 64,044,814 bushels, 52 percent greater than the 1942 aggregate yield, and bean production to 4,175,797 bushels, an increase of 23 percent over the preceding year. The 3,507,723 tons of alfalfa produced, vital as a winter feed for beef and dairy herds, also was at a new high. These three critical war food crops were grown on 36.4 percent of the total acreage in cultivation.

The expansion was due both to the concentration of farmers on the more important war crops, and to the increases in irrigated acreage resulting from enlarged farm activity and from additional facilities provided by the Bureau under the war food program. The irrigated area was increased to 4,055,329 acres, highest on record. It is expected that the total 1944 agricultural production on Bureau developments will be brought to an even higher level than that attained in 1943.

From the day—soon after Pearl Harbor—when the Secretary of Agriculture called for “the greatest production in the history of American agriculture” the Bureau has been seeking to extend irrigation systems to bring additional acreages under cultivation and to supply areas suffering with water shortages with a supplemental supply.

The Bureau prepared several accelerated construction programs (see the annual report for fiscal year 1943), listing the projects on which new areas could be served promptly, the amount of critical materials required in the construction, the year crop production could be expected, and other pertinent factors. The detailed information was presented to the War Food Administration, which has the wartime function of evaluating the potential food yield against the amount of strategic materials required, and of recommending clearance of projects to the War Production Board.

The Bureau's activities resulted in approval being given to construct irrigation facilities on 25 projects, which are bringing under cultivation 243,657 acres of new land and providing a supplemental supply for 1,022,125 acres. All clearances were granted in this fiscal year except those for Friant Dam and Madera Canal of the Central Valley project (California), facilities on the Gila project (Arizona), to protect an air base from dust storms, and Scofield Dam (Utah), which would provide both flood control and irrigation service.

The projects cleared were:

State	Project	Acreage to be benefited	
		New lands	Supplemental water
<i>Regular Reclamation Projects</i>			
Arizona.....	Gila.....	8,500	
California.....	Coachella (All-American Canal).....	10,000	16,000
	Madera Canal (Central Valley).....	20,000	80,000
	Friant Dam (Central Valley).....		160,000
	Friant-Kern Canal ¹		
Colorado.....	Colorado-Big Thompson.....		320,000
Idaho.....	Anderson Ranch.....		340,000
Montana.....	Fort Shaw Drainage.....		600
New Mexico.....	Tucumcari.....	45,000	
Oklahoma.....	Lugert-Altus.....	40,000	
	Carlsbad Drainage.....		1,200
Oregon.....	Deschutes.....	20,000	
Oregon-California.....	Klamath-Modoc.....	12,500	
	Modoc Extension.....	12,100	27,000
Utah.....	Provo River.....		19,300
Washington.....	Yakima-Roza.....	32,050	
Subtotal.....		200,150	964,100
<i>WCU Projects</i>			
Colorado.....	Mancos.....	2,000	8,000
Idaho.....	Post Falls (Rathdrum Prairie).....	2,527	1,000
Montana.....	Bitter Root.....	14,600	4,000
	Intake.....	620	240
	Dodson Pumping.....	1,200	
	Missoula Valley.....	900	1,200
Nebraska.....	Mirage Flats.....	12,000	
Nevada.....	Humboldt ²	8,000	17,000
South Dakota.....	Rapid Valley.....		12,000
Texas.....	Balmorhea.....		1,520
Utah.....	Newton.....	1,660	565
	Scotfield.....		12,500
Subtotal.....		43,507	58,025
Grand total.....		243,657	1,022,125

¹ Excavation only (pending before the War Production Board).

² Not yet approved by the President.

MUNICIPAL-INDUSTRIAL WATER AIDS WAR

Of equal importance with war power and war food production was a third major Reclamation wartime service—providing municipal-industrial water for major industries and military encampments, and for communities that were important in the war program.

As a multiple-purpose benefit, five operating projects met this need. Through construction on three other projects, additional areas in which shortages exist or threaten will be served with new supplies.

Boulder and Parker Dams in the Pacific Southwest, working as a team, stored fresh water from the Colorado River for diversion through the Metropolitan Water District aqueduct to busy Los Angeles and 12 nearby cities. Direct from Lake Mead above Boulder, 30 million gallons a day were piped to the world's largest magnesium plant at the peak of its activity.

The Contra Costa Canal of the Central Valley project (California) furnished water to important industries in the cities of the Upper San Francisco Bay area. The Rio Grande project (Texas-New Mexico), served El Paso, Tex., and nearby military encampments. Reclamation projects in Utah provided water for the cities of Salt Lake, Ogden, and Provo and a huge, new steel plant.

Raising the height of Altus Dam (Oklahoma) during the year will extend domestic water service during the fiscal year to important consumers in that area. Under construction are the Rapid Valley (South Dakota), and the Tucumcari (New Mexico), projects, which, in addition to providing irrigation service, will supplement the municipal supplies of the cities of Rapid Valley and Tucumcari, respectively. Through enlargement of the Weber-Provo Diversion Canal, principally for irrigation, and the construction of the Salt Lake Aqueduct, supplies will be made adequate for the Salt Lake and Provo areas, where the demand for water has risen sharply due to increased population and military centers.

CROP VOLUME AND VALUE AT RECORD LEVEL

With irrigation activities accelerated in accord with the demands for increased war food supplies, all records on Reclamation projects as to the acreage in production, total volume of crops, and crop values were broken in the calendar year 1943.

The 4,055,329 acres served wholly, or in part, by Bureau facilities on 44 projects in 15 Western States produced 10,660,000 tons of food and forage crops, valued at \$388,670,969. The gross returns were 43 percent, or \$116,622,453, greater than in calendar year 1942, which in turn exceeded the previous year's total by \$112,162,519. The skyrocketing of aggregate values was due partly to the fact that Reclamation farmers, despite labor difficulties and equipment shortages, had nearly doubled their actual production since the year of Pearl Harbor, and partly due to the sharp increase in market prices received for the commodities produced.

The returns cited are exclusive of the values of livestock fattened on Reclamation projects and of dairy and poultry products. These would increase quoted totals by about 25 percent.

The inventory of livestock and equipment on hand December 31, 1943, was valued at \$116,170,312, an increase of \$16,081,407 over the preceding year. Livestock values amounted to approximately \$950 per irrigated farm.

TABLE 1.—Reclamation areas and crop returns, calendar year 1943¹

	Irrigable area ²	Irrigated area	Area in cultivation (paying area)	Crop values	
				Total	Per acre
	<i>Acres</i>	<i>Acres</i>	<i>Acres</i>		
Regular projects.....	2, 397, 241	1, 927, 660	1, 900, 088	\$185, 263, 326	\$97. 50
Storage projects.....	484, 879	387, 103	391, 309	27, 708, 861	70. 81
Storage projects (no crop returns reported)	29, 376				
Special and Warren Act lands.....	1, 896, 026	1, 633, 041	1, 615, 424	170, 606, 761	105. 61
Additional areas reported:					
Temporarily suspended ³		53, 498	53, 498	1, 593, 852	29. 79
Leased areas, WRA centers, etc.....		54, 027	54, 027	3, 498, 169	64. 75
Grand total, 1943.....	4, 807, 522	4, 055, 329	4, 014, 346	388, 670, 969	96. 82
<i>Comparison 1942 and 1943 irrigation results⁴</i>					
Grand total, 1943.....	4, 807, 522	3, 947, 804	3, 906, 821	\$383, 578, 948	\$98. 18
Grand total, 1942.....	4, 821, 839	3, 936, 235	3, 821, 699	272, 048, 516	71. 19
Increase or decrease, 1942-43.....	⁵ -14, 317	+11, 569	+85, 122	+111, 530, 432	+26. 99
Percent of increase, 1942-43.....		+0. 29	+2. 22	+41. 00	+37. 91

¹ A detailed table of area and returns by individual projects is available on request from the Bureau of Reclamation, Washington, D. C.

² Area for which Bureau is prepared to supply water.

³ Generally part of irrigable area, but not subject to construction charges until reclaimed.

⁴ Based on areas reported in both years and excluding temporarily suspended and leased lands.

⁵ Decrease due to readjustment of estimated acreage.

The cultivated area, exclusive of areas temporarily suspended and leased lands, was at a new high of 3,906,821 acres in 1943. This was an increase of 85,122 acres over 1942. On projects entirely constructed by the Bureau, the cultivated area rose to 1,900,088 acres. In 1942 it was 1,873,978 acres. Crop values in 1943 amounted to \$138,181,276, as compared with \$185,263,326 in 1942. The cultivated area on projects furnished supplemental storage from Bureau works and on those under special and Warren Act contracts, totaled 2,006,733 acres in 1943, as compared with 1,947,720 acres in the preceding year. The crop values were \$198,315,622 in 1943 and \$133,867,240 in 1942. On leased areas, Japanese relocation centers, etc., the cultivated area totaled 54,027 acres, and crop values, \$3,498,169.

Eighty-three percent of the irrigable area for which the Bureau was prepared to supply water—4,807,522 acres—was under irrigation in 1943.

Because of labor difficulties and price conditions, the area planted to sugar beets was reduced to 139,014 acres in 1943, a decrease of about 25 percent over 1942. The 1943 yield totaled 1,996,213 tons, which was valued at \$17,494,670.

Reclamation projects also produced small grains, fruit and nuts, long-staple cotton, flax, hops, vegetables, and seeds.

Due to the war, no new land has been opened to homestead entry during the last 3 years.

TABLE 2.—Cumulative crop values—1906-43

	Federal irrigation projects 1			Warren Act Lands and Special Contractors			Entire area			
	Irrigated acreage	Total crop value		Irrigated acreage	Total crop value		Net area in cultivation	Total crop value		
		For year	Cumulative total		For year	Cumulative total		For year	Cumulative total	
1906	22,300	244,900	\$5,005,360	2	481,600	\$35,000,000	2	20,100	\$244,900	\$5,005,360
1907	187,628	4,760,460	1,119,566	880,613	64,368,468	1,019,170	949,590	109,726,030	4,760,460	1,097,472,730
1908	289,549	7,635,888	1,187,255	950,890	47,836,750	1,097,190	1,072,486	119,660	7,635,888	1,839,737,849
1909	410,628	12,641,248	1,223,480	981,940	969,550	1,235,020	1,192,030	132,145,660	13,920,663	2,007,592,389
1910	471,423	17,944,639	1,267,500	1,001,250	969,550	1,286,046	1,192,990	142,734,120	21,844,639	2,182,471,969
1911	562,311	23,086,441	1,292,130	1,051,380	993,040	1,386,046	1,251,830	160,280,160	28,944,639	2,364,823,129
1912	614,477	30,007,134	1,307,500	1,051,380	993,040	1,467,097	1,299,590	179,073,490	35,092,991	2,519,855,619
1913	694,142	38,276,534	1,322,821	1,051,380	993,040	1,569,881	1,396,440	193,395,350	41,866,441	2,661,447,069
1914	701,271	48,473,317	1,340,649	1,051,380	993,040	1,669,881	1,496,440	208,226,030	48,276,534	2,819,923,129
1915	810,649	60,164,452	1,358,291	1,051,380	993,040	1,772,881	1,596,440	223,145,660	56,473,517	2,976,498,738
1916	922,821	74,315,972	1,376,821	1,051,380	993,040	1,877,881	1,696,440	238,070,330	64,315,972	3,135,144,676
1917	1,026,663	90,462,313	1,395,291	1,051,380	993,040	1,982,881	1,796,440	253,000,000	72,462,313	3,297,646,789
1918	1,119,566	107,821,296	1,414,291	1,051,380	993,040	2,087,881	1,896,440	268,000,000	80,821,296	3,465,646,885
1919	1,187,255	126,974,137	1,433,821	1,051,380	993,040	2,192,881	1,996,440	283,000,000	89,174,137	3,639,591,022
1920	1,223,480	150,171,050	1,453,291	1,051,380	993,040	2,297,881	2,096,440	298,000,000	97,526,050	3,817,117,072
1921	1,267,500	177,920,300	1,472,821	1,051,380	993,040	2,402,881	2,196,440	313,000,000	105,873,000	3,992,990,072
1922	1,202,130	209,360,850	1,492,351	1,051,380	993,040	2,507,881	2,296,440	328,000,000	114,218,000	4,167,208,072
1923	1,213,700	241,046,300	1,511,821	1,051,380	993,040	2,612,881	2,396,440	343,000,000	122,563,000	4,341,771,072
1924	1,290,890	273,486,560	1,531,291	1,051,380	993,040	2,717,881	2,496,440	358,000,000	130,908,000	4,516,679,072
1925	1,320,300	305,926,860	1,550,761	1,051,380	993,040	2,822,881	2,596,440	373,000,000	139,253,000	4,691,581,072
1926	1,411,020	338,367,020	1,570,231	1,051,380	993,040	2,927,881	2,696,440	388,000,000	147,598,000	4,866,479,072
1927	1,378,940	370,807,260	1,589,701	1,051,380	993,040	3,032,881	2,796,440	403,000,000	155,943,000	5,041,382,072
1928	1,442,080	403,247,500	1,609,171	1,051,380	993,040	3,137,881	2,896,440	418,000,000	164,288,000	5,216,284,072
1929	1,482,900	435,687,740	1,628,641	1,051,380	993,040	3,242,881	2,996,440	433,000,000	172,633,000	5,391,186,072
1930	1,504,810	468,127,980	1,648,111	1,051,380	993,040	3,347,881	3,096,440	448,000,000	180,978,000	5,566,088,072
1931	1,522,718	500,568,220	1,667,581	1,051,380	993,040	3,452,881	3,196,440	463,000,000	189,323,000	5,740,990,072
1932	1,555,144	533,008,460	1,687,051	1,051,380	993,040	3,557,881	3,296,440	478,000,000	197,668,000	5,915,892,072
1933	1,587,570	565,448,700	1,706,521	1,051,380	993,040	3,662,881	3,396,440	493,000,000	206,013,000	6,090,794,072
1934	1,640,936	597,888,940	1,726,000	1,051,380	993,040	3,767,881	3,496,440	508,000,000	214,358,000	6,265,696,072
1935	1,552,124	630,329,180	1,745,470	1,051,380	993,040	3,872,881	3,596,440	523,000,000	222,703,000	6,440,598,072
1936	1,702,192	662,769,420	1,764,940	1,051,380	993,040	3,977,881	3,696,440	538,000,000	231,048,000	6,615,500,072
1937	1,725,463	695,209,660	1,784,410	1,051,380	993,040	4,082,881	3,796,440	553,000,000	239,393,000	6,790,402,072

1938	1,777,584	1,764,363	67,859,804	1,563,171,019	1,329,115	1,276,332	45,603,656	980,733,955	3,106,699	3,040,695	113,463,460	2,543,904,974
1939	1,922,868	1,903,269	73,769,654	1,636,940,673	1,218,108	1,174,803	40,313,140	1,021,047,095	3,140,976	3,078,072	114,082,794	2,675,987,768
1940	2,152,808	2,138,927	80,098,196	1,717,038,869	1,238,262	1,177,103	37,690,481	1,058,737,576	3,391,070	3,316,030	117,788,677	2,775,776,445
1941	2,199,179	2,178,288	110,399,806	1,827,438,675	1,140,204	1,202,172	49,486,191	1,108,223,767	3,339,383	3,380,460	159,885,997	2,935,662,442
1942	2,277,965	2,259,653	155,619,716	1,983,058,391	1,602,907	1,562,046	116,428,800	1,224,652,567	3,880,862	3,821,699	272,048,516	3,207,710,958
1943	2,422,288	2,398,922	218,064,208	2,201,122,599	1,633,041	1,615,424	170,606,761	1,395,259,328	4,055,329	4,014,346	388,670,969	3,596,381,927

1 Includes projects constructed by the United States and those for which supplemental water is furnished from storage works built by United States.

2 Estimated.

3 Does not include project acreage and returns from All-American Canal (Imperial Valley) and 5 supplemental water projects.

4 Does not include project acreage and returns from 2 supplemental water projects. Estimated data for Imperial Valley included under "Special contractors."

5 Does not include project acreage and returns from 1 supplemental water project. Estimated data for Imperial Valley included under "Special contractors." Includes cultivated acreages and returns from class 5 lands, leased areas, and other lands irrigated from project works.

PROJECT PLANNING HAS POSTWAR OBJECTIVE

Foresight in the programming of its studies and investigations of potential projects and of river basins and subbasins made it possible for the Bureau of Reclamation to present to Congress in June 1944 a comprehensive inventory of postwar construction.

Planning activities directed in pre-war days toward an orderly agricultural and industrial development of the West, and early in the war toward increasing production of electric power and war food supplies, created a large shelf of projects which can be undertaken after the war to provide emergency employment and permanent settlement opportunities. During this fiscal year, with the emphasis shifted to planning for the postwar readjustment, additional projects were added to the reserve.

About 170 irrigation and multiple-purpose projects and approximately 50 river basins and subbasins were under study during the year. The Bureau investigates river basins in conjunction with studies of individual projects to assure orderly regional development.

The most impressive of the basin-wide studies completed during the year was the report on the Missouri River. It proposes construction costing a billion and a quarter dollars in the upper basin area, which construction would ultimately bring under irrigation 4¾ million acres of new land in seven States and supplement the water supply for half a million acres suffering shortages.

In connection with the June 1944 project inventory, there are on hand 53 detailed field reports involving construction costs amounting to \$526,000,000, and 25 detailed field reports of Water Conservation and Utilization projects under the war food program, estimated to cost \$21,000,000.

Postwar planning was given added impetus in June 1944, when Assistant Commissioner William E. Warne held conferences with Bureau regional officials in each of the six regions to determine the status of investigations and to plan for increased activity in this field. As a result of the meetings definite deadlines calling for the completion in the field of basin reports were set for early in the next fiscal year. These are: Columbia River Basin, December 1; Rogue River Basin, December 1; Central Valley, October 15; Santa Barbara County, September 15; Russian River Basin, September 1; Lower Colorado River Basin, November 1; Upper Colorado River Basin, November 1; Great Salt Lake Basin, December 1; Nueces River Basin, August 15; Rio Grande Basin, September 1; Red River Basin, September 15; Pecos River Basin, October 1; Guadalupe River Basin, October 15; Colorado River (Texas) Basin, November 1; and Arkansas River Basin, December 1.

As part of its planning activities, the Bureau reviewed flood control reports of the Corps of Engineers, War Department. This work was carried on under the terms of an agreement, dated August 14, 1939, through which the Bureau, the Department of Agriculture, and the War Department interchanged information on multiple-purpose projects. On December 29, 1943, this agreement was superseded by a four-party agreement, which made the Federal Power Commission also a participant, and changed the name of the joint committee to the "Inter-Agency River Basin Committee."

SERVICEMEN SEEKING POSTWAR FARMS

Forecasting the great need for postwar expansion of reclamation in the West, war veterans and emergency workers evinced a growing interest during the fiscal year in obtaining farms on Federal Reclamation developments. A growing number of inquiries concerning land settlement opportunities were received in the Washington, D. C., headquarters and in the many Bureau offices near military posts and war production centers.

Further evidence of the demand for land was the enlarged activity in the transfer of ownerships on irrigation projects, particularly near war industries where workmen, receiving high wages, purchased land for postwar homes.

In preparation for meeting the enlarged requirements for land, the Bureau's land use and settlement activities were pointed to postwar objectives. At the end of the year the Bureau had completed a program for presentation to Congress as a possible basis for legislation to provide settlement opportunities commensurate with anticipated needs. The program contained various recommendations for settlement preference for veterans, and provisions to assure that suitable farm units will be available on reasonable terms and conditions. It also called for farm advisory services.

SPECIAL STUDIES WILL AID SETTLEMENT PROGRAM

Three special studies of settlement and development problems advanced by the Bureau during the fiscal year will be of definite postwar value in making farm opportunities available for returning servicemen.

To provide maximum benefits from the complex multiple-purpose Central Valley project of California, a great volume of factual material on all phases of the proposed development has been collected through a series of project studies. These investigations are to be concluded early in the next fiscal year. Many Federal and State agencies are participating in the programming.

The Bureau has substantially completed the studies known as the Columbia Basin Joint Investigations, which have as their objective a general plan for the settlement of a million-acre area to be watered by Grand Coulee Dam, and to prepare detailed plans for areas to be irrigated relatively soon.

The investigation of economic and agricultural aspects of the practical problems which will confront settlers on the type of arid desert soil that characterizes the Yuma-Mesa Division of the Gila project (Arizona) was advanced during the year. This large-scale predevelopment demonstration was undertaken in January 1942 in accordance with a directive from the Senate Committee on Appropriations. At the end of the fiscal year 320 acres were planted to alfalfa, and 590 acres prepared for planting of this crop next fall.

The development of 4,200 acres of public lands which the current schedule, approved by the War Production Board, contemplates, will aid in meeting the demand for new farms and new homes. A total of 150,000 acres of new lands, both public and private, may be developed rapidly on the Yuma-Mesa as a result of the knowledge gained from the investigation.

CONSTRUCTION CONTINUES DESPITE CURBS

Construction activities of the year were highlighted by the completion of Shasta Dam, second largest concrete structure in the world, and key feature of the Central Valley project (California), and the "holing through" of the 13.1 mile long Alva B. Adams tunnel of the Colorado-Big Thompson project (Colorado). Both Reclamation achievements were accomplished at the close of the fiscal period.

Shasta Dam is 602 feet high, 3,500 feet long at the crest, and 265 feet wide at the base. On June 30, 1944, it contained 6,391,682 cubic yards of concrete. Construction was begun in September 1938.

The transmountain tunnel cuts through the Rocky Mountains near Estes Park, Colo. When lined with concrete, which operation is now in progress, it will carry a supplemental supply of water from the headwaters of the Colorado River, on the west side of the Continental Divide, to 615,000 acres facing shortages in northeastern Colorado, on the east slope.

The Bureau's construction activities were retarded on most projects as the aftermath of a sweeping War Production Board stop-construction order issued in the fall of 1942, which halted all work except power installations on five projects. Since that time the War Production Board has cleared a number of projects to create work for Japanese evacuees from the Pacific coast and for conscientious objectors, to supply municipal-industrial water, to provide dust control for an air base, and to expand food production. Twenty-five projects were cleared under the war food program.

Work remained at a standstill on Davis Dam (Arizona-Nevada); Payette Division, Boise Project (Idaho); Friant-Kern Canal of the Central Valley project (California); irrigation features of the Columbia Basin Project (Washington); Eden, Kendrick, and Riverton projects (Wyoming).

Additional details on construction activities are provided in the summary of the activities of the various regions.

BUREAU ENGINEERS FOREMOST AS DAM BUILDERS

Since 1902 179 dams—5 of them the largest concrete structures in the world—have been constructed by the Bureau of Reclamation on 61 irrigation and multiple-purpose projects in 16 Western States. The 5 mammoth monoliths, which have given Bureau engineers the reputation of being foremost in the field of dam designing and construction are, in order of volume: Grand Coulee (Washington), Shasta (California), Boulder (Arizona-Nevada), Friant (California), and Marshall Ford (Texas).

The Bureau has also built the following existing facilities: 31 powerplants, 5,937 miles of transmission lines, 212,549 canal structures, 14,421 bridges, 358 tunnels having a combined length of 110.7 miles, 5,121 miles of ditches and drains, 23,683 culverts, 6,555 flumes, 2,322 miles of pipe, and 4,344 miles of roads. In the 42 years of its existence as a Federal agency, the Bureau has excavated 621,790,400 cubic yards of earth and rock—more than 60 times the bulk of the 7 great pyramids of Egypt. A total of 34,225,500 cubic yards of concrete have been poured, more than 6 times as much as used in all the locks and structures of the Panama Canal. In the preparation of this concrete, 38,475,900 barrels of cement were used.

STORAGE CAPACITY AT NEW PEAK

The storage capacity of 81 Reclamation reservoirs was increased by about 5 million acre-feet during the fiscal year. The June 30, 1944, capacity was 69,174,919 acre-feet. The active water storage—more than 53½ million acre-feet—was also at a record level. The largest of the man-made lakes were impounded by Boulder Dam (Arizona-Nevada), Grand Coulee Dam (Washington), and Marshall Ford Dam (Texas). Storage of water in the reservoir behind Shasta Dam was begun on December 30, 1943, and behind Friant Dam on February 22, 1944.

JAPANESE EVACUEES ON THREE PROJECTS

Increased war food production, valued at \$460,272, resulted from the activity in 1943 of persons of Japanese ancestry on 3 Reclamation projects, to which they were evacuated from West Coast military zones

early in the war. The approximately 38,000 men and women housed in the War Relocation Centers harvested 4,861 acres of hitherto undeveloped land.

The camps are located on the Gooding Division of the Minidoka project (Idaho), which at the peak of the year's activity held 10,000 persons; the Tule Lake Division of the Klamath project (Oregon-California), 18,027; and the Heart Mountain Division of the Shoshone project (Wyoming), 9,800.

In addition to farm activities, the Japanese aided in Bureau construction operations on the Minidoka and Shoshone projects. The camps were erected by the Army engineers, and the Bureau had charge of the work crews.

SMALL C. P. S. CREWS BUILDING DAMS

Construction was advanced on three medium-sized irrigation dams on the Rapid Valley (South Dakota), Deschutes (Oregon), and the Mancos (Colorado) projects by conscientious objectors housed in Civilian Public Service camps, established by the Selective Service System. The assignees also helped clear the reservoirs and performed other work. At the end of the year 124 men were stationed in the Rapid Valley camp, 90 in the Deschutes center, and 117 on the Mancos project. In the first 2 camps a religious organization was responsible for the welfare of the men, and the Bureau was in charge of the work. On the Mancos project all operations were supervised by Reclamation officials.

A small group of men in a camp administratively assigned to the Farm Security Administration was employed on Reclamation activities on the Buffalo Rapids project (Montana).

WATER CONSERVATION AND UTILIZATION CONSTRUCTION STIMULATED

Enactment of amendments to the Water Conservation and Utilization Act, and added emphasis on expansion of production of war food crops, caused increased activity under the Water Conservation and Utilization program during the year. Work continued on six projects authorized for construction before the war. Preconstruction activities were underway on six additional projects approved under the war food program.

The amendments to the Water Conservation and Utilization Act authorize, for the duration of the war, the expenditure of appropriated funds for project construction in lieu of contributions formerly made by the Work Projects Administration and the Civilian Conservation Corps.

The projects under construction are: Mirage Flats (Nebraska), Buffalo Rapids No. 2 (Montana), Newton (Utah), Rapid Valley (South Dakota), Mancos (Colorado), and Scofield (Utah).

Other projects cleared for construction and the acreages involved are: Intake (Montana), Missoula (Montana), Dodson (Montana), Bitterroot (Montana), Post Falls unit, Rathdrum Prairie project (Idaho), and Balmorhea (Texas).

Construction remains at a standstill, due to War Production Board stop orders on the Fallon unit of the Buffalo Rapids project (Montana), and on the Eden project (Wyoming).

During the year the Farm Security Administration, in accordance with the original approval by the President, assumed supervision and control of the operation and maintenance work on the Buford-Trenton project (North Dakota), which is providing water for 4,000 acres. The Farm Security Administration is also in charge of land development and settlement activities on the Buffalo Rapids No. 1 project, on which about 15,000 acres of land have been put under irrigation.

REGIONAL ACTIVITIES ADVANCE RECLAMATION

While not yet fully effectuated, chiefly because of difficulties in obtaining suitable personnel, the regionalization of the Bureau of Reclamation, begun in September 1943, intensified operations in all fields of Reclamation activity. The following is a summarization of the most important activities in each of the areas.

REGION I

The outstanding wartime activities in Region I during the fiscal year were the expansion of power production at Grand Coulee Dam (Washington), for industrial plants, and the extension of irrigation service on the highly productive Roza Division of the Yakima project (Washington). The region includes the States of Oregon, Washington, Idaho, and western Montana.

The Bureau's power program at Grand Coulee was spectacular. Three units rated at about 325,000 kilowatts were installed to complete, in 3 years, the transformation of an empty shell of a building into the second largest powerplant in the world. The fiscal year output was approximately 5,800,000,000 kilowatt-hours, double the production of the preceding year. In March 1944, the plant produced 621 million kilowatt-hours, a world's record for quantity of power generated during 1 month by a single hydroplant. About 98 percent of the Grand Coulee energy is consumed by war industries.

On the Roza Division, the acreage under irrigation was increased during the year from 9,000 to 15,000 acres. Ultimately the gravity system, under construction, will serve a total of 47,000 acres, whereon excellent settlement opportunities for returning servicemen and demobilized war workers could be provided.

Construction work in Region I was continued, under wartime restrictions, on the Deschutes project (Oregon), Anderson Ranch Dam

of the Boise project (Idaho), and the Gooding Division of the Minidoka project (Idaho).

Construction of Anderson Ranch Dam, which when completed will be the highest earth-fill structure in the world and will provide supplemental irrigation water for 340,000 acres in the fertile Boise Valley, was resumed after delay of about a year due to War Production Board restrictions. About 1,300,000 cubic yards of embankment and 75,000 cubic yards of rock-fill were placed during the year to bring the total yardage in place to about 2 $\frac{1}{4}$ million. Ultimately the dam will contain 9,600,000 cubic yards of material.

Design and location of irrigation features and development of a settlement pattern for the Columbia Basin project (Washington) was advanced. This project, of which Grand Coulee Dam is the key structure, offers the largest settlement opportunities of any single project in the Bureau's postwar program.

REGION II

Completion of Shasta Dam, dominant structure of the Central Valley project (California), at the end of the fiscal year, climaxed the construction activities in this region, which includes central and northern California, and a small portion of Oregon. The Shasta Reservoir, gradually filling since December 30, 1943, contained 1,175,129 acre-feet of storage on June 30, 1944, more than a third of its maximum capacity.

The first two of five 75,000-kilowatt generators to be installed in the Shasta powerplant began production in June 1944, sending their output, under a wartime contract, over the newly completed Government transmission line to a connection with the Pacific Gas & Electric Co. system at Oroville, Calif.

Three other major items of the Central Valley project were featured in the region's construction program. Keswick Dam and powerhouse, construction of which was halted for a time by the War Production Board, were practically completed. Work was being advanced rapidly on four contracts for the construction of 28 miles of the Madera Canal, which when completed will serve 20,000 acres of new land and provide supplemental service to 80,000 acres. Eight miles of the canal had been completed previously.

Installation at Friant Dam of needle valves borrowed from Boulder Dam to provide temporary control over the San Joaquin River was practically completed. Water storage in Millerton Lake was begun on February 22, 1944, and had reached 290,490 acre feet—approximately half maximum capacity—at the end of the year.

Construction of the 160-mile Friant-Kern Canal of the Central Valley project remains at a standstill. An application for clearance is pending before the War Production Board.

With War Production Board authorization under the war food program, granted on September 8, 1943, construction was resumed on the Modoc unit of the Klamath project (Oregon-California). On June 23, 1944, the War Production Board approved construction of the extension of this unit.

Region II is featured prominently in the Reclamation postwar inventory. Twenty-nine projects, which would serve 1,281,500 acres of new land and provide supplemental water to 3,485,000 acres now inadequately served are contemplated. Power installations on authorized projects would be increased by 446,500 kilowatts and an estimated 288,900 kilowatts of firm capacity would be provided on projects under study. The over-all cost of the postwar program in this region, on the basis of 1940 prices, would be \$551,360,000.

REGION III

With more than half the electric power produced by Reclamation power plants on projects in 12 States coming from Bureau installations within its boundaries, Region III was outstanding as a contributor to the prosecution of the war. This region includes nearly all of the State of Arizona, Southern California, and small portions of Nevada, New Mexico, and Utah.

Approximately 7 billion kilowatt-hours of energy were generated during the year. More than 50 percent of all the power used by the war industries of Southern California, southern Nevada, and Arizona was produced by Bureau generators in this area. These are located on five projects: Yuma and Salt River (Arizona); Boulder Canyon (Arizona-Nevada); Parker Dam (Arizona-California) and All-American Canal (California). After the war, and as the need arises, the present installation can be doubled.

Although no capacity was added, the output of the Boulder Dam power plant, largest in the world, was increased by 20 percent over the preceding year. By increasing the production of its generators, the output was brought to a new high of $6\frac{1}{3}$ billion kilowatt-hours. Revenues from the sale of this energy and for generating charges totaled \$8,162,422.86. One-fourth of the plant's production was consumed by a huge magnesium plant nearby. A new 82,500-kilowatt generator is scheduled to go into operation in September 1944.

Region III also contributed heavily toward the Nation's war food supply. The 744,380 acres of land served by Reclamation facilities produced crops having a gross value of \$109,371,178—an all-time high for the area.

Twenty-three of the projects in the postwar inventory are located in this region. The over-all cost of constructing these developments, on the basis of pre-war prices, is estimated at \$720,015,000.

Three of the projects have been authorized for construction, namely: Boulder Dam, with 287,500 kilowatts additional power capacity remaining to be installed, the Mesa Unit of the Gila project (Arizona), to provide water for 33,000 acres of new lands, and the All-American Canal (California) from which 400,000 acres of new lands may be irrigated and 20,000 provided with supplemental water.

Construction of a fourth project, Davis Dam, to provide river regulation and 225,000 kilowatts of power, was halted by the War Production Board late in 1942. Nineteen projects which will irrigate 454,235 acres of new lands, furnish supplemental water to 374,200 acres, and provide 1,099,200 kilowatts of firm power are under study.

REGION IV

With large-scale construction halted or retarded by emergency conditions, project planning activities received major attention in region IV. This region includes practically all of the States of Nevada and Utah, the southwestern portion of Wyoming, and that portion of Colorado west of the Continental Divide.

Work was advanced on more than 25 individual projects and sub-basins, with 6 reports completed and 14 reports nearing completion. The reports form the foundation for that portion of the reclamation inventory planned for region IV. The outline calls for the construction of 46 projects. These would serve 313,790 acres of new land, provide supplemental service to 684,940 acres, make available 8,600 kilowatts of new energy on authorized projects and 148,000 kilowatts of firm power capacity on proposed developments. On the basis of 1940 prices, the estimated construction cost is \$237,603,000.

Construction continued during the year on four projects. Conscientious objectors aided in constructing a medium-sized dam on the Mancos project (Colorado). The Newton Dam on the Newton project (Utah) was practically completed, and work was advanced on the Scofield project (Utah). Sufficient work was completed during the past 2 years on the canals of the Provo River project (Utah) to provide supplemental water in 1943 to more than 25,000 acres of highly developed lands and serve an industrial supply to the new \$200,000,000 Geneva Steel plant near Provo, Utah. Progress was also made on the Salt Lake Aqueduct of the Provo River project to make additional water available to Salt Lake City.

REGION V

Planning for postwar construction received primary consideration in Region V. In this region, comprising all of Texas and Oklahoma, that portion of New Mexico east of the Continental Divide, the southeast quarter of Colorado, and the southern half of Texas, 2 projects

are in operation, 3 under construction, 3 authorized, and 26 are under study.

More than 2,653,000 acres of land are now irrigated in the area; 194,000 of which are included in Federal reclamation projects. Construction of 30 projects outlined in the postar inventory would provide an irrigation water supply for 637,310 acres of additional land and furnish a supplemental supply of 1,615,980 acres now partially irrigated. About 18,000 kilowatts of additional electric power could be installed on authorized projects and 36,000 kilowatts of firm capacity made available on proposed developments. Total construction costs, based on 1940 prices, are estimated at \$296,786,000.

Construction was in progress, under the war food program, on the Tucumcari project (New Mexico), and the Altus project (Oklahoma). Work on both was suspended by the War Production Board in December 1942. In April 1944 both projects were cleared for war food construction. Development plans for the Tucumcari project call for 17,000 acres to be brought into production by 1945, with additional acreages subsequently. The Altus project by 1945 is to provide irrigation service to 20,000 acres and a domestic water supply to the city of Altus. It is scheduled to serve an additional 20,000 acres in 1946.

The three projects authorized are Valley Gravity Canal and Storage project (Texas), San Luis Valley project (Colorado), and the Balmorhea project (Texas). The latter was approved by the President in May 1944, and construction work will be begun as soon as negotiations for the purchase of additional water rights and for repayment contracts are completed. Construction on the Valley Gravity and San Luis Valley was halted by the War Production Board.

REGION VI

The Bureau of Reclamation's project planning activities in the West drew national recognition in the fiscal year because of the accomplishments in this region. Completed here was a comprehensive report on the conservation, control, and use of the water resources of the entire Missouri River Basin, one of the Nation's greatest drainage areas.

Region VI includes the States of North Dakota, South Dakota, Nebraska, the northern half of Kansas, northeastern Colorado, all of Montana east of the Continental Divide, and a major portion of Wyoming.

The investigations report was the culmination of more than 5 years of planning work. It was presented to Congress early in June 1944, and bills were introduced in both houses that would authorize the construction of the initial stages of the development planned.

Constituting a major item in the Bureau's postwar outline, the report proposes the irrigation of 4,760,000 acres of new land, the construction of about 90 multiple-purpose reservoirs, 16 power plants with a total installed capacity of 723,500 kilowatts and interconnecting transmission systems, flood control for the lower reaches of the Missouri River and many of its tributaries, and a sustained flow for navigation from Sioux City to St. Louis.

The estimated total construction cost of the entire program is \$1,250,000,000, and the initial developments recommended for construction would involve an expenditure after the war, of approximately \$200,000,000, for the irrigation and power features alone.

Completion on June 10, 1944, of the excavation of the 13.1-mile long transmountain tunnel of the Colorado Big-Thompson project through the Rocky Mountains to carry supplemental water from the west to the east slope was the most important construction achievement of the year in this region.

TABLE 3.—Settlement and economic data, 1943

State	Project	Irrigated farms		Towns on or tributary to the project		Number of schools	Number of churches	Banks		Special Warren Act contractors		
		Number	Population	Number	Population			Number	Deposits	Number of depositors	Irrigated farms ¹	Population
	<i>Regular</i>											
Arizona	Salt River	13,158	42,000	12	165,000	98	161	7	140,000,000	80,000	728	4,590
Arizona-California	Yuma	1,727	3,235	5	18,590	15	34	1	2,100,000	2,300		
California	Orland	673	1,918	1	1,366	6	17	1	2,200,000	2,814		
Colorado	Grand Valley	858	2,425	6	19,950	17	40	3	14,784,510	10,271	803	1,816
	Uncompahgre	1,792	5,103	3	7,980	28	35	4	7,056,550	6,810	167	272
Idaho	Boise	4,163	15,100	16	55,055	118	130	4	(3)		4,764	19,516
	Minidoka	3,542	11,966	10	14,532	33	74	6	(3)		11,161	50,614
Montana	Bitter Root	335	1,134	6	3,000	18	10	4	4,233,873	5,418		
	Frenchtown	42	153	1	110	1	1	(3)				
	Huntley	644	1,643	5	624	7	6		379,318	450		
	Milk River	597	2,469	15	10,939	30	36	7	12,663,670	9,763		
	Sun River	1,025	2,734	5	773	11	15	1	553,518	758		
Montana-North Dakota	Lower Yellowstone	676	2,295	7	4,245	18	22	3	4,197,605	4,700		
	North Platte	2,987	9,160	16	27,749	73	67	9	20,427,872	18,060		
Nebraska-Wyoming	Newlands	765	2,909	4	2,379	10	12	1	2,546,500	2,531		
Nevada	Carlsbad	1,954	4,954	4	20,900	13	20	2	6,039,870	7,080		
New Mexico	Rio Grande	6,456	25,747	40	135,957	83	184	6	88,570,428	52,634	144	1,507
New Mexico-Texas	Umatilla	396	1,320	4	1,873	7	15	1	2,212,155	2,200	39	61
Oregon	Vale	514	2,056	4	1,300	8	14	1	1,701,920	1,500		
	Klamath	970	2,812	5	28,169	30	35	5	(3)		537	1,611
Oregon-California	Owyhee	1,530	6,077	8	14,860	28	27	3	(3)		229	925
Oregon-Idaho	Belle Fourche	672	2,007	5	3,750	20	15	3	5,697,700	5,500		
South Dakota	Strawberry Valley	2,000	8,650	13	18,500	29	30	4	8,134,007	8,051		
Utah	Okanogan	397	952	3	5,000	8	8	2	3,434,265	3,400		
Washington	Yakima	5,483	18,145	24	56,557	74	83	8	17,350,017	16,402	4,316	17,466
	Kendrick	0	1,435	0	2,450	17	21	2	14,938,246	11,000		
Wyoming	Riverton	500	1,676	3	24,500	17	19	2	1,490,000	1,800	2	9
	Shoshone	1,034	2,136	5	2,790	4	4	1	1,983,455	1,650		
	Subtotal	53,395	177,751	237	649,196	814	1,138	93	362,695,479	254,102	22,890	98,387

Footnotes at end of table.

TABLE 3.—Settlement and economic data, 1943—Continued

State	Project	Irrigated farms		Towns on or tributary to the project		Number of schools	Number of churches	Banks		Special Warren Act contractors		
		Number	Population	Number	Population			Number of depositors	Population	Number of irrigated farms 1	Population	
California	<i>Supplemental storage projects</i>											
		All-American Canal:	4,488	27,000	8	33,723	157	76	7			
		Imperial Valley 2	(3)	8,000	4	4,400	9	12	2	(3)		
		Coachella Valley 2	30	(3)						(3)		
		Central Valley:	75									
		Fruitgrowers Dam	325	1,288	5	1,047	20	12	1	400,000	500	
		Pine River	1,143	4,816	16	9,460	23	30	3	2,460,000	6,342	
		Upper Snake River	90	287	1	1,287	3	4	1	2,020,737	1,497	
		Humboldt	606	2,520	2	31,318	21	21	3	31,650,000	22,187	
		Truckee Storage	40	160	0	8	3	0	1	336,000		
Oregon		Baker	118	460	1	1,875	8	4	1	336,000		
		Burnt River	646	2,050	3	15,000	23	32	4	4,525,228	5,210	
		Deschutes (Central Oregon I. D.)	161	484	1	500	1	3	0	0		
		Stanfield	97	201	0	0	0	0	0	0		
		Westland	516	1,520	3	3,730	5	6	0	0		
		Hyrum	678	2,500	10	3,675	15	23	1	1,148,390	2,475	
		Moon Lake	1,100	4,300	8	78,087	34	60	4	40,000,000	36,000	
		Ogden River	1,260	3,000	5	37,200	24	47	6	17,366,340	14,262	
		Froyo River (Deer Creek division)	257	1,086	2	2,933	5	4	1	800,000		
		Sagehen	3,000	15,000	21	26,706	31	26	8	50,000,000	40,000	
	Weber River											
	Subtotals	14,630	74,672	98	251,549	382	360	42	150,706,695	129,373		
Montana	<i>Water conservation and utilization projects</i>											
		Buffalo Rapids 2	115	240	3	5,600	11	16	4	4,500,000	5,500	
		Eden	90	(3)								
	Grand total	68,230	252,663	338	906,345	1,207	1,514	139	517,902,174	388,975		

1 Farms furnished partial or whole water supply by Bureau-constructed works.

2 Estimated figures used.

3 Data not reported.

OPERATION AND MAINTENANCE ACTIVITIES OUTLINED

The operation and maintenance of irrigation systems constructed by the Bureau was directed towards assuring water supplies for more than 4 million acres of land and the protection of the Federal investment.

Supervision was given to 15 projects or completed portions of projects operated in their entirety by the Bureau, and to the dams, reservoirs, and other reserved works on 6 other projects. Administration also extended to 26 projects or portions of projects where operations are conducted by water users' organizations under contract with the United States. Approximately 120 separate water users' organizations on these projects have contracts with the Federal Government.

SETTLERS GIVEN AID AND ADVICE

Maximum war food production through improved farming methods was one of the year's prime objectives for the Branch of Operation and Maintenance. Settlers were assisted in effectuating up-to-date practices in the proper utilization of land and water both by regular Bureau employees and by assistant county agents of the Extension Service of the Department of Agriculture, under a Memorandum of Understanding, dated June 12, 1940. The work performed included assisting landowners and water users in laying out and constructing farm irrigation systems, preparing land for irrigation, rendering advice in the economic use of water, alleviation of seepage conditions, and control of noxious weeds.

Considerable educational material was prepared and disseminated, including slide lectures and films designed to assist farmers in the development of pastures, measurement and proper use of irrigation water, and weed control.

SOIL AND CONSERVATION PROGRAM CONTINUED

Extensive field work in the lining of canals to conserve water and prevent damage to irrigable lands by seepage was carried on under the Soil and Moisture Conservation program. Asphalt and bentonite linings were installed and tested from the standpoint of design, placement, effectiveness, and cost, and results compared with standard concrete and earth linings. Other activities included: Prevention of canal bank erosion by vegetative plantings, investigation of methods to reduce siltation of canals and reservoirs, drainage work to relieve seeped land, installation of accurate devices for measurement of irrigation water, and studies of the requirements for and application of irrigation water by reason of relative impermeable characteristics of some soils.

MILLION ACRES OF WITHDRAWN LAND RESTORED

More than a million acres of land, most of which was public land withdrawn by the Bureau in connection with completed or partially

completed projects or projects under investigation, were restored to entry during the fiscal year.

Approximately 929,500 acres of public land were under lease during calendar year 1943; 688,000 acres for grazing purposes, 53,500 for agricultural uses (8,500 more than in 1942), and 188,000 for other special uses, including the areas reserved for Japanese evacuee centers. Some additional lands were leased early in 1944 for expanding livestock and farming operations to increase food production. Reclamation land temporarily transferred to the Grazing Service to provide for efficient range administration under the Taylor Grazing Act was reduced by the vacation of reclamation withdrawals and by transfers to the War Relocation Authority for Japanese encampments.

AMENDATORY CONTRACT NEGOTIATIONS ADVANCED

Under the Bureau's reorganized plan of procedure, active progress was made at the close of the fiscal year toward completion of negotiations of amendatory repayment contracts with a number of water users' organizations. To date eight contracts have been executed. A contract negotiated with the Klamath Drainage District of the Klamath project (Oregon-California) was approved by Congress on June 17, 1944. Power features contained in several agreements were given special attention.

Reclassification of irrigable lands under provisions of the 1939 Act was completed or in progress on approximately 298,000 acres on 14 projects or divisions of projects.

REQUESTS FOR RELIEF CONTINUE TO DECREASE

With farm incomes in 1942 and 1943 at high levels and prospects good for continuing high returns in 1944, requests and authorizations for temporary relief from the payment of accrued construction charges dropped to new lows during the fiscal year. Applications, in the amount of \$108,092.33, were submitted by eight water-users' organizations. Relief totaling \$21,916.44 was granted to four applicants.

In comparison, applications totaling \$189,922.44 were received in the fiscal year 1943 from six water-user groups and seven individuals. Relief in the amount of \$24,530 was authorized.

NEW LEGISLATION ADVANCES RECLAMATION

Three major items of legislation affecting Reclamation activities were enacted during the year. The Water Conservation and Utilization (Wheeler-Case) Act was amended, construction of the Hungry Horse Dam (Mont.) was authorized, and Congress gave its consent to the Belle Fourche Compact.

AMENDMENTS TO WATER CONSERVATION AND UTILIZATION ACT PASSED

To provide for a quick expansion of potential food-producing acres on projects in the process of construction under the Water Conservation and Utilization Act of October 14, 1940 (54 Stat. 1119), Congress amended this legislation on July 16, 1943 (Public, 152, 78th Cong., 1st Sess.).

The amendments authorize the expenditure of appropriated funds for construction in lieu of nonreimbursable money or services formerly contributed by the Work Projects Administration and the Civilian Conservation Corps, which were disbanded early in the war. The original Act has as its objective the stabilization of agriculture and employment in the Great Plains and other semiarid areas to the westward which are most seriously affected by periodic droughts.

CONGRESS GIVES CONSENT TO BELLE FOURCHE COMPACT

The long-standing controversy between the States of South Dakota and Wyoming over the division of waters of the Belle Fourche River was brought to an end in February 1944, when Congress gave its consent to the Belle Fourche Compact.

The legislation clears the way for construction of works to provide supplemental storage for irrigation projects in South Dakota and also storage for potential projects in Wyoming. Incorporated in the compact is a provision giving Federal recognition of water rights as against an assertion of power under the Commerce Clause of the Constitution. It requires the Federal Government to respect established water rights as property and to consult with State officials with respect to specific Federal programs or projects.

HUNGRY HORSE DAM APPROVED AS POSTWAR PROJECT

Construction of Hungry Horse Dam, a major feature of the comprehensive plan for multiple-purpose development of the Columbia River in the Pacific Northwest, was authorized by Congress on June 5, 1944 (Public, 329, 78th Cong., 2d Sess.). This structure, to be erected 4 miles above the confluence of the South Fork and Flathead Rivers in Montana, is a prominent item in the Bureau's inventory of irrigation and multiple-purpose projects for postwar construction. It would increase the firm power output of Grand Coulee and Bonneville Dams through regulation of the flow of the Flathead River. The act also authorizes an irrigation development in the vicinity of Kalispell, Mont.

BUREAU PREPARING VETERAN SETTLEMENT LEGISLATION

Drafting of legislation which would make homesteads available on Reclamation projects for returning servicemen after the war, in con-

junction with the Bureau's postwar construction program, was well advanced at the end of the fiscal year. Under tentative plans, the settlement program would be handled by the Department of the Interior in cooperation with the agencies that are charged directly with the administration of veteran affairs. The Bureau's legal staff is engaged in preparing a report on and drafting amendments to H. R. 3179, introduced by Congressman Murdock of Arizona, which would provide opportunities for veterans to reestablish themselves on irrigated farms.

SEEK TO AMEND PROJECT ACT OF 1939

Pending before Congress was legislation which would amend Sections 4, 7, and 17 of the Reclamation Project Act of 1939. The principal objective of the bill, reported out by the Senate Committee on Irrigation and Reclamation, is to extend the time within which amendatory contracts may be made to December 31, 1950, or 5 years after the end of the war, whichever period is the longer. With additional personnel available in the postwar period, it is expected many amendatory contracts can be negotiated. Relief provisions of the Act would also be extended by the measure.

BUREAU DECENTRALIZATION EFFECTUATED

Decentralization of the Bureau of Reclamation through the establishment of six regional offices and five administrative branches in Denver, Colo., the objective of which was to "streamline" the organization for greater efficiency in meeting war and postwar problems, was effectuated during the fiscal year.

Six outstanding Bureau officials were placed in charge of each region as Regional Directors of Reclamation, and five others, experienced in their respective fields, were named to head the branches. These are: Design and Construction, Project Planning, Operation and Maintenance, Fiscal and Administrative Management, and Power Utilization. Regional offices were established in Boise, Idaho; Sacramento, Calif.; Boulder City, Nev.; Salt Lake City, Utah; Amarillo, Tex.; and Billings, Mont.

The Regional Directors are responsible for coordinating all Bureau activities within their regions, and they report directly to the Commissioner. They have extensive latitude for independent action. Assistance in technical phases of their work is provided by the Branch heads.

On the basis that the improved organization would provide added protection of the Federal investment in irrigation and multiple-purpose projects, and that it was essential because of the Bureau's greatly expanded activities, nonreimbursable funds were sought for the cost

of administration, without success. Further efforts to obtain these funds will be made in fiscal year 1945, with continued emphasis to be placed on the fact that the decentralization extends a significant portion of the Commissioner's function (the cost of which is nonreimbursable) to the field.

Military furloughs, resignations, and transfers reduced the number of Reclamation employees from 6,543 on June 30, 1943, to 6,513 on June 30, 1944. Twenty-one Washington employees and 1,643 field employees were in the armed forces of the United States. Twelve have given their lives and 2 are missing.

The number of persons employed in the various Bureau activities were: Commissioner's office, 98; branch offices (Denver Colo.), 820; legal office (Denver), 13; Region 1, 1,733; Region 2, 833; Region 3, 1,050; Region 4, 312; Region 5, 1,109; Region 6, 545.

During the year the number of field offices, exclusive of headquarters for project planning work, was reduced from 54 to 50.

COMMISSIONER AND TWO ASSISTANTS APPOINTED

Harry W. Bashore, Assistant Commissioner of Reclamation since May 27, 1939, and for more than 37 years a Bureau employee, took office as Commissioner on August 3, 1943, upon appointment by the President. He replaced John C. Page, who resigned in June 1943 because of ill health. Mr. Page had served as Commissioner since January 25, 1937.

Secretary of the Interior Harold L. Ickes appointed two Assistant Commissioners during the year; namely, William E. Warne, former Chief of Information for the Bureau, and Kenneth Markwell, former Regional Director of the Federal Works Agency. Mr. Warne took office on August 9, 1943, and Mr. Markwell on April 18, 1944.

RECLAMATION FUND ACCRETIONS

In the 42 years of the Bureau's history, the accretions to the Reclamation fund have totaled \$220,910,306.02. (See table 4.) These have come from the sale of public lands, proceeds from the Oil Leasing Act, from Federal water power licenses, potassium royalties, and rentals and receipts from Naval petroleum reserves from 1920 to 1930 under the act of May 9, 1938. Collections—construction and operation and maintenance repayments, water rentals, power revenues, etc.—have totaled \$159,748,056.18.

Disbursements during that period have totaled \$349,523,020.29, leaving a balance in the fund on June 30, 1944, of \$31,135,346.91. Repayments of construction charges to the Reclamation fund during the fiscal year 1944 totaled \$400,000,000. Operation and maintenance collections amounted to \$1,400,000, and water rental, power, and other receipts aggregated \$6,000,000.

The total collections reflect the improved financial condition of Reclamation farmers and their continued response to the President's anti-inflation policy by maintaining a good record of repayments. The high level of the Reclamation fund provides resources for the extension of irrigation investigations and for the extension of irrigation systems when the resumption of construction is possible.

TABLE 4.—Accretions to reclamation fund by States

	Sale of public lands		Proceeds from Oil Leasing Act		Total to June 30, 1944
	Fiscal year 1944	To June 30, 1944	Fiscal year 1944	To June 30, 1944	
Alabama.....			\$31.76	\$197,635.78	\$197,635.78
Arizona.....		\$2,766,339.36	1,197.65	7,501.60	2,773,840.96
California.....		8,304,067.54	1,473,572.47	23,195,923.94	31,499,991.48
Colorado.....		10,326,330.20	131,696.11	1,236,483.51	11,562,813.71
Idaho.....		7,058,097.58	63.01	22,437.94	7,080,535.52
Kansas.....		1,033,601.40	596.24	10,803.06	1,044,404.46
Louisiana.....			9,454.01	342,050.77	342,050.77
Michigan.....			1,010.36	1,066.81	1,066.81
Mississippi.....				110.25	110.25
Montana.....		15,388,624.90	156,372.30	1,788,360.91	17,176,985.81
Nebraska.....		2,097,698.70	21.00	351.75	2,098,050.45
Nevada.....		1,042,345.90	8,541.57	14,733.55	1,057,079.45
New Mexico.....		6,742,810.30	747,899.95	4,966,805.38	11,709,615.68
North Dakota.....		12,219,646.27	18,856.49	278,050.99	12,497,697.26
Oklahoma.....		5,931,145.58	1,157.75	8,327.07	5,939,472.65
Oregon.....		11,995,324.73	98.30	1,055.58	11,996,380.31
South Dakota.....		7,733,675.48	5,529.35	24,826.07	7,758,501.55
Utah.....		4,397,539.48	162,673.69	1,294,669.49	5,692,208.97
Washington.....		7,475,102.22	1,296.25	45,270.96	7,520,373.18
Wyoming.....		8,722,080.55	1,178,712.22	41,822,755.37	50,544,835.92
Total.....		113,234,430.19	3,898,780.48	75,259,220.78	188,493,650.97
Proceeds, Federal water power licenses.....					1,960,590.86
Proceeds, potassium royalties and rentals.....					2,167,763.96
Receipts from naval petroleum reserves, 1920 to 1938, act of May 9, 1933.....					29,778,300.23
Grand total.....		113,234,430.19	3,898,780.48	75,259,220.78	220,910,306.02

¹ Proceeds for fiscal year, \$33,282.98.

² Proceeds for fiscal year, \$286,298.75.

FEDERAL INVESTMENT EXCEEDS \$900,000,000

The Federal investment in Reclamation since June 17, 1902, when the Reclamation law was approved, topped the \$900,000,000 mark in 1944. Expenditures for construction on all projects during the 12-month period totaled \$51,665,144.79, bringing the total Federal outlay under Reclamation to \$921,770,619.71. (See table 5, p. 34.)

Despite the war restrictions on materials and manpower, progress was made on the construction of irrigation systems under the war food program. While clearances from the War Production Board were not available sufficiently early in the fiscal year to complete war food schedules as planned, the Bureau of Reclamation was able to lay the groundwork for more rapid construction during the fiscal year 1945 and 1946.

The funds available for advancing power installations under the war power program enabled the Bureau to increase substantially not only the Federal investment in power facilities on reclamation projects, but to provide facilities, through additional storage and generating equipment, that are providing revenues for assisting in financing the cost of irrigation systems.

The importance from a financial standpoint of the power installations on Reclamation projects is illustrated by preliminary studies which indicate that about 50 percent of the repayable costs of the entire reclamation construction program as laid out at the beginning of the war, will come from power revenues. Approximately 45 percent of these costs will be repayable by irrigation water users, and the remaining costs will be allocated to nonreimbursable purposes such as flood control, navigation, and contributed labor, or will be repayable by municipalities for supplemental water supplies.

The Congress appropriated \$18,907,200 for construction of irrigation facilities during the fiscal year 1945. The total unexpended balance for construction purposes of all kinds brings to \$80,628,000 the total funds available for this activity by the Bureau of Reclamation during 1945.

Control over the construction of irrigation, power, and other facilities remained in the hands of the War Production Board. Construction of irrigation facilities is recommended to the War Production Board by the War Food Administration, and the construction of power facilities is subject to the direct consideration of the War Production Board.

Division of Power

ARTHUR GOLDSCHMIDT, Director



AFTER the war the problem of how to cope with abundance will beset our economy all along the line, and unless it is solved, will threaten the development of vital irrigation and flood control works dependent upon the Midas touch of power. Power facilities that were hastened to completion for war production must not remain idle to block further multiple-purpose water conservation needed throughout the Nation. Hydroelectric power cannot stagnate without dire results any more than manpower can. If it is unemployed the men and the capital that it supports will be unemployed also.

The country expects this Department to take the initiative in averting such a catastrophe, and quite naturally. We operate the largest aggregate of hydroelectric capacity in the world. We also market power which is generated at dams that are operated by the United States Army Corps of Engineers. The generating plants from which the Department of the Interior markets power produced 17.6 billion kilowatt-hours of energy during the fiscal year, as compared with 12 billion kilowatt-hours last year. As the year ended the total capacity of Department plants in operation amounted to 2,795,000 kilowatts. Other units now being tested will increase this total to more than 3 million kilowatts—an amount of energy sufficient to supply three cities the size of greater New York. And the Rivers and Harbors bill and the Omnibus Flood Control bill, both pending, would authorize the Secretary of the Interior to market, in addition, all the excess power which would be generated by these new projects that are to be constructed by the War Department.

Consequently, this Department has prepared to undertake the task of employment agent to find jobs for power after the war. The job can be simply stated, but it is not simple. We know that a lot of power will be needed in the West, but power works under contract, and in order to prepare for contracts we must know accurately how much power is to be delivered, and precisely where. Approximately how much and

approximately where within half a continent will not do. And the answer to these questions depends on the answers to innumerable others that stem from one big question—what kind of world will the postwar world be? How can more power be employed on the farm, in the home and in the factory? How fast will we fill back orders for such familiar things as radios and refrigerators? What now-unfamiliar things will become as commonplace as bathtubs? What will these necessities be made of? From what base will we extract the raw material? At what rate will they be manufactured? How will altered transportation practices affect certain sections? These and a book-length roster of other questions must be answered before we can know where there will be jobs for power, and for how much power, after the war.

Numerous inquiries have been launched in an effort to acquire the needed information. The power selling agencies of the Department have pursued some of our studies in collaboration with other Federal agencies, or with State or municipal research organizations. We do not pretend to have found the unalterable answer to many of our questions, but our inquiry has been profitable because we have found some reliable clues to what the answers will be when they are found, and we have placed ourselves in a position to be among the first to get the facts when they are established. Also, our work has done more than merely provide guidance for the Department. We have given much assistance to industries, power distributors and to congressional committees and to individual members of Congress.

Among the post-war power planning activities of the Department in which the Division has participated are the following:

General.—The Division has worked with the war agencies on the problem of disposition of war power plants. Some of the large military establishments, constructed during the last few years, have been so located or have required electric power in such quantities that it has been necessary to provide fuel-operated generating plants to serve them. During the past year the Division has initiated discussions regarding the acquisition by the Federal power agencies of those plants which the armed services will not need after the war, as a means of supplementing and firming the power which is now generated at federally owned plants. Such coordination of Government facilities will result in better operations, sounder financial arrangements and lower rates. In many instances such fuel-operated plants can provide needed peaking or standby power which is now being purchased by the Government.

Central Valley project.—The Division participated in studies being conducted by the Department to work out the pattern for the administration and the extension of the multiple-purpose development in the Central Valley and to determine the best method for making available to the people of California its maximum benefits at a minimum cost.

Members of the staff participated, as committee members, in the discussions and studies of 13 of the 24 problems into which the study was divided. These problems included the use of Shasta power for war production, the scheduling of construction features, the reconversion of war plants in the area, the extension of the project to provide additional post-war opportunities, the allocation of cost on the project, and the power policies to be effectuated. Some of the reports resulting from these studies were completed during the year.

Missouri River development.—The Division reviewed programs for the development of the resources of the Missouri River Basin, prepared by the Bureau of Reclamation and the Corps of Engineers, and undertook independent studies looking toward the coordination of the several interests involved in this development. The problem of a unified development on this major stream is being given close consideration.

Pacific Northwest.—The Division participated in discussions and reviewed proposals regarding further development of the Columbia River and its tributaries. These efforts cover the economic development of the area as well as proposals directly concerned with specific river structures, and have as their objective the establishment of a diversified industry as the basis for a more self-sustaining and self-reliant region following cessation of specialized war activities. The Director of the Division, representing the Secretary of the Interior on the Bonneville Advisory Board, participated in the consideration of the problems of securing upstream storage on the Columbia and in the review of the studies of the Administration with respect to the development of industrial opportunities in the Northwest.

Colorado River area.—The Division engaged in a study of the further development of the Colorado River, and of the opportunities for marketing additional power in Arizona to assure this State its share in the resources of this stream, integrated with development of the Pacific Southwest as a whole. Studies of the relationship between the Salt River Valley Water Users' Association of Arizona and the United States and its effect upon post-war marketing possibilities were made in cooperation with the Bureau of Reclamation. The studies included the possibility of integrating these power facilities with the Colorado River power plants to produce a unified operating system, and make possible lower power rates.

ESTABLISHMENT OF SOUTHWESTERN POWER ADMINISTRATION

The work of the Division of Power, which is charged with supervising and coordinating all of the power activities of the Department, continued along the lines that have been dictated by the market-

ing problems resulting from increased tempo of war operations, as well as the concern for post-war conversion and expansion.

The principal work in the field of operations which confronted the Division during the year was the establishment of the Southwestern Power Administration. This agency was created along the lines of the Bonneville Power Administration to market power from dams in Arkansas, Texas, and Oklahoma. By Executive orders of the President, under his war powers and as a war measure the Pensacola Dam of Oklahoma's Grand River Dam Authority, previously taken over by the Government under the Federal Power Act, was turned over on September 1 to the Department of the Interior for operating purposes, and the Department was also designated as the agency to market the power to be generated at the Norfolk and Denison multiple-purpose dams, then rapidly being completed by the Corps of Engineers of the United States Army. The initial installations at these three dams total 130,000 kilowatts. They may ultimately have a combined total capacity of 320,000 kilowatts. The task of setting up the Southwestern Power Administration was undertaken directly by the Division of Power, which handled negotiations with other Federal agencies, helped to formulate basic policies and operating procedures, reviewed recommendations for key personnel, supervised the preparation of operating budgets, accounting procedures and negotiations and reviewed contracts for the sale of power from the three dams.

RATES AND RATE SCHEDULES

Rural Electrification Administration financed projects.—Rural residents served by Rural Electrification Administration financed power distributing projects have been benefited by the rapidly growing power developments of the Department through the availability of abundant power at low rates. Thirty-seven Rural Electrification Administration financed distributing agencies are being supplied directly with energy from facilities under the supervision of the Department at rates ranging down to 2.7 mills a kilowatt-hour.

Reduction in rates to these units, made possible by direct service from Department plants, have ranged from 3 to 27 percent in the case of four projects in the Wyoming-Colorado area, and from 15 to 20 percent in the case of those projects which were served by the Bonneville Power Administration. In addition, one of the conditions of the sale to a private power company in Texas of power from the Denison Dam assured the continuation of low rates to fifteen Rural Electrification Administration projects that are served by that company as long as the Denison power is available.

General.—Recent major rate studies reviewed by the Division included those covering proposed rates for power from Fort Peck Dam, the general rate revisions of the Bureau of Reclamation covering its Wyoming installations, the establishment of an irrigation pumping rate in Arizona by the Bureau of Reclamation and the establishment of new rates by the Bonneville Power Administration. Current studies include possible additional rates for industrial purposes by the Bonneville Power Administration and rates for the sale of power from the Denison and Norfolk projects by the Southwestern Power Administration.

CONTRACTS

Important contracts for the sale of power are reviewed by the Division before execution, in order that a uniform Departmental policy with respect to power sales may be maintained. Although the Division does not generally participate in the negotiations of power contracts, the services of the staff of the Division are made available to the negotiating agency in special circumstances. For instance, during the year the staff of the Division has participated in negotiations of the Bureau of Reclamation (*a*) for the sale of Central Valley project power to the Pacific Gas & Electric Co. as a wartime measure, (*b*) for the sale of Fort Peck project power to the Montana Power Co. as a wartime measure, (*c*) for the sale of Fort Peck project power to the Montana-Dakota Utilities Co. on a long-term basis, and (*d*) negotiations by the Southwestern Power Administration for the sale of power from the Denison Dam to the Texas Power & Light Co. as a wartime measure.

MISCELLANEOUS

The Division took an active part in determining the allocation of the costs of the Grand Coulee Dam among the several purposes for which the project was built. The allocation of these costs is an essential prerequisite to the determination of the rates at which the power from Grand Coulee will be sold.

Through the work of the Division in cooperation with the agencies of the United States that are consumers of power and with the Federal Power Commission the Department was able to help in obtaining substantial savings in power costs to the Government in a number of instances during the year. For example, by temporarily supplying 9,000 kilowatts of power from the Grand River Dam to the Government-owned aluminum plant at Jones Mills, Ark., a substantial saving to the Government was realized.

The Division was also able to render service to the Puerto Rico Water Resources Authority in connection with its priorities problems in the construction of the Caonillas Dam, a necessary link in the

power system that supplies military bases in Puerto Rico. Assistance was also given to the Territorial Government of the Virgin Islands in connection with the power supply for Benedict Field, and to the Oklahoma Ordnance Works, through the Southwestern Power Administration, in connection with the supply of power to that establishment.

The Division continued to participate in the activities incident to safeguarding the national power supply, including consideration of the need for a dim-out and other measures in the interests of conservation of resources for war.

Bonneville Power Administration

PAUL J. RAVEN, Administrator



I. WAR AND PEACE

FEDERAL development of the tremendous water resources of the Columbia River was conceived by the Seventy-fifth Congress as a peacetime project for conservation and utilization of Pacific Northwest resources. During wartime, this program has been modified to meet the requirements of the Nation's first and biggest job—that of mobilizing its resources to win the war.

Under the impact of war the Bonneville Power Administration has telescoped 10 years of normal growth into a brief 5 years. It has delivered 6,472,326,000 kilowatt-hours for war needs during the fiscal year 1944, and has become one of the three largest power systems in the country, with a present energy output of approximately 10 billion kilowatt-hours per year. It has constructed a high-voltage, high-capacity transmission system which has grown from nothing in 1939 to 2,518 circuit miles as of June 30, 1944, involving an investment of about \$75,000,000. This system is marketing power from Bonneville-Grand Coulee generators which have increased in rated capacity from less than 100,000 kilowatts in 1939 to 1,316,400 kilowatts in 1944.

This forced growth has been possible largely because of the Administration's policy of developing Northwest power resources well in advance of immediate demands or specific markets. The value of this policy has been demonstrated time and again during the war emergency as mushrooming industries have steadily increased their production of critically needed war materials with Bonneville-Grand Coulee power.

During the fiscal year 1944, 5 Northwest aluminum reduction plants used Columbia River power in the production of nearly 600 million

pounds of aluminum, or approximately one-third of the Nation's entire output. Part of this aluminum ingot took final form in approximately 30,000 airplanes—again almost one-third of the entire national production for the year. Bonneville-Grand Coulee power was instrumental in turning out 258 ships, including 48 escort carriers, 62 tankers and fleet oilers, 32 Victory cargo ships, and 116 Liberty cargo ships. Less spectacular, but equally important, was the output of magnesium for planes and incendiary bombs, calcium carbide for ship welding, and ferrosilicon for steel—all from plants using Columbia River power. Thus, the Bonneville Power Administration has made a significant contribution to the Nation's ability to produce, a factor which has been vital to the work of winning the war.

Hydroelectric power from the Columbia River has established its right to be termed one of the Nation's most powerful tools of war production. It will play an equally vital role in the post-war development of the Pacific Northwest as a tool for the production of national and regional wealth. The power that today is flowing from Bonneville and Grand Coulee power plants over a vast region-wide network of high-tension transmission lines to huge war plants, will turn the wheels of the region's expanding industrial empire when the war is won.

With Allied victories on every battlefield during the past year casting a growing shadow of complete and devastating defeat over Axis hopes of world domination, attention began inevitably to shift from war to post-war problems, even while the Nation still was engaged in full war production. In the Pacific Northwest post-war thinking and planning has been dominated by a growing realization of one fundamental fact—the vast hydroelectric power resources of the Columbia River Basin hold the key to the future development of the region.

THE CONSERVATION PROGRAM

Multiple-purpose dams on inland waterways of the Nation are a most important means of carrying out the Federal Government program of conservation of natural resources. Bonneville Dam provides the means for impounding and controlling the waters of the Columbia River so that the river can be navigable for oceangoing vessels 180 miles inland, thus reducing transportation costs, prices for many products, and opening new markets for products of the Pacific Northwest. Behind Grand Coulee Dam is stored water for the reclamation and irrigation of 1 million acres of arid but fertile lands. Electric power produced at these Columbia River power plants further utilizes the inexhaustible water resources of the region by converting them into an energy form useful to the people for the production of more goods and

services to improve living standards, and to conserve other sources of energy, such as coal, wood and oil, which are subject to depletion and which should be conserved as much as possible for higher economic uses.

In carrying out these peacetime conservation policies, electric power produced at Bonneville and Grand Coulee Dams must first be used to meet the requirements of navigation, flood control, and irrigation. The remaining surplus power is marketed by the Bonneville Power Administration according to the basic policies laid down by Congress in the Bonneville Project Act of 1937.

REGIONAL LEADERSHIP

Since the enactment of these policies, the Bonneville Power Administration has worked toward and attained a position of recognized leadership in the development of the Pacific Northwest. The Administration in its 7 years of growth has fostered and encouraged Federal and State cooperation in the programming of regional developmental activities.

One of the most significant steps in this direction in the fiscal year 1944 was the formation on July 19, 1943, of the Northwest States Development Association, which is composed of the Governors of Idaho, Montana, Oregon, Washington, and Wyoming, and is aided by a technical committee of people responsible for the engineering and general planning functions in these States. The purpose of the Association is to further the balanced development of the Pacific Northwest and the Columbia Basin, with special emphasis on maximum utilization of the water resources of the region through irrigation, improved navigation, hydroelectric power development and flood control.

In its initial meeting the Association resolved that " * * * it shall be a further duty and responsibility of the Association to avail itself of the services and facilities of governmental, private and public agencies to the end that duplication of effort and consequent wasteful expense shall be avoided in the making of studies, the programming of activities and the carrying on of research."

Emphasizing the importance of the Pacific Northwest as a nerve center of industrial and commercial contact with the tremendous potential markets of the Far East, the association's initial report on a Columbia Basin program states: "It is believed that the rapid advance in Northwest development and production must continue. This advancement must be supported by a progressive and dynamic regional and national post-war reconstruction program. Post-war progress on the Pacific coast and in the basin will be especially great if the national reconstruction program is accompanied by world cooperation and trade. Confidence in the Northwest and its future are based on its geographic location, its great resources, and its people.

“The basic development projects of the Pacific Northwest—begun before the war—have paid tremendous dividends in the war effort. They will continue to pay dividends after the war. The present stage of development is not sufficient to meet either war or post-war needs; continuing and progressive development is necessary.”

THE REGIONAL PLAN

Following general endorsement by the Department of the Interior of the Bonneville Power Administration's proposals for a basin-wide program, representatives of the Administration met with the Five State Governors' Association and presented its program for consideration. This program included the Hungry Horse project in Montana, the Cabinet Gorge and Albeni Falls projects in northern Idaho, the Foster Creek and Snake River projects in Washington, the Umatilla Dam on the Columbia River and the Detroit project in Oregon.

On December 17, 1943, the Association issued its advance program report, which included all of the projects recommended for consideration by the Bonneville Power Administration, as well as a number of additional projects involving irrigation, navigation, and flood-control improvements. The program involves a total expenditure of approximately \$600,000,000 in war emergency and post-war projects.

Gearing its own plans to the multiple-purpose projects outlined in the Five-State Governors' report, the Bonneville Power Administration set up an advance construction program involving approximately \$100,000,000 in new transmission lines and substations designed to coordinate existing and proposed dams and load centers in a region-wide transmission grid system.

In round figures the combined programs outlined by the Northwest States Development Association and the Bonneville Power Administration will add about 1 million acres to the 3½ million acres of land now under irrigation in the region, and will provide improved water supplies for several hundred thousand more. It will increase regional power capacity by about 2 million kilowatts—adding about 60 percent to the total regional capacity through new plants and upstream storage. The combined effects of the program will be broader and more diverse development; the establishment of new industries; new opportunities for employment—for business—for private and public enterprise and for investment.

In addition to increasing materially the real wealth of the region and the Nation, the program will have the effect of bringing about a greater maturity in the Northwest regional economy, particularly through a more advanced development and use of resources, as well as supplying a base for substantially larger population. It follows that public investment will induce at least as much more wealth—in

land, improvements, plant and communities—a prospective increase of some \$1,500,000,000.

PUBLIC WORKS AND REEMPLOYMENT

The immediate post-war program of asset-building, self-liquidating public works will produce some 50,000 construction jobs for returning servicemen and demobilized war workers. In operation the program will produce more than 100,000 continuing new jobs in agriculture, industry, and service, with an accompanying increase of some \$200,000,000 in annual income for the region. A program of the kind suggested will conceivably provide, if continued during the next 2 decades, a base for new regional population of at least 2 million. This will mean, averaging 4 persons to the farm home, 200,000 people on 50,000 new farms; 800,000 people dependent upon 250,000 new industrial jobs, and approximately 1,000,000 people dependent upon 350,000 new service jobs.

Testimony presented by the Bonneville Administrator before the Senate Committee on Postwar Economic Policy and Planning and before the House Committee on Irrigation and Reclamation during the past fiscal year outlined clearly the Administration's fundamental status as a regional developmental agency. Both reports stressed the importance of a balanced and unified program of development in the Columbia River drainage basin as one of the major factors in providing for maximum postwar employment in the Pacific Northwest.

In accordance with the Presidential Executive Order 9384 of October 4, 1943, and to facilitate and coordinate Bonneville Power Administration consideration of a unified advance program, a special committee on advanced planning, programming, and budgeting was formed within the Administration on November 20, 1943. The functions assigned to the committee were the coordination of the Administration's programs and plans with various governmental and regional interests, effectuating necessary technical staff assignments, review and coordination of data and reports prepared by the staff in accordance with such assignments, and presentation of unified recommendations to the executive committee of the Bonneville Power Administration for consideration and review.

The advisory committee was directed to place particular emphasis upon the formulation of unified basin-wide power system development plans for both the wartime and the post-war period. The committee was also directed to give particular attention to the coordination of the administration's advance plans and programs with those of other agencies of the Department, as well as other Federal, State, and local governmental agencies and interests.

During the fiscal year 1944, the committee has successfully brought together those concerned in various advance programming efforts in

the joint consideration of system extension projects; a long-range system development program and a 3-year and a 6-year advance construction program. The committee has also made preliminary studies for the potential use of surplus war materials, equipment and plant by Bonneville Power Administration, public power distributors and industries in the region.

PACIFIC NORTHWEST OPPORTUNITIES

Closely related to the committee's work and a significant contribution to advance regional planning was the publication by the Bonneville Power Administration of the Pacific Northwest Opportunities report. The report, although of a preliminary nature, presented comprehensive flow charts and detailed information on a wide variety of industrial and agricultural possibilities in the Pacific Northwest, together with pertinent comment on raw materials, power supply, and geographical particulars.

Publication of the report met with immediate and widespread acclaim. Nation-wide press comment, as well as complimentary letters from leaders of industry and business, educators and other professional people, members of Federal, State, and local governmental agencies, indicated that the report was not only filling an urgent need for information of this type on the Pacific Northwest but was serving as a definite stimulus to interest in the potentialities of the region.

Pointing out the purpose of the report as well as the purpose of the Bonneville Power Administration program, the preface of the report says: "The underlying aim for the whole region and for all the agencies that serve it is to create a stronger and better balanced economy by raising it further from its status of a mere colonial producer of raw materials. The wastefulness of unused rich resources must be changed to wealth, productively used. The wantonly expensive system of shipping raw materials 3,000 miles east and resulting finished products 3,000 miles back to the west must be eliminated. A more reasonable economy will, it is hoped, result from this study, from similar studies by others and by construction programs."

Referring to the place of power in the program, the preface states: "Hydroelectric power is an outstanding resource in the Pacific Northwest. It is a product of the river-development project. It is the means of enlarging the benefits of all the other phases of the project. It is, besides, the principal key to the development and use of other regional resources. Power irrigation and drainage pumping facilitates reclamation. Power widens the usefulness of both farmer and crops to an indefinite horizon. Power draws minerals from the earth; becomes an essential ingredient in electro-manufacturing and cuts down the cost of other manufacturing. Power supplies terminal, storage, and distributing service in commerce. Power fosters the growth of

many diverse industries and, available everywhere, distributes them throughout the region. Power raises the level of living in city and country. Power is the invisible magic that flows in abundance from river development and leads to regional development."

Further presenting the value of the relationship of various programs and the need for cooperation, the preface says: "Both power development and regional development, so closely related, are matters of deep concern to a number of Federal agencies, States, communities, and private enterprise. All plans must be formulated on a joint or cooperative basis if they are to be comprehensive and realistic. This presentation of a Bonneville Power Administration program could hardly be complete or clear without some indications of other closely related programs for regional development. Similarly, the programs of other agencies cannot be complete or clear without recognition of the related power program of Bonneville.

All the basic plans must be brought together and properly correlated and the interest and enthusiasm of all agencies must be assured for a really effective program for regional development.

The report offers a constructive contribution to regional planning and development programs for future transition from the current war period to peace.

Several sections are devoted to the industrial opportunities offered in the fields of railroad electrification, farm utilization of power, electric steam generation, and electric house heating. In addition to the manufacturing and distribution possibilities offered, each of the foregoing represents a considerable power load building potential.

ADVANCE MARKETING STUDIES

Continuing studies are being carried on to elaborate the material contained in the report. As an example, tests and investigations of electrically heated houses were participated in throughout the year by the administration's utilization staff. Activities were centered at Longview, Wash., where a substantial number of privately-owned homes have been successfully heated by electricity for the past 3 years. During the calendar year 1943 an average of 11,000 kilowatt-hours of energy costing \$73 per home was consumed for heating service in the Longview homes. Information gathered at Longview and submitted to the U. S. Army Engineers was the basis for selection of electric heat for another project of 1,800 houses in this region. The reduction of war loads will stimulate activity by power distributors to expand the domestic market, and facts indicate that electric house heating will triple annual domestic energy consumption. It is estimated that 25,000 houses should be electrically heated in this region within 10 years, representing a heating load of approximately 125,000 kilowatts and marketing 275 million kilowatt-hours annually. Negotiations

have been carried on during the year with the War Production Board to release the materials for electric heaters to be used in new permanent-type houses in the Northwest.

FUEL CONSERVATION

The possibilities discussed in the report for the use of hydroelectricity in the generation of steam as a fuel-oil replacement have passed the study phase and are approaching commercial reality. The markets opening for the sale of power for this use have been vastly accelerated by the requirements for fuel oil in the prosecution of the war.

A major user of fuel oil for steam generation for some time has been the pulp and paper industry, although other and smaller industries are now consuming increasing quantities due to the depletion of other forms of fuels. The estimated amount of heavy fuel oil consumed in Washington and Oregon alone during fiscal 1944 was 13 million barrels. Of this, some 440,000 barrels were consumed in power generation by electric utilities, leaving a balance of approximately 12,790,000 barrels consumed by industry. In heating value 440,000 barrels is the equivalent of 15,400,000 kilowatt-hours. War's demands, higher production cost, and the expanding use of oil as a raw material for manufacture are all factors tending to bring steam generation by means of electric boilers into close competition with other forms of heat production. This is especially true when consideration is given to the substantial amounts of secondary power available which can be sold at a lower cost than is provided by the Bonneville firm power wholesale rate of \$17.50 per kilowatt-year. Based on recent inquiries of the pulp and paper industry and data collected from field investigations, it has been estimated that if all present oil consumption by this industry for the generation of processed steam were replaced by electric power, a market of 450,000 kilowatts of secondary power would be created.

As the foregoing examples indicate, it becomes obvious that wider use of hydroelectricity for domestic and industrial heating purposes as well as for such power consuming purposes as railroad electrification will induce substantial savings in exhaustible wood, coal, and oil supplies, for which science is constantly finding new and higher uses.

CUT-BACKS AND CONVERSION

Late in December 1943 the Administration began to be confronted with threatened cut-backs in production of the northwest war industries it was serving, particularly in the case of aluminum plants. These cut-backs emphasized the need for immediate provision for additional advance marketing studies, in order to be better prepared for remarketing power released by war industries when curtailments occur. The Administration's 1945 budget had been prepared on the assumption that the war would require full war production throughout the fiscal

year 1945. However, some curtailments in production began in December 1943 and as yet no action had been taken on the advance planning budget, which provided for marketing studies to meet situations of this nature. It was concluded, after consultation with representatives of the Department and endorsement by the Bonneville Advisory Board at a meeting held on March 9, 1944, to present an immediate request to the Bureau of the Budget and the Congress for a supplemental appropriation for this purpose to be added to the administration's 1945 fiscal year budget.

The Bureau of the Budget and the President recommended a supplemental appropriation for this purpose of \$254,000. While this recommendation did not reach the House in time for action on the measure, the House committee had indicated general sympathy to the proposal and after hearings the Senate committee and the Senate approved addition of this amount to the 1945 budget. However, in conference the amount was compromised and the sum of \$127,000 was finally approved for this purpose.

In addition to endorsing the supplemental appropriation for advance marketing studies, the Bonneville Advisory Board at its meeting of March 9 recommended reinstatement of priorities for Grand Coulee Unit No. 7 and endorsed the general program for upstream storage development as worked out with the States of Idaho and Montana. Proceedings of this meeting reiterated in large part the findings of the Advisory Board at its earlier meeting held October 11 and 12, 1943.

REGIONAL ADVISORY COUNCIL

Another major development of the year was a decision to proceed with appointment of a group of regional consultants with whom the Administrator could confer regarding regional policy and the developmental program. Arrangements were finally completed for designation of the regional consultants with the endorsement of the Secretary of the Interior and the Advisory Board. The first meeting of the group, comprising 20 regional consultants from the 4 States of Oregon, Washington, Idaho, and Montana, was held in Portland on March 31, 1944.

A general program report was presented by the Bonneville staff outlining the objectives of the Administration and the plans suggested for developmental activity. The remainder of the meeting was devoted to review and critical study of the Pacific Northwest Opportunities report.

A second meeting of the group was held on June 5 and 6, at which time such specific phases of the program as industrial load building and electric house heating were discussed. It was determined that extension of the consultant's deliberations might be carried on by

smaller groups in the localities represented and their findings made subjects for discussion at periodic meetings of the major regional group.

II. SHIFT FROM CONSTRUCTION TO OPERATIONS PROGRAM

The fiscal year 1944 marked a turning point in the history of the Bonneville Power Administration. After 7 years of intensive construction activity the Administration had completed a basic transmission grid system comprising more than 2,500 miles of high-voltage lines. During the year the Bonneville powerhouse was brought to completion by the United States Army Engineers with the addition of generators 9 and 10, and the sixth, seventh, and eighth generators were installed by the Bureau of Reclamation in the west powerhouse at Grand Coulee Dam.

With completion of these major generating and transmission facilities, and with further construction, excepting certain emergency projects, curtailed by the war, there has been a sharp swing toward the operating, research and marketing phases of the Administration's activities. Rapid expansion of facilities to meet the needs of war industries, the steady and accelerating demand of the armed services upon personnel, and other exigencies of the emergency made it necessary to maintain great flexibility within the Administration. Rapid adaptability to quickly changing conditions became a real necessity. Toward this end a general realignment of the Bonneville organization was effected by Administrative Order No. 59, dated November 4, 1943.

ADMINISTRATION REALIGNMENT

The order gave organizational emphasis to the power system operations by establishing a Division of Operations and Maintenance, which formerly was one of five sections in the Engineering Division, and by combining the remaining four sections of the former Engineering Division into a Division of Engineering and Construction. Both new divisions are now included in the Branch of Engineering and Operations, under the supervision of the chief engineer. The net result is a strong, efficient engineering organization, streamlined and well adapted to the major tasks of operations, maintenance and construction which lie ahead.

Similarly, the former Market Development section, which was one of five sections in the System Planning and Marketing Division, was advanced in status to the Division of Industrial and Resources Development. Other functions of the former marketing division were combined in the Division of Power Sales and Service. The two new divisions, which are figuring importantly in preparations for post-war activities, are included in the Branch of Power Management.

A new Branch of Fiscal and Administrative Management was established under the supervision of a controller to embrace a Division of Finance and Accounts, including all budgetary, financial, and accounting functions, a Division of Administrative Services to embrace service functions, and an Organization and Procedure Staff to conduct management studies.

Finally, the executive committee, composed of the branch managers, general counsel, and administrative staff, was formally established to guide and coordinate matters of policy and programming, with responsibility for current administration being delegated largely to the branch and division chiefs.

The new plan of organization was resolved through analyses made by staff members of the administration in cooperation with members of the Department of the Interior, taking into consideration the three-fold nature of the Bonneville Power Administration as an operating utility, a government business organization and a regional service agency.

III. WARTIME OPERATIONS

During the fiscal year 1944, maximum hourly generation supplied by the Bonneville and Grand Coulee plants was 1,355,000 kilowatts as contrasted to 841,000 kilowatts during fiscal year 1943.

The comparison is indicative of the pressure of regional war needs on the administration's transmission system. As the war has progressed it has become necessary to operate all facilities at capacity, and in many instances with heavy overloads, to supply these needs. For example, the Grand Coulee generators have operated continuously for extended periods of time with approximately 20 percent overload and Bonneville generators with approximately 10 percent overload. During the greater part of the year both plants have operated without reserves.

The low water months of this year marked the first period when the entire flow of the Columbia River was utilized through the Bonneville generators. From September 14, 1943, until April 5, 1944, with minor exceptions of a few hours' duration, no water was spilled at Bonneville Dam. During this period, too, the natural flow at Bonneville was augmented, in amounts as high as 28,000 second-feet, by storage water released from Grand Coulee Reservoir. Although the scheduling of such releases was vastly complicated by conditions along the river which affected the arrival time and quantity delivered over wide limits, the operation was highly successful in increasing the generating capability of the Bonneville plant and relieving the necessity for transmitting large blocks of Grand Coulee power over lines that were already heavily loaded.

WARTIME POWER LOADS

Transmission facilities, also, have operated at capacity throughout the year, and in a number of instances, under conditions of extreme overload. A noteworthy example is the No. 1 Covington-Coulee 230,000-volt line which has carried, for weeks at a time, over 210,000 kilowatts of power, often reaching peaks of 230,000 kilowatts, an amount greatly in excess of its normal operating limit of 175,000 kilowatts. Transformer banks in many of the system's substations have been repeatedly loaded beyond rated capacity. This condition has required the installation of forced-air-cooling, portable fans and temporary or semipermanent water sprays in order to permit continuous overloads as high as 60 percent above normal ratings in some instances.

Transmission costs have been reduced during the year, in spite of the strains placed on personnel and equipment. Total transmission expense has increased only 12.8 percent over the fiscal year 1943, while the transmission expense per kilowatt-hour delivered has decreased 33.4 percent. Unit operating and maintenance costs have also shown a decrease.

By operating all facilities at maximum capacity during the past fiscal year, the Bonneville Power Administration has been able to meet not only all power demands of its own war customers but to supply other utility systems in the Northwest Power Pool with 1,810,602,507 kilowatt-hours for meeting requirements of their own systems. This was more than double the previous year's deliveries to other utility systems in the Northwest Power Pool.

THE NORTHWEST POWER POOL

But the Administration's contribution to the effectiveness and success of the Northwest Power Pool during fiscal year 1944 cannot be measured entirely in terms of kilowatt-hours delivered. The Administration's far-sighted policies of establishing interconnections with adjoining utilities and providing transmission and generating facilities in anticipation of war and peacetime needs have contributed immeasurably to the present strength and capability of the power pool. The western group of utilities, in particular, would have been hampered greatly in providing power to wartime loads had the Administration's policies not been followed. The policies were formulated in consultation with the War Production Board and voluntarily placed into effect in advance of Order No. L94 of the War Production Board which applied to all utilities of the United States. Even without curtailment of oil-fired generation, the individual capabilities of practically every utility would have been inadequate to serve its loads

without assistance, directly or indirectly, from the Bonneville-Grand Coulee system.

Three interconnections with other utilities were added during the fiscal year, two at 115 kilovolts with the Pacific Power & Light Co. at Vernita, and Pasco, Wash., and one at 13.2 kilovolts with the Northwestern Electric Co. at J. D. Ross substation. The first two, which stem from the acquisition of all Pacific Power & Light Co. property in the vicinity of Hanford, Wash., by the United States Army, replace the Hanford interconnection as a point of delivery to the company's main system. This interconnection continues in effect, however, as a point of delivery to the Washington Water Power Co.-Pacific Power & Light Co. combination via the 115-kilovolt lines acquired by the Army.

The third interconnection was made at the request of the Northwestern Electric Co. to supply additional hydro energy to that system for displacing fuel-generated energy in the Postland area. Preparations for a fourth interconnection with the Portland General Electric Co. at St. Johns substation at 11.5 kilovolts were also under way at the close of the year. Both of these installations are considered temporary, pending completion by the Portland General Electric Co. of another interconnection with the Administration's 115-kilovolt system near Harborton (West Portland), Oreg.

Approximately 50 percent of the electric energy consumed in the 5 northwest States during the past fiscal year was generated at the Bonneville and Grand Coulee power plants and distributed over the Federal transmission system. At the end of the year the peaking capacity of the Administration's system was approximately 50 percent of the combined 5-State hydro generating capacity, and 44 percent of the total generating capacity. The use of Columbia River energy for displacing oil-fired steam energy in the Seattle and Portland areas saved approximately 3,500,000 barrels of critical fuel oil during the year. Without these contributions by the Administration, the effectiveness of the power pool would have been seriously impaired.

Tabulations of energy receipts and deliveries which follow indicate the scope of the Administration's contribution to the effectiveness of the power pool's operation through the use of interconnections during this fiscal year. It should be noted in the tabulation, "Power Pool Operations," that the amount of energy delivered to the adjoining utilities for their own use is listed separately. The amounts scheduled in the column designated "Other" include energy transferred to the Bonneville Power Administration customers and energy losses in connection with such transfers.

Bonneville-Grand Coulee generation (kilowatt-hours)

	Fiscal year 1943	Fiscal year 1944
Bonneville plant.....	2, 801, 480, 400	3, 488, 873, 992
Grand Coulee plant.....	2, 816, 955, 729	5, 751, 520, 210
Total.....	5, 618, 436, 129	9, 240, 394, 202

Power pool operations—Scheduled interchange¹

Agency	Scheduled to BPA (kilo- watt-hours)	Scheduled from BPA (kilo- watt-hours)	
		For own use	Other
Puget Sound Power & Light Co.....	13, 085, 000	339, 671, 000	169, 826, 000
Tacoma City Light.....	122, 672, 000	222, 018, 000	129, 006, 000
Seattle City Light.....		220, 382, 000	
Washington-Pacific System.....		227, 548, 347	137, 115, 853
Portland G. E. Co.....	24, 000	800, 983, 160	63, 310, 840
Total.....	135, 781, 000	1, 810, 602, 507	499, 258, 693

¹ The other members of the Northwest Power Pool—Northwestern Electric Co. and power systems in Utah, Montana, and Idaho—are not directly interconnected with the Bonneville-Grand Coulee system.

IV. POWER SALES

The Bonneville Power Administration continued to supply power to a major share of the Pacific Northwest's war loads during the past fiscal year, approximately 89 percent of all power generated at Bonneville and Grand Coulee dams going either directly to the Administration's war customers, or to other utility systems in the region to help them meet their war loads.

By June 30, 1944, the Administration had in effect 91 executed power and exchange contracts, with a total over-all contract demand of 1,054,612 kilowatts. This represented an increase of 143,860 kilowatts during the fiscal year. On a contract basis, these demands were divided as follows:

Industrial sales of 894,600 kilowatts; military establishments 23,250 kilowatts; cooperatives 9,170 kilowatts; public or peoples' utility districts 48,200 kilowatts; municipalities, 5,725 kilowatts; and privately owned utility companies 73,667 kilowatts. In addition two municipalities and two private utilities are being served under exchange contracts.

THE PUBLIC POWER MARKET

Three new public-owned power agencies signed contracts during the year, and six new contracts were executed with existing public-agency customers of the Bonneville Power Administration. This brought the total of "public agency" contracts in force at the end of the fiscal year to 54 with a total contract demand of 63,095 kilowatts as compared with a total of 59,685 a year ago. While this increase in contract demand is comparatively small, a better indication of

public-agency growth is gained by a comparison of power consumption figures for the two years. Continuing the upward trend of previous years, the sale of power to publicly owned and operated power distribution agencies, excluding Tacoma and Seattle, by the Bonneville Power Administration increased 60.2 percent, rising from a total of 176,723,021 kilowatt-hours in fiscal 1943 to 283,081,561 kilowatt hours in fiscal 1944.

Public utility districts led the field in increased power use with total 1944 purchases from the Bonneville Administration of 214,923,-990 kilowatt-hours at a cost of \$607,350, as compared with 1943 figures of 123,518,776 kilowatt-hours at a cost of \$364,546. Sales to co-operatives rose from 27,467,193 kilowatt-hours to 37,671,071, while revenues increased from \$122,839 in fiscal 1943 to \$162,756. Sales to municipalities, exclusive of Tacoma and Seattle, climbed from 25,737,-052 in 1943 to 30,486,500 in 1944, and revenue received increased from \$99,212 to \$113,256.

The cumulative list of public agency contracts follows:

Contracts with public agencies as of June 30, 1944

Name of purchaser	Contract demand in kilowatts	Date of execution
I. Public or peoples' utility districts:		
Central Lincoln ¹	(2)	Feb. 25, 1942
Clark County, Wash. No. 1.....	10,250	Aug. 1, 1942
Clatskanie ²	800	Mar. 4, 1942
Columbia River ⁴	(2)	Dec. 18, 1942
Cowlitz County, Wash. No. 1.....	5,000	May 16, 1944
Grant County, Wash. No. 2 ⁵	370	June 12, 1942
Grays Harbor Co., Wash. No. 1.....	3,000	Nov. 1, 1943
Kittitas County, Wash. No. 1.....	200	July 23, 1943
Klickitat County, Wash. No. 1 ⁶	7,575	June 3, 1942
Lewis County, Wash. No. 1.....	400	May 1, 1942
Nehalem Basin ⁴	(2)	July 9, 1942
Northern Wasco County ⁴	4,000	Oct. 28, 1940
Pacific County, Wash. No. 2.....	980	Sept. 8, 1941
Skamania County, Wash. No. 1 ⁸	925	Apr. 9, 1942
Stevens County, Wash. ⁴	(2)	Oct. 8, 1943
Tillamook County ⁴	2,000	May 15, 1940
Union County ⁴	(2)	Mar. 2, 1942
Wahkiakum County, Wash. No. 1.....	700	Feb. 17, 1943
Whatcom County, Wash. No. 1 ⁴	16,500	May 15, 1942
Yakima County, Wash. No. 1 ⁴	2,500	July 9, 1941
Total.....	48,200	
II. Municipalities:		
Canby, Oreg. ⁹	300	Dec. 22, 1939
Cascade Locks, Oreg.....	200	Feb. 14, 1939
Centralia, Wash.....	300	Feb. 13, 1940
Drain, Oreg. ¹⁰	250	Mar. 14, 1941
Ellensburg, Wash.....	2,000	Apr. 1, 1942
Eugene, Oreg.....	(11)	Aug. 20, 1940
Forest Grove, Oreg. ⁹	750	Nov. 7, 1939
Grand Coulee, Wash.....	525	Mar. 6, 1943
McMinnville, Oreg.....	1,000	Jan. 13, 1940
Monmouth, Oreg.....	400	May 1, 1942
Seattle, Wash.....	(11)	May 6, 1940
Tacoma, Wash.....	(11)	Mar. 5, 1940
Total.....	5,725	

See footnotes at end of table.

Contracts with public agencies as of June 30, 1944—Continued

Name of purchaser	Contract demand in kilowatts	Date of execution
III. Cooperatives:		
Benton-Lincoln Electric Cooperative, Inc.	400	Oct. 9, 1942
Benton Rural Electric Association, Inc. ¹²	325	June 4, 1942
Big Bend Electric Cooperative, Inc. ⁵	260	June 11, 1942
Blachly-Lane County Cooperative Electric Association ¹³	50	Oct. 7, 1941
Clearwater Valley Light & Power Association, Inc. ⁵	700	June 17, 1942
Columbia County Rural Electric Association	300	Dec. 1, 1942
Coos Electric Cooperative ⁴	(²)	Feb. 29, 1944
Douglas Electric Cooperative, Inc. ¹⁰	625	July 1, 1942
Idaho County Light & Power Association, Inc. ⁵	160	June 8, 1942
Inland Empire Rural Electrification, Inc. ⁵	1,400	May 28, 1942
Kootenai County Rural Electrification Association ⁵	210	June 9, 1942
Lincoln Electric Cooperative, Inc.	700	May 20, 1942
Nehalem Valley Coop. Electric Association ¹²	100	July 1, 1943
Nespelem Valley Electric Cooperative, Inc.	160	June 25, 1943
Northern Idaho Rural Electrical Rehabilitation Association, Inc. ⁵	400	Apr. 29, 1943
Okanogan County Electric Cooperative, Inc. ⁵	120	June 8, 1942
Pend Oreille County Elec. Cooperative, Inc. ⁵	200	May 1, 1943
Salem Electric Cooperative Association	700	Apr. 26, 1944
Stevens County Electric Cooperative, Inc. ⁵	310	June 2, 1942
Umatilla Electric Cooperative Association ¹²	1,350	Aug. 22, 1942
Wasco Electric Cooperative, Inc.	200	Dec. 1, 1942
Total	8,670	
IV. Irrigation districts:		
Vera Irrigation District ⁴	500	Apr. 4, 1944
Grand total	63,095	

¹ Operating but at present not served by B. P. A.

² No contract demand specified.

³ Operating but at present has only an emergency service connection with B. P. A.

⁴ Not yet in operation.

⁵ Served via W. W. P. Co.

⁶ Served (at Condit point of delivery) via P. P. & L. Co.

⁷ Total of three points of delivery, only one of which is energized or constructed, viz: Condit, 100 kilowatts; North Dalles, 125 kilowatts; Goldendale, 350 kilowatts.

⁸ Served via P. P. & L. Co. at White Salmon River point of delivery, but directly by B. P. A. at North Bonneville and Bonneville dam delivery points.

⁹ Served via P. G. E. Co.

¹⁰ Served via C. O. P. Co.

¹¹ Interchange.

¹² Served via P. P. & L. Co.

¹³ Not energized; completion of line to connect with Eugene substation deferred for duration.

PROGRESS OF PUBLICLY OWNED AGENCIES

The trend toward post-war thinking and planning was evidenced during the year by the increased activity on the part of the Northwest's publicly owned and operated power distribution agencies. A significant move during the year was the concerted effort on the part of the city of Seattle and the public utility districts in the Puget Sound Power & Light Co.'s service area to purchase the company's distribution properties on a system-wide basis. The public agencies requested the Bonneville Power Administration to participate by acquiring the major generating and transmission properties, and by serving as negotiating agent for the transaction.

In February 1943, the public utility districts and the city of Seattle authorized the Bonneville administrator to act as negotiator for purchase of the properties to be acquired by the public utility districts and the city. The Secretary of the Interior also authorized the administrator to negotiate for the purchase of the company's major

generation and transmission facilities, contingent on congressional approval and appropriation of funds.

An offer of \$90,000,000 for the Puget properties was submitted on behalf of the public utility districts, the city of Seattle, and the Bonneville Power Administration to the company's board of directors on May 18, 1944. The offer was rejected on April 13, 1944, on the grounds that it was not made by an agency giving proof that it had the legal power to acquire such properties and evidence of its ability to finance the acquisition.

V. CONSTRUCTION PROGRESS

The Branch of Engineering and Operations continued to prosecute vigorously its curtailed wartime construction program during the year. In spite of handicaps imposed by wartime restrictions, the critical shortage of skilled manpower; and manufacturing delays, all energization dates were met promptly and, in many instances, well in advance of the customers' requirements.

Transmission-line facilities placed in service during the year included Spokane-Trentwood Line No. 2, Willamina-Grand Ronde Line, Boyer-Tillamook Line, Salem Alumina Line, Longview-Columbia Way Line No. 2, and Bradford Island Crossing No. 4.

New substations were placed in service at Tillamook and the Salem Alumina plant; switching stations were placed in service at Pasco and Willamina; and the Earlington switching station was removed and reconstructed at South Renton.

Major additions to substations during the year included: Transformers at Spokane, Tillamook, and Bayview; a temporary transformer at the Salem Alumina plant; transformer cooling fans at Midway and St. Johns; shortwave radio stations at Covington and Midway; construction of 230-kilovolt line terminal facilities at Midway for the Hanford No. 1 and No. 2 lines; 230-kilovolt and 115-kilovolt switchgear additions at Midway; installation of synchronous condensers at Spokane and Troutdale; and installation of static condensers at Alcoa.

Major projects still under construction at the close of the fiscal year included a second 230,000-volt, 183-mile line from Grand Coulee dam to Covington, Wash., near Seattle; a second 230-kilovolt transformer bank at the Midway substation, and condenser installations at two other major substations.

The following tabulation shows, by comparison with fiscal year 1943, the system additions constructed during fiscal year 1944. Generating facilities installed at Bonneville and Grand Coulee by the United States Engineers and the Bureau of Reclamation, respectively, are included for completeness.

Facilities placed in service

Type	Installed at end of fiscal year 1943	Fiscal year 1944		Installed at end of fiscal year 1944
		Added	Removed	
Generation (kilovolt-amperes):				
Grand Coulee (including house unit).....	484,000	324,000	-----	808,000
Bonneville.....	410,400	108,000	-----	518,400
Total.....	894,400	432,000	-----	1,326,400
Transmission lines (circuit miles):				
230 kilovolts.....	1,053.2	-----	-----	1,053.2
115 kilovolts.....	1,058.5	45.6	-----	1,104.1
69 kilovolts and lower.....	323.0	37.6	-----	360.6
Total.....	2,434.7	83.2	-----	2,517.9
Substation facilities:				
Transformation (kilovolt-amperes).....	2,050,579	179,000	22,500	2,207,079
Static condensers (kilovolt-amperes).....	18,890	12,500	-----	31,390
Synchronous condensers (kilovolt-amperes).....	182,500	70,000	-----	252,500
Substations (number).....	43	2	-----	45
Switching stations (number).....	8	3	1	10

VI. FINANCIAL STATUS

The financial position of the administration is indicated by the accompanying balance sheet for June 30, 1944. This statement has been prepared from cost records maintained by the administration in accordance with the uniform system of accounts prescribed by the Federal Power Commission for electric utilities operating under the Federal Power Act. The balance sheet reveals an investment of \$74,842,588 in electric plant before deducting the depreciation reserves of \$3,239,330, leaving a net of \$71,603,258. The plant investment includes only the transmission lines, substations, and related facilities. No amount is included in the plant account for the generating facilities at the Grand Coulee and Bonneville projects inasmuch as these projects are under the jurisdiction of other agencies. Information supplied by the Bureau of Reclamation and the United States Army Engineers in regard to the investment in generating projects as of June 30, 1944, is given below. The data exclude interest during construction and are subject to account review.

Item	Bonneville Dam	Grand Coulee Dam	Total
Joint purpose facilities.....	\$38,471,999	\$137,783,405	\$176,255,404
Direct power facilities.....	36,106,635	37,494,424	73,601,059
Direct navigation facilities.....	5,490,895	-----	5,490,895
Direct irrigation facilities.....	-----	5,266,182	5,266,182
Total.....	80,069,529	180,544,011	260,613,540

The tenth and last generating unit at the Bonneville Dam was installed in December 1943. The estimated remaining investment required to complete this project was only \$2,400,000 as of June 30, 1944. At the Grand Coulee project the ultimate investment is estimated at \$487,000,000, of which \$280,800,000 is direct investment for irrigation works.

Bonneville Power Administration balance sheet, June 30, 1944

Assets and other debits

Utility plant.....		\$74,842,588
Long-term note receivable.....		1 28,000
Emergency fund.....		2 500,000
Current and accrued assets:		
Cash—disbursing officers.....	\$623,009	
Accounts receivable:		
Power customers.....	1,522,028	
Other.....	192,787	
Accrued utility revenue.....	2,001,307	
Materials and supplies.....	2,253,913	
Other current and accrued assets.....	375,225	
Total current and accrued assets.....		6,968,269
Deferred debits.....		652,786
Total revenue receipts deposited.....		36,457,168
Less:		
Emergency fund.....	2 \$500,000	
Cost of Federal power—preliminary.....	3 13,913,891	
Interest expense.....	4 5,671,786	
Operating expense expenditures.....	5 8,980,648	
Total deductions.....		(29,066,325)
Total assets and other debits.....		90,382,486

Liabilities and other credits

Congressional appropriations.....		\$113,920,758
Less:		
Operating expense expenditures.....	5 \$8,980,648	
Unrequisitional appropriations.....	32,667,066	
Total deductions.....		(41,647,714)
Donations and other Federal aids.....		5,003,118
Federal investment.....		77,276,162
Current and accrued liabilities:		
Accounts payable.....	\$320,106	
Other current liabilities.....	77,660	
Total current and accrued liabilities.....		397,766
Deferred credits.....		27,826
Depreciation reserves.....		3,239,330
Contributions in aid of construction.....		175
Surplus.....		9,441,227
Total liabilities and other credits.....		90,382,486

Figures in parentheses indicate a deduction.

¹ Received pursuant to contract of sale of certain plant to Public Utility District No. 2 of Pacific County, Wash.

² Created from revenues in accordance with sec. II of the Bonneville Act.

³ Computed at the assumed rate of \$0.00075 per kilowatt-hour pending completion of cost allocations and financial agreements as to cost of power.

⁴ Imputed interest on Federal investment.

⁵ Expended from appropriations for operations.

The balance sheet indicates that revenue receipts have been deposited in the United States Treasury in the amount of \$36,457,168. These receipts are deposited in a special account, except a very small portion representing miscellaneous revenue covered directly into the Treasury, from which a portion has been or will be allocable to the reclamation fund and the remainder has been or will be covered into

the Treasury to the credit of miscellaneous receipts. Upon the completion of accounting analyses and financial negotiations now under way with the Bureau of Reclamation and the Corps of Engineers, War Department, the accounts of the Administration will reflect the application of revenues in much the same way as private industries apply revenue to meet operating expenses, including the cost of power produced at the two Federal dams, interest on the power investment, and repayment of the power investment through an amortization schedule. Inasmuch as these analyses and agreements have not been completed, a consolidated actual financial statement is not available; but the following pro forma statement for the fiscal year 1944 indicates the administration's approximate financial position.

Bonneville Power Administration pro forma statement of consolidated income (partially estimated), fiscal year 1944

Revenues.....		\$20, 893, 363
Operating expenses:		
Bonneville Power Administration....	\$3, 377, 487	
Bonneville Dam project.....	382, 600	
Grand Coulee Dam project.....	993, 329	
Shasta Units: Rental and special costs.....	1, 000, 000	
	<hr/>	\$5, 753, 416
Depreciation:		
Bonneville Power Administration....	1, 119, 429	
Bonneville Dam project.....	439, 100	
Grand Coulee Dam project.....	700, 000	
	<hr/>	2, 258, 529
Total operating revenue deductions.....		8, 011, 945
Net operating revenue.....		12, 881, 418
Income deductions (interest):		
Bonneville Power Administration....	\$1, 846, 057	
Bonneville Dam project.....	1, 100, 000	
Grand Coulee Dam project.....	2, 195, 000	
	<hr/>	
Total income deductions.....		5, 141, 057
Net income from power operations.....		7, 740, 361

This pro forma statement is based upon information that is now available as to the costs of operating the two generating projects and as to the allocation of the joint investment at these projects to power purposes. In the event the ultimate allocations differ from presently used assumptions, the indicated power cost will be affected. In addition, final figures will reflect adjustments due to the inclusion of interest during construction, and determination of final depreciation and amortization policies. Despite the tentative character of the statements, it is believed that the results are fairly indicative of the answers that may finally be developed.

The statement for fiscal 1944 reflects the actual revenue, operating expenses, depreciation and imputed interest for the Bonneville Power Administration, together with estimates for the expenses, depreciation, and interest at the two dams allocable to power. The statement also reflects estimates of the costs at the dams for operation, depreciation on power facilities including an allocated share of joint items, and imputed interest on the power investment, both direct and joint. The statement thereby indicates the consolidated result of operations, which is a net income of \$7,740,361 for the fiscal year and is available for amortizing or repaying the investment.

Expenses shown do not include any amounts for the amortization of special war investments in transmission and feeder line facilities although \$1,000,000 is allowed in each of the fiscal years 1944 and 1945 for special costs in connection with the installation of two generating units from the Shasta project as a war measure.

Although revenue for fiscal year 1944 exceeded \$20,000,000, a very substantial proportion of the present revenue is derived from service to war plants and establishments. Of the 1,010,262 kilowatts of total contract demand in active executed contracts, 733,600 kilowatts are in industrial contracts subject to cancellation and an additional 40,850 kilowatts are in very short-term industrial contracts. At the Administration's basic rate of \$17.50 per kilowatt-year these cancellable and short-term industrial contracts involve annual revenue of \$13,552,875. Under industrial contracts having cancellation provisions the total amount of cancellation or termination payments, assuming cancellation of all the contracts effective as of July 1, 1945, would be approximately \$9,200,000, which amount has been set up as representing in part the cost of remarketing the power made available by such contract cancellations.

The Bonneville Act and Executive Order 8526 place upon the Administration the responsibility for marketing the power at rates which will make the developments at Bonneville and Grand Coulee financially self-liquidating. The high rate of revenues during the war period, when facilities are operating at extreme overloads and without reserve facilities, has resulted in a surplus that may very well prove to be the medium through which the administration's financial responsibility will be met during the immediate post-war reconversion period when it will be necessary to develop peacetime markets to use the power that has been going into war production. A portion of this surplus should in effect be used now for advance marketing work; the balance will serve as a reserve for post-war adjustments.

VII. ADVANCE TRANSMISSION PROGRAM

Contemplated plans for future transmission line construction based on regional studies made by the Administration are extensive. It is

proposed that the main 230,000-volt transmission grid be extended in the immediate post-war period to tie into the Bonneville-Coulee system new generating plants such as those planned for the Umatilla, Hungry Horse, Cabinet Gorge, and Detroit projects. In addition, new 230,000-volt facilities are proposed for the north Puget Sound area in order to deliver more energy to pulp and paper mills and to meet the demands of expanding industrial growth anticipated in that area.

The over-all transmission capacity of the main system into the Portland area will be increased with new points of delivery. Extensions and reinforcements are planned for the lines into the Willamette Valley. Also planned are extensions into Union County, Oreg., to compensate for power deficiencies in the central Oregon districts.

Contemplated additions to the main transmission grid include lines to Clallam and Jefferson Counties in Washington State to increase the power supply on the Olympic Peninsula now limited by lack of transmission facilities. New lines are planned for Stevens County and the Metaline Falls district of Pend Oreille County to provide for the expansion of the mining industries in the area.

Reinforcement of the various substations and feeder lines of the Bonneville system is planned to help relieve overloaded conditions of facilities and to provide the necessary reserves for normal peacetime service.

These extensions will bring to the outlying districts of the Pacific Northwest a supply of electric power for domestic, agricultural, and industrial uses at the lowest rates available in the nation. To determine the developmental possibilities in these and all other sections of the region, the administration is carrying on a program of county-wide economic surveys. Ten of these have already been completed for counties in the States of Washington and Oregon. A considerable portion of the \$127,000 fund appropriated by Congress for market development activities will be devoted to the expansion and acceleration of these studies in preparation for post-war programs.

Southwestern Power Administration

DOUGLAS G. WRIGHT, Administrator



THE Southwestern Power Administration, an agency of the Department of the Interior, was created by order of the Secretary of the Interior on August 31, 1943, for the purpose of fulfilling the requirements of the Executive Orders 9366 and 9373 which provide for unified administrative control of (a) the operation of the Grand River Dam project and the marketing of the power generated by the project, (b) the marketing of power generated by the Norfork Dam project, operated by the United States Army Engineers, and (c) the marketing of the power generated by the Denison Dam project, also operated by the United States Army Engineers.

The Southwestern Power Administration assumed these duties on September 1, 1943, with the present Administrator appointed as Acting Administrator.

GRAND RIVER DAM PROJECT

The Grand River Dam project was constructed by the Grand River Dam Authority, an agency of the State of Oklahoma, under a Public Works Administration loan and grant agreement. Construction was started in 1938 and the plant began commercial operation May 1, 1941. Of the total \$25,113,636 estimated cost of the project, \$11,113,636 was supplied by the Federal Government as a grant and \$14,000,000 as a loan which is to be repaid by the Grand River Dam Authority from revenues of the project. The initial installation was four 15,000-kilowatt generating units and space for two additional units.

With the power supply for war production becoming critical in 1941, the President on November 21 assumed control of the project on behalf of the United States under section 16 of the Federal Power Act and

designated the Administrator of the Federal Works Agency to operate the project and dispose of the power generated.

Contracts were negotiated for the sale of power to war industries. Forty thousand kilowatts of the capacity were committed to the Ark-La Electric Cooperative, Inc., for transmission to the Defense Plant Corporation's aluminum plant at Jones Mills, Ark. Other war loads served were Camp Gruber near Muskogee, Okla.; the Oklahoma Ordnance Works near Pryor, Okla.; and the Cardox Corporation at Claremore, Okla.

During the period of Federal control, from November 21, 1941, through June 30, 1944, the gross revenue amounted to \$3,630,692.

NORFORK DAM PROJECT

On June 19, 1943, the President under Executive Order 9353 assigned to the Administrator of the Federal Works Agency the additional responsibility of marketing the power generated at the Norfolk Dam project in Arkansas, which is a combined flood control and hydroelectric development on the North Fork of the White River. This project was constructed and is to be operated by the United States Army Engineer Corps. The project was built with an initial installation of one 35,000-kilowatt generating unit and provision for three additional units. The cost of the Norfolk project is approximately \$26,000,000.

Generation for test purposes started on June 18, 1944. Commercial operation is expected to begin by December 1944. Meanwhile, the plant is being used to generate emergency power that is vitally needed in the southwest area because of unexpectedly heavy war loads and the unexpected failure of some generating equipment on the systems of the privately owned utility companies.

DENISON DAM PROJECT

The Denison Dam project, built by the United States Army Engineer Corps and located between Texas and Oklahoma on the Red River near Denison, Tex., was scheduled for completion in 1944.

The Denison Dam project, like the Norfolk project, is a combined flood control and hydroelectric development. It is also to be operated by the United States Army Engineer Corps. The cost of the Denison project is approximately \$54,000,000. The initial installation consists of one 35,000 kilowatt generating unit and provision for four additional units.

The project commenced test operations in June 1944 and is now being operated on an emergency basis to supply power in the north Texas area. Commercial operation is expected to begin during the first half of 1945.

COORDINATED OPERATION OF THE THREE PROJECTS

With three federally controlled projects within a short distance of each other, it was readily apparent that their operations should be coordinated to assure maximum efficiency. Since the Secretary of the Interior was already well experienced in power-marketing operations through his supervision over the Bonneville Power Administration and the Bureau of Reclamation, the operation of Grand River Dam and the marketing of power from all three projects were placed under his jurisdiction on September 1, 1943.

The Grand River, Denison, and Norfolk Dam projects are all connected to the Southwest power pool transmission network. It is possible, therefore, to coordinate their operations by arranging for the interchange of power and energy between projects during periods of low water or in emergencies as well as for meeting high load commitments. When full commercial operation starts, this flexibility of exchange of energy will permit the Government to make commitments for each project for considerably more load than it could if each project were operated separately. This gain will directly benefit our war effort.

MARKETING POLICIES

The Grand River Dam project has its own transmission system which enables it to serve its customers directly and without relying on the facilities of others. Interchange agreements with the Public Service Co. of Oklahoma and the Oklahoma Gas & Electric Co. provide stand-by and off-peak steam-generated power and energy.

Project sales approximate 420 million kilowatt-hours of firm energy a year.

The Denison and Norfolk projects, on the other hand, do not yet have adequate transmission facilities. It was therefore necessary, for the time being, to market the power produced by these projects through the existing transmission facilities of the private utility companies. Under these circumstances it was necessary to negotiate agreements whereby the energy would be sold to the nearest private utility company and these companies in turn were to pass on to war industries, rural electric cooperatives, and other customers the financial benefits derived from the purchase of this low cost energy. A contract has been executed for the output of the Denison plant, providing among other things for a rate reduction in excess of \$400,000 per year. A similar contract is being negotiated with the Arkansas Power and Light Co. for the output of the Norfolk plant.

POST-WAR OPPORTUNITIES

The Grand River Dam project has as customers three municipalities and four Rural Electrification Administration projects. In

addition to these it serves a new plant of the Cardox Corporation at Claremore, and has a contract to serve the new Goodrich Rubber Products plant at Miami, Okla. These are permanent customers which are expected to continue in business after the war. The Denison and Norfolk projects do not as yet have any industrial customers.

The Southwestern Power Administration has an industrial unit which is engaged in the promotion of new customers for the area that will use power after the war. This unit is working with the various chambers of commerce and civic groups throughout the area in the preparation of industrial surveys of the various towns and cities in the regions served by the Grand River, Norfolk, and Denison Dam projects. The Arkansas, Red, and White River Valleys served by these projects offer a promising field for industrialization because of the abundant natural resources and raw materials in their regions.

While the capacity of the three dams is at present largely required for war purposes, there is ample opportunity for post-war operations to absorb the entire output of these three projects as well as a number of new projects which are to be built by the Army after the war. In order to assure proper disposition of this additional power and energy, the Southwestern Power Administration is now studying post-war market possibilities of the area and the transmission facilities needed to serve this probable market.

Bureau of Mines

R. R. SAYERS, Director



FOREWORD

IN CENTERING every effort on the fulfillment of war assignments, the Bureau of Mines in 1944 contributed heavily to the procurement of adequate mineral commodities for victory and the post-war security of the United States.

The great expansion of domestic production, implemented by increased imports during the year, assured ample supplies of virtually all major metals needed for war and essential civilian use. By adding millions of tons to the Nation's known reserves of critical and essential ores and by developing new processes for the utilization of these domestic ores, the Bureau not only furthered the war program but also strengthened national security and improved the prospect of new and better materials for peacetime America.

The war activities of the Bureau augmented its accumulated knowledge of the mineral resources of the United States and Alaska. The urgent demands for metals and minerals prompted the most extensive exploratory program ever attempted. But the urgency of the program at the same time stressed the need for a complete inventory of these resources before another national emergency arises.

Maintaining extreme flexibility in all of its activities, the Bureau swiftly shifted the emphasis of its exploration and research programs to meet each new requirement. As market analyses and military strategy indicated changes in the availability and need for certain metals and minerals last year, the Bureau modified its search for such traditionally strategic minerals as manganese, chromium, mercury, and tungsten, and stressed such minerals as fluorite, beryl, optical calcite, and barite instead.

The exploratory program, conducted in part with the cooperation of the Geological Survey and State agencies, made substantial contributions toward an adequate supply of all these minerals. In addition,

it made known important additional reserves of bauxite, alunite, aluminous clay, mica, and the ores of iron, zinc, lead, copper, molybdenum, and vanadium, together with workable deposits of numerous nonmetallics, including fluorspar, graphite, corundum, kyanite, sillimanite, celestite, and block talc.

Thousands of ore samples were analyzed and many of these were subjected to beneficiation tests to determine whether the minerals could be feasibly extracted. Laboratories and pilot plants developed successful processes for the production of manganese and chromium from domestic low-grade ores and demonstrated methods for the utilization of available low-grade bauxites, alunites, and aluminous clays. Metallurgical investigations and ore-dressing studies conducted on many zinc, lead-zinc, and other ores extended the lives of existing mines and demonstrated the workability of newly developed ore bodies. Milling tests on pegmatites yielded acceptable concentrates and indicated that, with further refinement, milling may supplant wasteful and inefficient hand-sorting of these ores.

A process developed by Bureau chemists and engineers added a new light, strong, and corrosion-resistant metal, titanium, to the practicable list of materials of the future. Industry achieved a considerable reduction in metal losses by adopting techniques evolved from the Bureau's research on the recovery of valuable constituents from aluminum and magnesium drosses, powders, and dust.

With war draining the Nation's petroleum reserves and hastening the day when the United States may have to look elsewhere for motor fuels and lubricants, the Bureau completed preliminary plans for an extensive research program on producing synthetic liquid fuels from coal, oil shale and other materials. Airplanes and automobiles already have been operated successfully on synthetic fuels produced in the Bureau's laboratory-scale pilot plant. Now the task is to build and operate larger demonstration plants to provide technical knowledge and make commercially feasible what may possibly become a great new post-war industry. The preservation of motorized transportation and assurance of adequate national defense for future generations of Americans are the goals.

As coal and all other fuel shortages became acute, war industries relied more heavily upon the Bureau's many services in the field of solid fuels. The Bureau surveyed the entire beehive coke industry and provided technical aid to facilitate production of high-quality metallurgical coke of uniform grade for the steel industry. It explored coal fields of the West to find new sources of coking coals, advised on the substitution of available coals for specialized uses, helped mine operators improve the quality of their product, developed safe methods of storing subbituminous coal during the slack season to ease the manpower shortage, and maintained a consulting service for in-

dustry and Government on fuels and fuel-burning equipment. Millions of tons of coal were sampled and tested for Army, Navy, and other Government purchasing agents, and the volume of boiler water samples analyzed was tripled, saving thousands of dollars and increasing the efficiency of Federally-operated power plants.

With the cooperation of industry, the Bureau opened a Nation-wide fuel efficiency program to combat waste in the industrial and commercial use of all types of fuel and energy.

The Bureau's research on petroleum and natural gas, conducted under stress to meet war objectives, will contribute heavily to the needs of the peace era to come. To supply more oil for war but at the same time prolong the life of the Nation's oil fields, long-range engineering studies were made of producing areas engaged in primary extraction and the latest technical information on secondary recovery was collected and disseminated among operators. Many special reports prepared for the Petroleum Administration for War aided refiners in meeting production schedules on fuel for warplanes, toluene for explosives, and other petroleum products. Particularly significant was the discovery of new sources of base stock and high-octane components for blending into aviation gasoline.

By completing and putting into operation three new helium plants within a single year, making five in all, the Bureau again met the vast helium requirements of the armed forces and, in addition, provided considerable quantities for commercial consumers and the scientific development of new uses for the post-war period.

The Bureau made more than 4,000 chemical analyses and control tests on explosives and inflammable materials, supplementing its own work by placing at the service of the Army, Navy, and other war agencies its research facilities and years of experience in testing blasting materials for the mineral industries. In addition to providing technical information needed in designing munitions and safeguarding manufacturing plants, the Bureau determined inflammability and explosibility factors for organic chemicals used in rapidly expanded textile, synthetic rubber, and plastics industries, and developed new safety standards governing diesel mine locomotives and mine explosives.

With the assistance of the safety, plant-security, and health programs of the Bureau of Mines, the mineral industries in 1944 lowered accident rates in some fields despite war handicaps, and maintained a perfect antisabotage record in all. This is concrete evidence of greater safety achievements to come when the end of the war eliminates the adverse conditions embodied in long hours, inexperienced labor, equipment shortages, and the need for maximum production.

Federal coal mine inspectors visited and revisited hundreds of mines in the United States and Alaska, and attributed the innumer-

able improvements for protecting life and property not only to Federal recommendations but also jointly to company initiative, employee cooperation, and State action. The accident-frequency rate in mines reinspected by the Bureau declined about 6 percent, and coal-mine fatality rates dropped to the lowest point in the industry's history during the first 6 months of 1944.

Safety engineers and instructors trained 25,000 employees of mining and affiliated industries in first aid, and thousands more in mine-rescue and accident-prevention procedures. Bureau men investigated mine fires, explosions, and accidents, and often risked their lives participating in rescue and recovery operations after disasters.

Attributed in a large measure to industry's cooperation in following Federal suggestions, not a single established case of sabotage marred the wartime explosives control and mineral production security programs of the Bureau of Mines. More than 500,000 licenses, including renewals, were issued under the Federal Explosives Act, and special investigators for the Bureau inspected 6,000 stores of explosives last year. Mineral production security engineers inspected or reinspected approximately 2,000 mines, mills, and smelters, and the program was so successful that the staff was curtailed and the emphasis shifted to prevention of production losses from fires and accidents instead of sabotage.

Special research studies were made on air contaminants, and thousands of air samples containing harmful gases and dusts were analyzed for the Army, Navy, and industry. Confidential investigations were made for the Navy on indicating instruments which may protect lives in mines after the war as they do now on ships of the fleet. Inspections were conducted and recommendations prepared on hygienic conditions in mines, plants, and Army posts.

To aid Government and industry in assuring adequate mineral commodities for prosecuting the war and for the anticipated advance in post-war living standards, the Department of the Interior consolidated all of its mineral economic services in the Bureau of Mines. Now providing accurate and up-to-date information on all phases of domestic and foreign mineral production and consumption, these services will be converted swiftly under plans already prepared to help peacetime agencies charged with dealing with vital domestic and world problems such as disposal of Government-held metal and scrap, and unemployment resulting from possible mineral production curtailments, and with such questions as the international control of minerals used in munitions, and equitable distribution of the world's mineral output.

Collecting, analyzing, and publishing current and periodical data on all mineral commodities, the Bureau's commodity specialists undertook many special studies on foreign mineral resources for the War

and Navy Departments as the armies of liberation shattered the ramparts of Axis strongholds and took up the complex relief and rehabilitation problems of freed peoples. With victory on the way, the Bureau received an increasing number of inquiries on reconversion and other post-war problems as Government and industry became more aware of the need for market analyses, including adequate information on mineral uses, supply, and potential demand, to guide public and commercial policy.

Demands from industry, war agencies, and the public for published information continued to increase. Many bulletins, technical papers, handbooks, and Minerals Yearbook chapters were published, but the number of copies printed and distributed was held to a minimum under a rigid policy of economy. Shortage of paper, difficulties of printing, and lack of stenographic help made it necessary to delay publication of many other reports. This postponement resulted in a flood of telephone and personal calls, consuming hundreds of man-hours of the time of the Bureau's engineers, technicians, and commodity experts. It is hoped that these reports, together with a large wartime accumulation of other valuable but still confidential information can be published after victory to service the mineral industries and the general public.

FUTURE WORK

With some of the Nation's richest mineral reserves becoming depleted because of unparalleled military demands, the Bureau of Mines has planned for 1945 another extensive program of exploration and research to develop new domestic sources of these materials as a cushion against the needs of a possibly protracted war and the vast deferred requirements of the post-war world.

Working toward its ultimate goal of a complete inventory of the mineral resources of the United States and Alaska, the Bureau will undertake continent-wide explorations for chromium, manganese, nickel, cobalt, copper, fluorspar, lead, zinc, magnesium, mercury, molybdenum, tungsten, vanadium, and the many pegmatite and non-metallic or industrial minerals. As in the past year, the emphasis given the quest for each mineral will vary with the strategic war needs of the moment.

The Bureau's engineers, metallurgists, chemists, and other technologists will continue to seek and develop the best methods of utilizing known and newly proved domestic mineral reserves, a vital part in the program of stock-piling for both anticipated and unforeseen developments.

One of the more important projects, an investigation of raw material resources for steel production, will be further developed to assure the required steel for an extended war if necessary and to retain for

the post-war United States the ability to compete in world mineral production. Aimed at effective utilization of widespread deposits of steel-making materials, including the ferroalloys and fluorspar as well as iron ore, the program calls for compilation of a detailed record of these resources and the construction of three pilot and demonstration plants in the areas in which the raw materials exist.

A 5-year program of research and demonstration-plant construction will be pursued under the Synthetic Liquid Fuels Act in cooperation with the oil and coal industries. The program envisages the construction of an oil-shale demonstration plant and demonstration plants for synthesis of liquid fuels from coal and lignite to provide the information on design and operation needed for ultimate private commercial developments. Meanwhile, research will continue in the Bureau's laboratory-scale hydrogenation plant, and a pilot plant under construction at Grand Forks, N. Dak., will be completed for gasification of subbituminous coal and lignite to provide water gas for reduction of iron ore and synthesis of oil or gasoline from coal. The Bureau's newly installed electron microscope will be used to study the constitution of coal in relation to the problems of carbonization and hydrogenation.

To assist the anthracite industry, new research programs are underway on the prevention of floods, and increased production by mechanical mining.

To increase pig-iron production, new and more extensive investigations will be conducted with a view of improving the quality of coking coal and metallurgical coke. Exploration of western and southwestern coal fields for new sources of coking coals will continue, together with research on problems of making and using sponge iron, producing steam from solid fuels, effects of slag on furnace performance, use of substitute fuels, fuel-burning equipment, explosives, and mine operations. The scope of tests on the explosibility of industrial dusts will be widened to include factors not amenable to laboratory treatment, and the Nation-wide campaign promoting efficient commercial and industrial use of fuel and energy will continue.

With the expansion of helium-production facilities virtually completed, activities have turned to economies in production, conservation of helium, better transportation methods, and wider commercial uses. Pipeline facilities needed to return surplus helium to underground storage will be completed in October 1944, saving for future military, medical, scientific, and commercial uses millions of cubic feet that otherwise would be lost forever in fuel gas going to market. Investigations will be undertaken for improving metals by using helium in their manufacture and for bettering the process in which helium is used as an inert atmosphere around the torch in welding magnesium, aluminum, and alloy steels. A pilot plant is being constructed for

liquefying helium in large quantities for use in investigating metallurgical processes and properties of metals, and efforts will be made to design a container for transporting helium in liquid form, which would save vast quantities of steel required for cylinders and tank cars, reduce freight charges, and lighten the burden on transportation facilities.

Congress having appropriated funds for the employment of 25 additional coal-mine inspectors, the Bureau will increase its total field staff to 132 inspectors and 10 specialist engineers and inspect a greater number of mines. This should result in more improvements in safety practices and further curtailments in coal-mine accident rates over a period of years.

SUMMARY OF ACTIVITIES

TECHNOLOGICAL WORK

Exploration and Metallurgical Research

As the flood of the United Nations' war production approached the crest and required more and more raw materials, mineral exploratory crews of the Bureau of Mines ranged into new and untouched areas of the United States and Alaska and its scientists delved deeper into the mysteries of metallurgy to meet each new challenge for metals and mineral products.

Changing fortunes of war altered the relative need for various metals, and the Bureau swiftly shifted the emphasis of its exploratory and research work from such traditionally strategic minerals as manganese, chromium, mercury, and tungsten, to fluorite, beryl, optical calcite, and barite. The exploratory work made substantial contributions toward a growing security in each of these materials, and the Bureau had a leading part in developing a new alloy of copper, electrolytic manganese and nickel, which may make a future supply of beryl for motor parts and other uses less critical.

The search for additional bauxite and the demonstration of methods for utilizing domestic low-grade bauxites, aluminous clays, and alunites were continued with outstanding success. The quest for more raw materials for the steel industry, including alloying elements, established important new sources of iron, tungsten, nickel, and chromium ores. Bureau laboratories concentrated on effective utilization of these ores and those from low-grade manganese and chrome deposits found by exploratory crews. Some of the processes developed doubtless cannot be employed during the present war, but they will be available in any future emergency.

A large volume of work remains to be done, and additional pilot plants are planned for 1945 to demonstrate how to utilize minerals

of definite areas in war and peace. Mining and metallurgical research will be conducted in the eight experiment stations and the program will be administered through regional and district offices to maintain close and effective cooperation with the mining industry and with State and other local agencies (as of June 30, 1944, there were 3 regional offices and 25 district offices). A new electrodevelopment laboratory, authorized by Congress 2 years ago, has been opened at Albany, Oreg., to study mineral treatment problems of the Northwest, where low-cost power will be a factor in post-war developments.

Advancements of the Bureau toward the projected goal of a complete inventory of national mineral resources and effective methods of processing these minerals are reflected in the progress reports for various commodities.

Iron, steel, and ferroalloys.—Substantial tonnages of ore were indicated in many areas as the Bureau of Mines, helping the iron and steel industry maintain its war production schedules by providing adequate raw materials, explored 70 deposits in 30 States and Alaska during the year. Some of the 70 deposits, which included 35 iron, 4 chromium, 6 manganese, 3 molybdenum, 3 nickel, 4 vanadium, 7 tungsten, and 8 fluor spar deposits, are now supplying the metal for landing boats, heavy guns, tanks, and other weapons being used to drive the Jap from his island outposts and the Nazi from occupied areas of Europe.

Continuing its exploration for additional iron ore for a greatly-expanded steel industry, the Bureau has found large tonnages of usable ore in Utah, Nevada, California, and Montana to feed the new blast furnaces of the West. At the Scotia mine in Pennsylvania, the Bureau indicated more than a million tons of washed ore reserves (brown ore) with a marketable grade between 48 and 51 percent iron, and the property should be in production soon, for commercial interests were erecting a sink-float plant to beneficiate the ore. At the Poorman iron deposit on Kasaan Peninsula, Prince of Wales Island, Alaska, an exploration project indicated approximately a million long tons of measured ore, with an average content of 52.4 percent iron. In Georgia, similar work resulted in the mining and shipment of considerable tonnages of brown iron ore to the furnaces at Birmingham, Ala.

Intensive study has shown that most of the iron ores from deposits explored by the Bureau can be concentrated to metallurgical-grade, and that very high purity concentrates particularly suited to one type of sponge iron manufacture can be produced from a deposit in North Carolina and another in New Mexico. Adoption of a non-choking classifier developed by the Bureau made possible additional recoveries with higher-grade products at plants treating Alabama red iron ores.

Sponge iron research and pilot plant work progressed at several points. At Laramie, Wyo., production was begun at the large sponge iron rotary kiln demonstration plant, using local coal and iron ore as the raw materials, but additional investigations will be necessary before the commercial possibilities are known. At Longview, Tex., experiments were completed at a semicommercial plant using natural gas and Texas iron ore, and commercial interests were considering recommendations for changes to bring the plant into production. A dual process was developed for making sponge iron from low-grade, refractory, Minnesota iron ores, using gas obtained from North Dakota lignite, and plans were completed for combining these steps in a demonstration plant. About 250 tons of sponge iron, produced in Bureau-operated brick plants in Ohio and North Carolina, was being used in commercial plants to determine its value for the production of steel and wrought iron.

To lessen the dependence of the steel industry upon imports of ferroalloys, the Bureau of Mines last year conducted exploration work for all of these minerals—chrome, manganese, cobalt, nickel, tungsten, vanadium, and molybdenum.

A large tonnage of low-grade manganese ore was delineated in Pennsylvania, and Bureau exploration projects for manganese iron ore were successful in Georgia where two of the properties drilled were in production. Mining, ore-dressing, and other problems involved in using the extensive but low-grade manganese ores at Chamberlain, South Dakota, still were under study.

As the shipping shortage eased, permitting importation of higher-grade ores, all of the major manganese production projects recommended by the Bureau were abandoned except one—the milling project at Butte, Montana. The Las Vegas hydrometallurgical project, which had not been recommended by the Bureau, failed to produce substantial quantities of manganese and proved the need for extensive pilot-plant testing of processes before large-scale use. Such tests were completed on two processes developed in the Bureau laboratories, the nitrogen dioxide and the dithionate methods, and these now are available for quantity production of manganese from domestic low-grade ores in any future emergency.

The foundation for effective peace-time use of domestic manganese deposits was laid firmly at Boulder City, Nev., where the Bureau's electrolytic manganese pilot plant was operated with greater efficiency. The product was used in magnesium bomb cases and in a variety of steels and nonferrous alloys tested for commercial value.

The Bureau continued exploration work on the iron-nickel-chromium ores of Washington and completed small-scale pilot plant tests demonstrating the feasibility of smelting these ores.

An entirely new tungsten area was opened, making the East a potential producer for the first time, when a large tungsten ore deposit was explored by the Bureau in North Carolina.

Deposits of molybdenum also were explored in North Carolina, Montana, and Arizona. The most outstanding find was in Halifax County, North Carolina, where about 500,000 tons of inferred low-grade ore with an average content of 0.55 percent molybdenum was indicated. A substantial tonnage of submarginal molybdenum material was found in Montana.

Completing approximately 39,000 feet of diamond drilling on 40 vanadium properties in the Colorado-Utah area, the Bureau indicated approximately 40,000 tons of minable ore and a considerable part of this ore already has been mined. Exploration of vanadiferous deposits in Wyoming revealed approximately 1,481,000 tons of inferred low-grade ore with an average grade of about 0.746 vanadium, and methods for treating this material have been developed in Bureau laboratories.

Important new fluorspar industries with a promise of peace-time permanency sprang up in Utah and Texas as a result of Bureau work, and approximately 41,500 tons of fluorspar with an average grade of 30 percent, which can be concentrated, were indicated in the Kentucky-Illinois fields. Metallurgical tests conducted in conjunction with exploratory work on fluorite deposits in Utah, have shown the ore to be amenable to concentration for production of metallurgical and acid-grade fluorspar, and the Bureau has developed a method by which the finely-divided flotation concentrate can be agglomerated to meet the size requirements of the metallurgical industry. A mill was constructed and this property went into production. The Bureau's exploratory work in Texas opened a new fluorspar mining district in the Eagle Mountains of Hudspeth County which is one of the more significant recent developments in that State.

Nonferrous minerals.—Concurrent with an expanded program of exploration and research on zinc and lead ores, the Bureau of Mines launched a major drainage project to revive the dormant Leadville district in Lake County, Colorado, where 84 flooded mines have been idle since 1933. A tunnel now under construction for the permanent gravity drainage of these properties will make available an estimated 4 million tons of readily-mined zinc, lead, and manganese ores for the security and commercial needs of post-war America.

Exploration of 30 deposits in 15 States last year added 12 million tons of new zinc and lead-zinc ores to the country's reserves. In the same period, 730 zinc and lead deposits were examined by Bureau engineers, and ore-dressing tests and other metallurgical investigations in the Bureau's laboratories determined efficient methods of utilizing many ores. These combined activities extended the lives of producing

mines and demonstrated the workability of newly developed ore bodies.

Conducting 17 exploration projects for copper in 10 States, the Bureau marked out 773,000 tons of commercial ore containing 2.0 percent copper and 406,000 tons of marginal ore containing 1.3 percent copper. The work involved diamond and churn drilling, trenching, test-pitting, rehabilitating old mine workings, sampling, and drilling long holes with percussion air drills.

Carrying their quest for tin to remote Seward Peninsula, where only the storm-whipped Bering Strait separates Alaska from the Soviet Union, Bureau engineers explored six deposits before snow and bitter cold compelled suspension of the work until another summer. Three additional deposits were explored, two in Montana and one in California. A recoverable reserve of 3,450 tons of tin was indicated in three of the nine deposits.

Ore containing the equivalent of 6,100 flasks of mercury was delimited by a Bureau exploratory crew at a mine in Alaska, and drilling in Napa County, Calif., indicated submarginal mercury ore in sufficient tonnage to warrant continuing the work in the 1945 fiscal year. No ore was found in 3 other explorations.

Trenching, tunneling, and diamond drilling were carried out on 19 pegmatite deposits in 9 widely scattered States, and extensive experiments were conducted on ore-dressing methods for extracting the minerals from their ores. At 9 deposits, Bureau personnel established workable reserves of strategic mica for radio parts and aviation spark plugs; at 8, significant quantities of beryl for alloys used in springs, motor parts subject to wear, and parachute harness fasteners; at 2, commercial quantities of lithium for high-conductivity copper castings, ceramics, and pharmaceuticals; and in 2 others, exploitable reserves of rare tantalum minerals for radio vacuum tubes and surgical and dental supplies.

Recent pioneering tests in the Bureau's laboratories and pilot plants on the milling of pegmatites to segregate the desired minerals have yielded acceptable concentrates, indicating that with further refinement milling may supplant the present wasteful and inefficient hand-sorting of these ores.

Nonmetallic minerals.—Now essential in a multiplicity of war products, the nonmetallic or industrial minerals will acquire added importance in the approaching post-war period when there will be an immense demand for building materials, insulating products, fertilizer minerals, paints, pigments, and inorganic compounds. With the double objective of satisfying the needs of war and peace, the Bureau of Mines charted workable deposits of graphite, corundum, optical calcite, kyanite, sillimanite, celestite, block talc, and barite. Means for beneficiating and using these domestic resources were developed

through intensive laboratory research and partial independence of foreign sources was established.

Achievements of the year were numerous. Light-weight, high-temperature refractories of the "Navy" brick type were made from topaz and domestic kyanite but will require some minor perfections. Special insulators for military and other radio equipment were prepared from domestic talcs, replacing former imports, and promising deposits of block talc were found in California and Montana. Exploration for domestic graphites was concluded and methods were developed for recovering a maximum of large flake needed as a lubricant, for foundry facing, in the manufacture of crucibles, stoppers for steel ladles, and other war uses. Eliminating a long rail haul, commercial development began on foundry molding sands explored in Oregon, and a tremendous reserve of commercial-grade sillimanite discovered in South Carolina will be exploited more thoroughly at once. Preliminary tests on bauxitic clays associated with the Alabama and Georgia bauxites indicated that many were suitable for high-temperature refractories, and they will be investigated in greater detail. Domestic clays were classified and a publication was issued enabling the average person interested in the development of clay products to determine for what purpose a specific type is best adapted.

Light metals.—Anticipating the accelerated tempo of the victory drive and the demands for aluminum, magnesium, and their alloys, the Bureau of Mines called on its exploratory, laboratory, and pilot plant crews to promote a still greater output of these light metals from domestic sources.

Responding to the challenge, exploratory crews quadrupled their 1943 discoveries by increasing known reserves of bauxite more than 40 million tons, of which about 15 million tons were of a grade suitable for direct use in present Bayer alumina plants. Since much of the bauxite was found at depths supposed to preclude economical exploitation, the Bureau undertook studies to develop new methods of mining the material. In Arkansas, construction began on a pilot mill to demonstrate the commercial feasibility of a Bureau process for beneficiating low-grade bauxite to yield a feed for Bayer-plant processing.

Other exploratory drilling increased the reserves of alunite, another alumina-bearing material, to more than 32 million tons, and the Nation's aluminous clay deposits were proven to exceed 1 billion tons.

A large factor in securing War Production Board authorization for the construction of several 50-ton-a-day semicommercial alumina plants, the Bureau's pilot-plant work on chemical processes was continued to permit use of alunite, clays, and other aluminiferous ores. Commercial sponsors of the alumina plants called upon Bureau engineers for aid in designing, installing, and ultimately putting the plants into operation.

At the Bureau's Norris, Tenn., laboratory, engineers and chemists developed a process for producing magnesia, nickel, chromite, and silica gel from North Carolina and Washington olivines, a magnesium-silicate material which constitutes the Nation's second largest reserve of magnesium and one which previously had defied attempts at utilization. The process will be carried to the pilot-plant stage to obtain information on cost, design, and operation.

A process for the production of magnesium oxide and magnesium chloride from dolomite was developed with the cooperation of a private concern and was submitted to pilot-plant tests. During this investigation, a method was found for rotary kiln decomposition of magnesium chloride hexahydrate, an operation that had been considered commercially impracticable. Large-scale pilot work on the production of magnesium metal directly from the oxide by electrolytic means was continued, together with research on the carbothermic reduction process.

Industry achieved a considerable reduction in metal losses by adopting techniques evolved from Bureau studies on the recovery of valuable constituents from aluminum and magnesium drosses, powders, and dust.

Titanium, a light, strong, and corrosion-resistant metal, was added to the list of useful materials of the future by a process developed by chemists and engineers of the Bureau laboratories at Salt Lake City, Utah. The process work, involving powder metallurgy, is being carried forward at Boulder City, Nev., and at Salt Lake City in preparation for pilot-plant experiments.

Coal and Coal Products

Greater production of coal and coke, better quality fuel, and conservation of fuel resources through more efficient utilization—these were the focal points for the multifold solid-fuel activities conducted by the Bureau of Mines during 1944 to meet the staggering demands of war and to maintain the position of the United States as the No. 1 industrial power when peace returns.

Coal analysis.—More than 20,000 samples of coal, coal dust, coke, peat, pitch, and tar were analyzed during the year. The tests helped guide Government purchasing agents in awarding contracts for millions of tons of coal, aided Federal coal-mine inspectors in formulating recommendations to curb coal-dust explosion hazards in mines, assisted Bureau engineers and scientists in coal-field exploration and research, and helped operators improve the quality of their products. Savings by the War Department alone in rejecting inferior fuels were greater than the actual cost of the service. At that Department's request, the Bureau sampled coal and trained Army personnel in coal sampling at military posts throughout the country. The volume of

tests made on boiler feed water was tripled to prolong the life and increase the efficiency of Army boiler plants. A consulting service was maintained for industry and Federal agencies on substitute fuels, types and changes in fuel-burning equipment, and means for increasing efficiency of power plants.

Coal mining and exploration.—Coal fields of the West were explored to find new sources of coking coal for steel plants in that area and to locate minable beds to relieve the critical fuel shortage in the Pacific Northwest and provide an adequate supply for post-war development. Studies were made on new methods for distributing rock dust and the use of air conditioning to curb roof falls. Many operators were assisted in improving mining practices.

Gas- and dust-explosion research.—Mechanization of coal mines and increased production for war posed problems which made necessary the testing of larger-than-standard charges of permissible explosives to determine their gas-and-dust ignition hazards. Other services to industry with a post-war value included determinations of the inflammability of powdered metals and plastics. Military pyrotechnics also were tested.

Coal preparation and storage.—To supplement limited supplies of high rank coals needed in certain industries, the Bureau investigated conversion of marginal coal by preparatory treatment and the salvaging of coal now rejected merely because it is mixed with impurities. Helping to alleviate conditions resulting from the critical manpower shortage, the Bureau developed methods for storing during the slack mining season unlimited quantities of subbituminous coal in open pits and in homes without loss from oxidation or spontaneous combustion. Safe storage now is possible on the West coast, at isolated Army posts, and at other places remote from the sources of supply.

Coal combustion.—The Bureau developed a small, new-type stoker which will burn subbituminous coal for 30 days without attention and supply hot water for a normal-size family at a cost of less than a dollar a month. Offering a post-war promise of modern heating service at minimum expense to Western rural families, the Bureau plans to develop larger models for household heating. Meanwhile, research continued on the effect of coal-ash on the operation of large boiler furnaces generating power for essential industries, and means were developed for preventing serious loss of steam capacity from external corrosion of furnace wall-tubes. Successful methods were found for using small sizes of anthracite as domestic fuel, which may help ease shortages in the larger sizes.

Fuel efficiency.—To offset or at least alleviate a possible fuel shortage in the winter of 1944-45, a National fuel efficiency program was launched during the year with the cooperation of industry to combat wasteful practices in the commercial and industrial use of all types of

fuel and energy. A council of 12 leading fuel engineers was established, and 110 coordinators were appointed to administer the program in assigned areas with the assistance of 5,000 "regional engineers," all volunteers from industry.

Coke studies.—Answering a plea from the Nation's steel industry for more and better-grade metallurgical coke, the Bureau of Mines sent engineers and a mobile laboratory into the field, conducted a critical survey of the needs of the entire beehive coke industry, and provided operators with the technical information needed to produce the blast furnace fuel required for maximum steel production. A study was made of methods employed by certain coal companies in producing coal of uniform ash and sulfur content by careful blending of coal and control of the mining operation, and tests were conducted on the carbonizing, expanding, and storing properties of coals from newly developed fields to maintain supplies of suitable coking coals.

Synthetic liquid fuels.—Noting the unparalleled war withdrawals from the petroleum reserves of the United States and the continuing decline in the discoveries of new oil fields, the Seventy-eighth Congress appropriated \$5,000,000 and authorized the Bureau of Mines to construct and operate demonstration-size plants to produce synthetic liquid fuels from coal, oil shales, agricultural, and forestry products. Guided by experiments conducted for several years in a laboratory-scale pilot plant and other installations, the Bureau has prepared comprehensive research programs on coal hydrogenation, synthesis of liquid fuels from hydrogen and carbon monoxide, and shale-oil extraction, and is designing the new equipment and buildings needed. The project will help provide the "know how" for ultimate private commercial production and a lasting supply of fuel for the machines of a post-war motorized America.

A pilot plant for complete gasification of subbituminous coal and lignite was designed, built, and tested successfully during 1944. Another pilot plant is under construction at Grand Forks, N. Dak., which will provide 400,000 cubic feet of hydrogen-rich water gas daily for the reduction of iron ore and could be employed for synthesis of oil or gasoline from coal. Tests have shown that subbituminous coal will yield the same amount of water gas as high-rank coals, although its cost at the mine is less than half. Meanwhile additional progress was counted in certain phases of laboratory experiments on coal hydrogenation and synthesis of liquid fuels, and a method was developed for predicting the yields of primary tar and light oil from analyses of the coal.

Petroleum and Natural Gas

Many important war assignments on petroleum and natural gas have been carried out, and the Bureau of Mines has contributed to post-war needs with each achievement because research in this field must be conducted along the same general lines, whether the results be applied in war or peace.

Despite handicaps, war missions were fulfilled on four major fronts: primary extraction of oil, secondary recovery, chemistry and refining, and helium production.

Manpower shortages were encountered, together with difficulties in obtaining equipment needed to test flowing wells, but the Bureau's small staff of petroleum engineers supplied basic knowledge and applied technical skill to the operation of condensate and other types of fields engaged in primary extraction of oil. Five engineering reports on Gulf coast fields and three others on the flow characteristics and properties of the fluids in separate reservoirs were supplied to the Petroleum Administration for War and the operators in response to a need for specific facts and figures, and aided the entire war program. Subsurface surveys were made in two important Rocky Mountain fields to permit the formation of plans to operate them at high rates of production, and research was continued on the effect of well spacing on oil recovery.

To supply more oil for war by secondary recovery—stimulative methods of production in fields where nature no longer drives oil to the wells—Bureau engineers disseminated information of modern engineering practices among the 15,000 oil operators of the Appalachian region; surveyed water-flooding projects in Oklahoma, Kansas, and Illinois; studied air- and gas-injection in Illinois; and collected data on water flooding of limestone reservoirs, a subject on which little information has been available. Laboratory research continued on mechanical and solvent extraction of oil from impregnated surface and near-surface deposits, and experiments were made on reducing the cost of lifting oil from vertical wells by introducing the use of siphons on properties where air and gas are injected. A report was begun on observations of a project in Venango County, Pa., where horizontal holes are being drilled into the oil sand from a vertical shaft. Many of the Bureau's findings on secondary recovery will prolong the period in which the United States can depend upon natural crude-oil deposits as its main source of petroleum for liquid fuels and chemical products.

Hitherto unknown sources of base stock and high-octane components for blending into aviation gasoline were disclosed by the Bureau's chemical and refining research. This information aided the Petroleum Administration for War and the refiners materially in meeting the needs of war for aviation fuel, toluene used in the manufacture of explosives, and other petroleum products.

More than 40 reports were submitted during the year to the Petroleum Administration for War and others concerned with evaluation of crude oils and base stocks, analyses of naphthas, and improvement of marginal base stock quality. Constituents of asphalts were studied so that they, like those in aviation fuels, may be compounded to meet exacting requirements.

Work undertaken to give industry fundamental data on thermodynamics of hydrocarbons progressed satisfactorily, and combustion heats of 10 hydrocarbons in the lubricating-oil range of petroleum were determined.

A field pilot plant was built and initial tests were made to remove microcrystalline wax from tank bottoms. Used for munitions and other war products, it accumulates at the rate of 3 million barrels a year in the midcontinent area alone.

Laboratory and field tests developed many innovations in mixing and controlling oil-base drilling fluids and aided operators materially in improving the wall-building and water-loss properties of the fluids, thus effecting economies in the use of steel casing.

An oil-shale research program, authorized by the Synthetic Liquid Fuels Act (Public, 290), has increased the scope of the Bureau's research toward making petroleum and its products available at lower cost through more efficient extraction.

Helium

With the completion of three new plants, the helium-production facilities of the Bureau of Mines met all the requirements of the armed forces and made large quantities of this lightweight, noninflammable "miracle" gas available to commercial purchasers for industrial, medical, and experimental uses.

In January 1944, the Bureau's helium plants at Amarillo and Exell, Tex., were awarded the Army and Navy "E" for their outstanding performances.

Quantity production of helium, the gas which gives buoyancy to antisubmarine patrol blimps and meteorological and barrage balloons, has made possible its use as a shield in the welding of magnesium, aluminum, and alloy steel and has changed radically many procedures in fabricating airplanes and other war equipment. Important medical developments dependent upon assured supplies of helium include the elimination of explosion hazards of anesthetics and the alleviation of certain respiratory ailments.

To conserve helium for these and many new uses being developed for the post-war world, the Bureau of Mines is replacing in nature's underground storage vaults excess supplies processed from the natural gas destined for commercial fuel markets. Otherwise, this helium would be lost forever.

Explosives

Promoting safety and efficiency in the manufacture and handling of explosives in war and for the peace to come, the Bureau of Mines conducted many research and testing projects for the armed forces and for the mineral industries.

More than 4,000 analyses and tests were made during the year, including 220 chemical analyses, about 1,000 gallery tests, and more than 3,000 other control tests. Among the subjects for research were incendiary bombs, artillery shells, practice mines, railroad torpedoes, tracer mixtures, black powder, camouflage nets, aerosols for control of insect pests, and defects in carbide specifications and acetylene generator operations.

At the request of such agencies as Army Ordnance, the Army Engineer Board, Chemical Warfare Service, Navy Department, and the Board of Economic Warfare, problems were solved on the sensitivity of explosives materials under impact, friction, confinement, elevated temperatures, and certain conditions of electrical environment and exposure. The hitherto unavailable information was applied immediately in safeguarding essential manufacturing facilities and in designing front-line munitions. While primarily for military explosives and pyrotechnics, the information will be of major importance to peacetime industry.

To counter fire and explosion hazards, inflammability and explosibility factors were determined for industrial organic chemicals used in the tremendously expanded textile, synthetic rubber, and plastics industries which will have major roles in the post-war world. Aiding imperative wartime construction, control measures were suggested to curb acetylene-generator explosions which threatened serious delays in West Coast shipyard operations.

Diesel mine locomotives, when designed especially to prevent explosions or the development of toxic gas conditions, offer distinct advantages in many mining operations. To encourage their use while maintaining safe conditions in post-war mine development, a schedule was prepared governing the testing and approval of such locomotives. Testing was continued to maintain quality in explosives, particularly those used in coal mining.

SAFETY, PLANT PROTECTION, AND HEALTH ACTIVITIES

Wartime emphasis on the health and accident-prevention program of the Bureau of Mines to conserve manpower and promote greater production of raw materials for armies and fleets has opened a broad channel for sweeping advancements in industrial safety when peace returns.

Numerous handicaps—increased production, longer hours, employment of older and inexperienced workers, shortages of repair parts, and inability to obtain replacements for faulty equipment—faced the mineral industries last year, but accident rates in the industry as a whole increased but slightly; in some activities they even declined. Having proven what can be done through intensive safety education, accident-prevention work, investigative and research activities, and by laboratory testing of equipment before use, the Bureau predicts greater achievements in the post-war period when many of the current adverse conditions and handicaps are erased.

Under the Bureau's wartime security programs, safer storage, handling, transportation, and use of explosives evolved from the administration of the Federal Explosives Act. The antisabotage activities of the mineral production security staff were so successful, due to the cooperation of industry, that the program has been curtailed.

SAFETY WORK

With many years of experience at their command, the Bureau's safety experts constituted a foundation for the coal-mine inspection, explosives control, and mineral production security programs, coordinating the administration and directing the field activities of all three in addition to conducting safety education, assisting at mine fires and explosions, and making investigations of accidents and means of preventing them.

Laying the groundwork for a new era of industrial safety after the war, engineers and safety instructors during 1944 trained nearly 25,000 employees of the mining and affiliated industries in first aid, increasing to 1,609,239 the number completing these courses since the Bureau was established in 1910. About 230 persons were trained as first-aid instructors, completing a force of nearly 17,000 qualified to teach Bureau procedures. Certificates were awarded to 40 mines and plants in which all employees had received first-aid instruction, and Bureau personnel aided in conducting 10 first-aid contests in 4 States. Mine-rescue instruction was given to nearly 2,800 mine workers, swelling the ranks of those so trained to 80,504. Familiar with the rescue equipment and safe procedures essential in saving lives when fires, explosions, and other disasters occur, these men form an efficient reserve on call for rescue work and possible civilian defense emergencies.

Assisting in rescue and recovery operations, frequently arduous and dangerous, Bureau engineers investigated 30 mine explosions in 10 States and Alaska, 47 mine fires in 18 States, and 142 miscellaneous accidents in 27 States and Alaska during the year. One Bureau of Mines safety expert lost his life last year during recovery operations following a mine explosion. At the request of the owners, rigid

inspections were made of 75 privately maintained mine-rescue stations.

The Bureau's accident-prevention instruction registered new enrollment gains, complete courses being taken by about 1,600 workers and officials and partial courses by about 670, representing the coal mining, metal mining, and petroleum industries. Motion pictures, slides, exhibits, testing galleries, and other equipment were employed in the safety education program. Sound motion pictures on safety subjects were shown more than 500 times during the year, and Bureau representatives attended more than 600 safety meetings in 37 States.

Continuing its investigations and test work to determine the safety of electrical equipment for use in mines, the Bureau approved 37 complete units and issued 12 letters of suitability concerning separate explosion-proof parts for use on approved equipment. Explosion tests conducted during these investigations totaled nearly 2,000. In addition, about 900 explosion tests were made for the Navy Department on equipment intended for ships and munitions plants, and a special study also was made for the Navy on toxic gases emitted by overheated electrical conductors.

Safety activities of the Bureau have many ramifications, and numerous special investigations were undertaken to determine the causes of explosions, fires, and asphyxiations in war plants and to help minimize hazards involving various gases and dusts.

COAL-MINE INSPECTION

Despite wartime conditions adversely affecting all safety efforts, fatality rates in the Nation's coal mines have declined to the lowest point in history—indicating the salutary effects of the thousands of improvements in practices and conditions established under the Federal coal-mine inspection program, the success of which hinges on the cooperation and assistance of State inspectors and the aid of mine operators and their employees. At the same time, a reduction in accidents has conserved manpower and aided an industry vitally essential to the prosecution of the war.

From the inception of the Bureau's inspection program on December 1, 1941, to the end of the fiscal year, Federal inspectors had examined nearly 2,500 mines for the first time, reinspected some 1,200 mines once, about 200 a second time, and 3 for the third time. Mines inspected at least once produce a total of nearly 600 million tons of coal and employ about 96 percent of all coal-mine workers. The number of mines inspected each month continued to increase as the inspection force became more proficient and as changes were made in inspection procedure.

The Bureau safety standards for anthracite and for bituminous coal and lignite mines were revised during the fiscal year to cover changed conditions directly related to the war.

The accident-frequency rate in coal mines reinspected by Bureau representatives has declined approximately 6 percent, and it is significant that only one major explosion and one major fire disaster occurred during the first 6 months of 1944 when fatality rates reached their lowest ebb in coal-mining annals. This record was achieved in the face of numerous handicaps: increase in the average age of mine workers from 32 to 45, employment of inexperienced men to replace those lost to war plants and the armed forces, a greater effort by workers resulting in physical and mental fatigue, and a shortage of repair parts and new equipment to recondition or replace worn and unsafe facilities.

The inspection staff and the Bureau's mining-explosive and mining-electrical engineers also maintained a consulting service for small operators confronted with particular safety problems, supervised experimental work on devices and procedures designed to improve safety, conducted experiments on permissible explosives, made special studies in connection with the use of explosives and electricity in mines, and prepared reports and pamphlets on safety subjects for the guidance of the mining industry.

EXPLOSIVES REGULATION

Although millions of pounds of nonmilitary explosives were used by American industries last year, no clear-cut cases of sabotage involving blasting materials were reported to the Bureau of Mines, the Federal agency designated by Congress to maintain strict control over such explosives and their ingredients.

License revocation proceedings were brought against only 16 persons, compared with 40 in the previous year. However, two cases involved possible disloyalty, a question that did not arise in 1943. Most storage violations result from ignorance of Federal requirements. Twelve licenses were revoked, and in some instances fines up to \$300 and prison sentences up to 2 years were imposed.

Administering the Federal Explosives Act through an organization of 4,100 cooperating licensing agents serving without pay, the Bureau by the end of the 1944 fiscal year had approved more than 500,000 licenses, including reissuances. Explosives investigators, aided by other Bureau personnel, reported on approximately 6,000 stores of explosives, and nearly 9,000 letters of instructions were sent to licensees.

To simplify procedures for licensing agents and the public, and to aid in administration, new application and license forms were prepared, amendments to regulations were issued, and the text of the act, regulations, and amendments, together with safety suggestions for handling explosives, were distributed under one cover.

Cooperation maintained with military authorities, the Federal Bureau of Investigation, and State and local law-enforcement officers made the functioning and administration of the program increasingly effective.

ANTISABOTAGE

A record unblemished by a single known case of sabotage during the present war has been maintained by the Nation's mineral industries, cooperating with law-enforcement officers, the armed forces, and the mineral production security program of the Bureau of Mines. In fact, the Bureau's program has been so effective that it now can be modified and the emphasis shifted to prevention of production losses from fires and accidents instead of subversive activities. Personnel has been reduced more than 50 percent, coal-mine security activities have been transferred to the coal-mine inspection staff, and metal-mine security work has been curtailed.

However, at the request of the Provost Marshal General's office, some of the Bureau's specially trained engineers have replaced Army officials in conducting recurring inspections of most mines and related facilities labeled essential by the War Production Board. Accident-prevention courses for supervisory officials of large metal mines and plants also will be continued, together with explosives-magazine inspections.

During the year the Federal engineers inspected nearly 1,000 mines, mills, and smelters and assisted the operators in establishing adequate security standards. They also made more than 1,000 reinspections, visiting some facilities several times to insure the correction of unsatisfactory security conditions and thus aid in maintenance of war-mineral production. Some inspections were made jointly with War Department representatives at mines and related facilities on the Army's "master responsibility list." Hundreds of other mines were visited, and reports were submitted on approximately 2,800 explosives magazines in connection with the Federal Explosives Act.

HEALTH IN THE MINERALS INDUSTRIES

Confidential wartime studies by the Bureau of various precision instruments now protecting the lives of Americans on the Navy's fighting ships and in military establishments will be available to improve

working environments in post-war mineral industries confronted with the huge task of filling deferred civilian demands for materials of all types.

Other advancements of the fiscal year included the development of a new dust-sampling device, improvements in a microprojector to facilitate the collection and determination of the amount of harmful dust in the air, and progress in the application of the X-ray and petrographic methods in analyzing dusts and ores from a health standpoint.

In addition to the development and improvement of apparatus for determining the amount and composition of such atmospheric contaminants as noxious gases, fumes, and dusts, the health work of the Bureau, directed mainly toward preventing occupational disease and improving the efficiency of workers, included studies of properties and sources of atmospheric contaminants, evaluation of the harmful or dangerous character of atmospheric environment, and control of unhygienic conditions.

Inspections were made and recommendations prepared on the hygienic conditions in coal and metal mines, at two Army posts, a steel plant, an engine-manufacturing plant, and an electric power plant. In the laboratory, a research project revealed that toxic and explosive gases are liberated when organic insulating material is decomposed by an electric arc.

In assisting its field and laboratory investigations, the Bureau analyzed approximately 16,000 air samples, involving more than 100,000 determinations, and also tested 555 air samples from fire areas in coal and metal mines. Thirty-eight air and gas analyses were made for the Army and 708 for the Navy, and about 1,000 determinations were required on dust and source material collected during coal-mine inspections and other Bureau investigations conducted to help control health and explosion hazards in mines and plants of the mineral industries.

Approval-testing of all types of respirators continued. Meanwhile, the information collected from 1933 to 1942 during a program of sealing abandoned mines to control acid mine drainage was analyzed to aid in a possible post-war program on this problem. The first draft of an approval schedule for Diesel mine locomotives was completed and was submitted to other Bureau personnel and to industry for critical review.

ECONOMICS OF MINERAL INDUSTRIES

As the United Nations' war machine rolled relentlessly forward to new goals, changes in the production-and-demand scene in mineral commodities, both foreign and domestic, caused war agencies to rely

more heavily on the long-established statistical and economics services of the Bureau of Mines for authoritative information, particularly in the field of foreign minerals. The emphasis on foreign minerals and the post-war era required an increase in the Bureau's staff of foreign-mineral specialists.

Threatened coal shortages impelled the Solid Fuels Administration for War to ask for more information on supplies in critical areas and the outlook for production and future demand. All these requests and others on primary and secondary metals, chemical raw materials, fertilizers, and petroleum were met speedily.

Governmental efforts to balance mineral supplies against requirements were successful in many instances during the year and, with the exception of fuels, pressure for additional production or conservation was relaxed. For many commodities it was possible even to consider reconversion and post-war problems in which the Bureau's fact-finding services are as essential as they were in planning the war program.

Seeking a more effective organization for the postwar responsibility of assuring adequate supplies for the anticipated advance in living standards, the Department of the Interior during the year consolidated all of its mineral economic services in the Bureau of Mines.

METALS

Adequate supplies of virtually all metals needed for war and essential civilian uses were assured during the fiscal year by the continued expansion of domestic production and increased imports of foreign ores and metals. Analyses of the thousands of voluntary reports from industry on production, stocks, and consumption of nearly 40 mineral commodities disclosed a gradual improvement in the supply-and-requirement position of nearly all major war metals, although output declined slightly during the last 6 months of the fiscal year, largely due to manpower shortages.

The Bureau of Mines continued to prepare confidential reports based on these surveys for the use of war agencies, and war censorship authorities permitted a larger number of these studies to be made public. Invaluable to agencies concerned with war supply problems, the factual monthly and quarterly metal summaries will serve an equally important purpose in the post-war period, and the service will be extended to industry and the public as rapidly as censorship measures are relaxed.

Disposal of Government-held inventories of metal and scrap will present one of the most complex post-war problems. Preparing for peace as it did for war, the Bureau of Mines will be ready to provide

comprehensive information needed for the solution of this and other reconversion problems, including the status of marginal producers, unemployment resulting from possible curtailment of production, the accelerated depletion of domestic reserves, and the competitive situation between metals.

NONMETALLICS

As in the years past, the Bureau of Mines compiled and distributed periodic reports on commercially important nonmetallic minerals and their primary products. Special emphasis again was given those having critical war uses, and field investigations were made by Bureau specialists when acute shortages developed in some commodities. Reports were prepared on many vital nonmetallic war minerals, including mica, asbestos, sulfur, fertilizers, quartz crystals, graphite, and abrasives.

Markets for building materials dropped sharply as the mobilization program passed from the construction to the production phase; at the same time, the demand for chemical raw materials, fertilizers, and many other nonmetallics reached record heights under the stimulus of war. In consequence, as the year progressed and the supply-demand relationships eased, an increasing number of requests for information bearing on reconversion and post-war problems were received by the Bureau's experts in the field of nonmetallics. Both industry and Government became more aware of the need for market analyses—adequate information on uses, supply, and potential demand—to be used as guides in the establishment of company and public policies. Much of this information is available in chapters of the Bureau's Minerals Yearbook and other published reports, but some amplification will be required to supply additional facts desired by producers and consumers of chemical raw materials, fertilizers, and building materials.

PETROLEUM AND NATURAL GAS

Uniformly essential in providing the basic current and annual reports required by war agencies, the Bureau's normal functions as a storehouse of information on petroleum and natural-gas economics have been expanded and geared to new and pressing wartime needs.

The most important additions to its work have evolved from the increasing complexity of refinery operations required to fill the demands of the machines and plants of war for fuels, lubricants, and other petroleum products. Monthly surveys on the production and distribution of aviation gasoline were revised and improved. The monthly canvass covering products of natural gasoline and cycle plants, required as blending agents for aviation gasoline and as ma-

terial for synthetic rubber, was enlarged and adjusted to current requirements.

Forecasts of demand for motor fuel and crude oil have supplied an accurate barometer of the wartime changes in national consumption and estimates of the demand for domestic crude petroleum by States of origin have given the Petroleum Administration for War a gage for determining desirable rates of production.

The Bureau has cooperated in preparing reports on the reserves of crude petroleum and natural gas in relation to present and future national supply, and its accumulated information on foreign oil production and international trade has been of outstanding value to agencies concerned with war and post-war supply. Reports and economic studies of the Bureau are of particular aid in interpreting the effect of the war on the long-term trends of the oil and natural-gas industries.

COAL

Continued shortages of anthracite and domestic coke, accelerated demand for metallurgical coke, and increased requirements for light oil and coal-tar derivatives for the manufacture of explosives, synthetic rubber, aviation gasoline, plastics, and pharmaceuticals required that the Bureau of Mines continue special surveys previously initiated, expand others, and inaugurate new studies. This vital information, requested by the War Production Board, Solid Fuels Administration for War, and other war agencies, provided the basis of the program for the equitable distribution of anthracite and permitted control of prices and allocation of coke byproducts to war plants.

Detailed information on production, import and export trade, and solid-fuel requirements of Eastern Europe and North Africa was prepared for the War and Navy Departments; and the well-established weekly, monthly, and annual domestic reports were published during the year, but with some deletions due to censorship regulations.

Effective May 30, 1944, the extensive economics and statistics facilities of the Solid Fuels Administration for War were transferred to the Bureau of Mines, thus expanding the Bureau's coverage to include the economics of the bituminous coal industry. Thus, the Bureau now can give industry and Government virtually complete coal economics service. With minor adjustments, the war program in this field will be essential in helping solve problems of the post-war era.

FOREIGN MINERALS

Being geared for the post-war world, the work of the Bureau of Mines on foreign mineral economics was expanded during the year to include studies of foreign mineral resources with special reference to their importance in international relationships during the next few years.

Information was earmarked for Government agencies responsible for the solution of post-war problems of an international nature, including economic relief and rehabilitation of liberated areas, political and commercial control of world minerals, and equitable distribution of world output. Such pertinent information also is in demand by agencies concerned with the twofold problem of obtaining from foreign sources adequate supplies of minerals not available domestically in sufficient quantities and with adjusting the Nation's mineral procurement program after the war, particularly with Latin American countries.

ACCIDENT AND EMPLOYMENT DATA

Paralleling the annual statistical surveys of mineral production was the Bureau of Mines' Nation-wide canvass of mines, quarries, mills, smelters, and coke ovens to obtain facts on the number and causes of accidents, and the number of employees and man-hours worked.

This information, collected for many years as an essential part of the Bureau's accident-prevention activities, will be equally useful during and after the conversion to peacetime operations.

Using the information during the last fiscal year in formulating military and civilian programs, war agencies found particularly helpful the facts provided on the location of mines producing minerals needed for war, the productivity per man-hour as related to the Government's over-all policy of manpower conservation, the extent of employment at mines and quarries producing minerals unessential to the prosecution of the war, and other facts concerning matters affecting the mineral industry and its absorption of manpower.

This program was elevated to divisional status in the Bureau organization during the year because of the growing importance of accident prevention and the anticipated intensification of efforts to improve the accident record of mineral industries in the post-war period.

PUBLIC REPORTS

Requests from industry, governmental war agencies, and the public for informative material on all phases of the mineral industries continued to increase during 1944. Although many additional reports were published, the number of copies printed and distributed was restricted in keeping with a policy of rigid economy established during the previous fiscal year, and the total volume of pieces issued remained virtually unchanged. The Minerals Yearbook again was classed confidential and was not distributed generally.

In all, 512 bulletins, technical papers, handbooks, Minerals Yearbook chapters, and contributions to technical journals were prepared, together with many hundreds of periodic reports of a statistical nature

to serve industry. Thousands of letters were written in response to mail and telephone requests for information.

The Bureau's Washington library of selected reference material was increased by approximately 2,500 books; about 230 different periodicals, many on an exchange basis, were received regularly; and 25,200 books and periodicals were circulated for use outside the library. In addition to regular accessions, about 3,000 books and pamphlets were being transferred to the library from the Coal Economics Division, which acquired them from Solid Fuels Administration for War. The Washington library now has about 60,000 books.

During the year, some 6,000 readers visited the library for reference work and approximately 6,000 telephone calls were received. Nearly half of both readers and calls were from war agencies and other sources outside the Bureau.

The Bureau's free educational motion pictures, produced with funds contributed by private industry, were shown in the United States and many foreign countries on 93,586 occasions during the year to audiences totaling 7,691,166 persons. Showings in educational institutions decreased, but this decrease was largely offset by increased showings in industrial plants. Since 1922, the Bureau's films have been shown on 1,112,338 occasions to audiences totaling 115,878,059 persons. Seven new sound films were added to the Bureau's library of 10,000 reels.

ADMINISTRATION

As in past years, activities of the Bureau of Mines were administered from Washington, D. C., but were carried on largely in the field offices, laboratories, and pilot plants. For greater efficiency, many payments of salaries and vendor bills were made by the Treasury Department's regional disbursing officers nearest to field projects. Wage board procedures were put into effect at the Electrometallurgical Laboratory in Boulder City, Nev., and at the helium plants at Amarillo and Exell, Tex.; Otis and Cunningham, Kans.; and Shiprock, N. Mex.

PERSONNEL

On June 30, 1944, there were 4,300 full-time employees of the Bureau of Mines, distributed as follows:

Classification and number of appointees

	P&S	SP ¹	CAF	CPC ²	Total
Department.....	137	8	635	5	785
Field.....	705	311	1,055	1,444	3,515
Total.....	842	319	1,690	1,449	4,300

¹ Includes instrument makers, safety instructors, laboratory aids, assistants, etc.

² Includes laborers mechanics, messengers, etc.

PROPERTY

As of June 30, 1944, the property of the Bureau had a total valuation of \$8,485,533.37, of which \$2,533,869.06 was for land, buildings, and improvements; \$1,681,168.88 for laboratory equipment; \$1,540,665.36 for machinery and power plant equipment; and the remainder for certain helium properties, office furniture and equipment, automobiles and trucks, rescue cars and specialized apparatus, and other goods.

FINANCE

Total funds available to the Bureau of Mines for the fiscal year ended June 30, 1944, including direct appropriations, departmental allotments, reappropriated balances, and sums transferred from other departments for service work, were \$25,476,222. Of this, \$19,821,562 was spent, leaving an unexpended balance of \$5,654,660. These figures are subject to revision because of unpaid obligations.

Table 1 presents classified information regarding the financial history of the Bureau for the fiscal years June 30, 1941-45.

Table 2 gives a statement of the distribution of congressional appropriations to the services and divisions and the expenditure of these funds in 1944 by Bureau divisions.

TABLE 1.—Bureau of Mines appropriations and expenditures, fiscal years ended June 30, 1941-45

Fiscal year	Appropriated to Bureau of Mines	Departmental allotments ¹	Funds transferred from other departments ²	Total funds available for expenditure	Unexpended balances	Total expenditures	Expenditures, exclusive of service items ³
1941.....	\$3,944,400.95	\$91,790	\$2,225,939.10	⁴ \$6,262,130.05	⁵ \$1,069,298.98	\$5,192,831.07	\$4,934,951.05
1942.....	8,910,388.68	97,490	2,223,026.41	⁵ 11,230,905.09	⁶ 1,823,415.21	9,407,489.88	8,747,726.21
1943.....	28,707,630.94	106,450	2,567,615.26	⁶ 32,168,548.20	⁷ 5,851,566.64	26,316,981.56	25,178,429.84
1944.....	20,969,098.00	91,300	3,460,898.00	⁷ 25,476,222.00	⁸ 5,654,660.00	19,821,562.00	17,962,090.00
1945.....	23,956,639.36	91,300	4,416,853.33	⁸ 28,464,792.69	-----	-----	-----

¹ Includes printing and binding, stationery, and contingent funds.

² Includes proceeds from sales of residue gas.

³ Service items include helium, and other investigations and services for other departments.

⁴ Includes \$6,539.10 unexpended balance reappropriated, and balance of \$85,452.95 receipts from sale of helium and other products.

⁵ Includes \$914,718.39 unexpended balance reappropriated, and balance of \$79,002.28 receipts from sale of helium and other products.

⁶ Includes \$976,885.27 unexpended balance reappropriated, and balance of \$128,018.51 receipts from sale of helium and other products.

⁷ Includes \$4,606,720.72 unexpended balance reappropriated, and balance of \$202,723.66 receipts from sale of helium and other products.

⁸ Includes \$4,603,644 unexpended balance reappropriated, and balance of \$291,152 receipts from sale of helium and other products.

TABLE 2.—Bureau of Mines Expenditures, fiscal year 1943

Division or service	Salaries and expenses	Operating rescue cars and stations and investigation of accidents	Coal-mine inspections and investigations	Salaries and expenses, enforcement of Federal Explosives Act	Protection of mineral resources and facilities, including petroleum	Testing fuel	Mineral mining investigations	Oil and gas investigations	Purchase of land, etc. Bartlesville, Okla.	Expenses, mining experiment stations	Care, etc., buildings and grounds, Pittsburgh, Pa.	Economics of mineral industries	Investigation of raw material resources for steel production
Office of the Director.....	\$28,951	\$598 8,711	\$22,989	\$4,958	\$9,726	\$10,125	\$9,608			\$221 7,404		\$653	\$10,235
Office of Minerals Reports.....													
Total.....	28,951	9,309	22,989	4,958	9,726	10,125	9,608			7,625		653	10,235
Administrative Service.....	444,783	24,425	15,870	48,288	10,316	9,468	1,641	\$21,906		11,943		37,549	36,729
Mining and Metallurgical Service.....													
Central Region.....							82,805			19,924			30,830
Eastern Region.....							13,743			35,447			516,080
Western Region.....		40,787	12,831	3,391	1,647	18,376	115,541			224,901	\$134,205		827,936
Fuels and Explosives Service:							198,209			296,305			527,347
Fuels Division.....		103,726	16,879	6,524		376,278	1,377			611	4,577		28,047
Explosives Division.....		94,456		69,546									
Petroleum and Natural Gas Division.....								542,550	\$23,975				
Total.....	198,182	16,879	16,879	76,070		376,278	1,377	542,550	23,975	611	4,577		28,047
Economics and Statistics Service:													
Coal Economics Division.....												41,077	
Foreign Minerals Division.....												44,853	
Metal Economics Division.....												115,691	
Mineral Production and Statistics Division.....			19,189									153,809	
Nonmetals Economics Division.....												79,710	
Petroleum Economics Division.....												56,017	
Total.....			19,189									491,157	

TABLE 2.—Bureau of Mines expenditures, fiscal year 1944—Continued

Division or Service	Experimental plant for synthesis of motor fuel, Pittsburgh, Pa.	Development and operation of helium properties (special fund)	Maintenance, Bureau of Ships	Emergency fund for the President, national defense (allotment to Interior, Bureau of Mines)	Emergency fund for the President, national defense (allotment to Interior, Office of Secretary)	Salaries and expenses, Solid Fuels Administration for War	Working funds	Printing and binding	Contingent	Total
Office of the Director						\$147		\$891 4,477		\$31,354 147,402
Office of Mineral Reports						147		5,368		178,756
Total						1,096		6,378	\$6,266	529,067
Administrative Service		\$590						2,027		384,307
Mining and Metallurgical Service								1,947		2,984,588
Central Region								5,792		3,074,970
Eastern Region								13,589		5,647,557
Western Region								4,025		
Fuels and Explosives Service:	\$927			\$3,756		162,660	\$571,216	2,102		1,341,712
Fuels Division							5,967			173,694
Explosives Division		52,884					1,452			2,701,097
Petroleum and Natural Gas Division										
Total	927	52,884		3,756		162,660	578,635	19,716		4,216,303
Economics and Statistics Service:										
Coal Economics Division								369		167,559
Foreign Minerals Division						126,123		53		44,906
Metal Economics Division								1,512		234,278
Mineral Production and Statistics Division							117,075	32,278		205,276
Nonmetals Economics Division								950		80,660
Petroleum Economics Division								145		56,162
Total						126,123	117,075	35,307		788,851
Health and Safety Service:										
Coal-Mine Inspection Division					\$32,512			3,865		688,794
Safety Division				110				1,645		430,999
Health Division			\$12,487					1,800		109,180
Mineral Protection Division										362,815
Explosives Control Division										424,575
Total			12,487	110	32,512			6,310		2,016,363
Total appropriations	1,027	344,626	12,500	5,738	35,392	359,668	954,926	85,000	6,300	25,476,222
Total expenditures	927	53,474	12,487	3,866	32,512	290,026	695,710	82,845	6,266	19,821,562
Balances	100	1 291,152	13	1,872	2,880	69,642	1 259,216	2,155	34	5,654,660

1 Available for expenditure in fiscal year 1945.

Geological Survey

W. E. WRATHER, Director



MODERN wars are not won by a single battle or even on a single front. Though each battle must be fought with vigor and the intent to win, the planning staff and the field command would indeed be short-sighted if they squandered on one engagement too much of their power in men and munitions. On the contrary, they must plan for an entire campaign, must hold in reserve the forces that will be required for other battles, and, by endeavoring to hold the initiative, must gradually evolve a broad strategic pattern that will lead to final victory. Both the intelligence service and the planning staff must focus much thought on future engagements far behind the enemy's present lines.

The Geological Survey must endeavor to be similarly forward-looking.

Of necessity, most of the Survey's energy since Pearl Harbor has been devoted to immediate objectives—the many tasks that contribute directly to the winning of the war. Those tasks have included investigations, both in this country and abroad, of sources of the metals, minerals, and fuels that must be made available in seemingly endless amounts to provide the munitions and machines of war; the research for and preparation of confidential technical reports on foreign combat terrains, required by the military planning staffs and the fighting forces; the analysis of complex problems of water supply for military installations and for plants engaged in making the implements of war; and the mapping of millions of square miles in this country, in Alaska, and on other continents, to provide the countless maps needed by the armed forces and by our military and commercial planes in world-wide air-transport service.

However, the Survey has endeavored to plan and execute its work in such manner that the results would not only meet the day-by-day war

demands but would also be of greatest usefulness in the campaigns yet to come. Its engineers and scientists must be, and within the limits of its present means are, an "intelligence service" for the far-sighted gathering of basic information needed now and in the future by the Nation's "planning staff," both governmental and private.

To achieve an enduring peace this Nation is pouring out its wealth of manpower and resources without stint or hesitation. When peace comes this country must assume its part in rebuilding a war-torn world. Even now, Federal and State Governments and industry are devoting serious thought to plans for demobilization, reconversion, and post-war development. For the conception and perfection of sound plans, as well as for the later successful accomplishment of many public and private development projects, those planning agencies must have access at the earliest possible time to all needed information on our mineral resources, which have been seriously depleted by war demands; on the flow of rivers and the amounts of surface and underground waters that can be made available for municipal and industrial uses and for irrigation, flood-control, and power projects; and on the nature of the terrain as shown with engineering accuracy on detailed topographic maps.

The gathering of such information and the preparation of reports and maps are functions of the Geological Survey. Much material is already available through the work of earlier peacetime years; other material has been gathered as a byproduct of its urgent war studies but is still largely undigested and not generally accessible; and many investigations and surveys remain to be made. If the planners for post-war reconstruction are not to be gravely handicapped but are to have the fundamental information available in time to be of value, the Geological Survey should be enabled to proceed at once with the full analysis and coordination of the data now in its files and with the most pressing of the additional investigations and surveys. To postpone these tasks until the end of the war would be extremely short-sighted, if not disastrous. They should be undertaken immediately, for they are fully as urgent and practical as the direct war jobs that must be continued.

GEOLOGIC BRANCH

During the past year the Geologic Branch has been fully on a war basis. For the duration this situation will necessarily continue, but it is essential that plans be prepared now to adjust the Branch's work to assist in solving the problems that will face this country in the post-war period and to orient the war work, insofar as that is possible, in such ways as will permit its results to contribute also to the conversion period. The normal demand for minerals, greatly accelerated by war activities, has resulted in an alarming depletion of the supply of many of the basic materials upon which our economy is built. As the richer deposits of minerals are exhausted, more reliance must be

placed on exploration for deposits that are concealed or only obscurely indicated, on deposits of lower grade, and on improved technique in recovering those lower-grade materials. Industry is primarily interested only in those resources that can be exploited at a profit and in peacetime pays scant attention to large reserves of ores and minerals that are below commercial grade. Yet in times of national emergency these low-grade deposits may be the only available sources of vitally needed raw materials. It is a function of the Geological Survey to keep an inventory of all reserves of mineral commodities. During the year Survey geologists have completed the examination of many hundreds of deposits and made preliminary estimates of the national reserves of some 15 or 20 mineral commodities. This inventory should be kept current and broadened.

The rapid depletion of our supplies of petroleum, natural gas, and coal is a matter of grave national concern. The Survey, with its skilled force of geologists, paleontologists, chemists, and petrographers, is the organization best qualified to carry out basic field studies on the stratigraphy and geologic structure of large areas to discover and define those wherein it may be profitable to prospect for new supplies of mineral fuels. These studies should be still further expanded as promptly as possible.

WAR MINERALS

For the 3 years prior to the summer of 1942, principal emphasis was placed by the Geologic Branch upon the search for and appraisal of domestic deposits of the metals and minerals originally classified by the Army and Navy Munitions Board as "strategic" and "critical." With the success of the antisubmarine campaign through the winter of 1942-43 large imports of these commodities began to arrive regularly, and by the fall of 1943 the pressure for domestic production of some of them began to ease. It became apparent, however, that domestic reserves of some of the common metals were being seriously depleted, and geologic personnel was gradually shifted from work on some of the original "strategic" metal deposits to work in districts that held out hope for developing noteworthy new reserves of the common metals. Attention was focused on such zinc districts as Metaline, Wash., Pioche and Goodsprings, Nev., Eureka, Utah, southwestern Wisconsin, and eastern Tennessee, and on the copper districts in the Foothills Belt, Calif., Globe, Ariz., and Michigan. In most of these districts the Geological Survey's work led to recommendations for exploration by the Bureau of Mines, which has been especially successful in Washington, Wisconsin, and eastern Tennessee. Work has been continued in many strategic metal districts to complete studies initiated earlier and to obtain data currently desired by the war agencies, as in the southeastern and western manga-

nese districts; the Almaden and Oat Hill mercury deposits, California; the tungsten districts of Pine Creek, Calif., Mill City, Nev., and Yellow Pine, Idaho; and the vanadium districts of southeastern Idaho and Colorado-Utah.

The object in studying bauxite deposits has been twofold—to relieve the critical shortage of this, the only commercial source of aluminum, by aiding private companies in discovering and delimiting new areas, and to give an accurate appraisal of our resources so that they can be used more wisely in the post-war period as well as in the war emergency. Detailed surveys of areas containing bauxite were continued in nine areas in the Gulf Coastal Plain. Final reports, with geologic and prospecting maps, have been submitted for all these areas except Arkansas, where drilling and mapping is still in progress, and for part of Mississippi, a report on which is still in a preliminary stage. In Saline and Pulaski Counties, Ark., the cooperative drilling program of the Geological Survey and the Bureau of Mines during the fiscal year 1943-44 delimited more than 11 million tons of bauxite of commercial grade.

The search for sources of aluminum and magnesium covered the country from coast to coast and included studies of deposits of alunite, high-alumina clay, magnesite, dolomite, and brucite, in addition to the intensive work on bauxite. More than 250 pegmatite deposits containing sheet mica, beryllium, tantalum, lithium, and feldspar were examined in 13 different States, and recommendations were made to the Bureau of Mines for further exploration of a number of these deposits. Other nonmetallic mineral deposits studied included talc, graphite, salt, potash, asbestos, corundum, and quartz crystals.

Studies of iron-ore deposits were carried on in more than 50 separate areas in 20 States. Some of this work was done in cooperation with other Federal and State bureaus or at the specific request of other Government agencies. Work was carried ahead to obtain information that will be essential to insure a supply after the war, when deposits of inferior quality and small reserves may become producers. Investigations of districts in which appreciable reserves appear to be indicated included those made in the Iron River and Crystal Falls districts of Michigan, the Adirondack region of New York, and the Highlands region of New York-New Jersey.

Owing to greatly increased demands for fluorspar for war uses, consequent depletion of national resources, and likely continuance of an augmented demand for new civilian purposes after the war, fluorspar investigations were pushed energetically and enlarged. In addition to the three established parties working in (1) the Kentucky-Illinois district and Tennessee, (2) Colorado, Idaho, Wyoming, and Washington, and (3) New Mexico, Texas, and Arizona, a fourth party was organized to take charge of work on fluorspar in Utah, Nevada, and

California. Temporary parties were assigned to work in northwestern New Mexico and in Montana and northern Idaho.

In the field of mineral fuels attention was directed primarily to the search for new supplies of petroleum. Regional studies were initiated in 23 States to obtain data on the distribution of possible oil-bearing formations and to locate broad areas where conditions in these rocks might be favorable for the accumulation of petroleum. Nearly 100 geologists were engaged in these expanded activities at the end of the year. Ten preliminary maps and charts giving the results of these studies were issued during the year, and others are in preparation. The petroleum investigations, though stimulated by the war and aimed toward the discovery of war fuel supplies, yield basic geologic data of lasting value in the future search for oil and many other natural resources.

Tar sands and asphalt deposits that have considerable potential importance as sources of petroleum were mapped in Oklahoma and California, and preliminary examinations were made of deposits in many other States. This work was conducted in part in collaboration with the Petroleum Administration for War and the Bureau of Mines.

Examination of coal deposits was confined mainly to areas in the West, where expanded war activities have increased the demand for coking and steam coal. Detailed mapping of coal beds was undertaken in Colorado, Nevada, Oregon, and Alabama in conjunction with exploratory drilling by the Bureau of Mines. Coal deposits were also studied in Oklahoma and Washington.

The sections of Chemistry and Physics, Paleontology and Stratigraphy, and Petrology devoted their time mainly to the laboratory study of materials collected by the field geologists who needed this information in the solution of their war minerals supply problems. In the chemical laboratory more than 8,000 tests and analyses were made, and new techniques were developed for field and laboratory determination of many of the rarer elements that have come to have new and secret, either actual or potential, war uses.

AMERICAN REPUBLICS

Investigations of strategic and critical minerals in the American Republics continued. The work was financed in about equal proportions by the Department of State and the Foreign Economic Administration. Close and cordial cooperation continued with Mexican, Cuban, and Brazilian geological agencies, and cooperative field work was begun with the newly formed Bureau of Mines of Haiti and with the minerals agencies in Chile and the Dominican Republic.

Recently discovered aluminous deposits in Haiti were examined, and prospecting was done in the Dominican Republic for similar deposits. Investigations of chromite and manganese deposits in Cuba

were continued. In Mexico work on fluorspar, copper, mica, mercury, antimony, manganese, and tungsten was carried on in collaboration with the Instituto de Geología, the Dirección de Minas y Petróleo, and the Commission for the Investigation of Mineral Resources. In Brazil investigations of the mica deposits of Minas Geraes were carried on in cooperation with the Departamento Nacional da Producao Mineral and the United States Purchasing Commission. Investigations of mercury and tungsten deposits in Chile were commenced in cooperation with the Chilean Department of Mines. Survey geologists on detail to the Foreign Economic Administration continued investigations of the resources of Colombia, Guatemala, Nicaragua, and Honduras.

The eruption of the new volcano, Paricutin, in Michoacan, Mexico, provided an opportunity to make many observations of considerable scientific interest.

MILITARY GEOLOGY

During the fiscal year 1943-44, the Military Geology unit has continued to prepare terrain intelligence reports for the Military Intelligence Division, Corps of Engineers, and at their request has increased its staff of professional scientists from 30 to 67. The staff now includes several soils scientists and a forester. At the request of the commander of the Southwest Pacific theater, 4 of these military geologists and 1 soils scientist were assigned to headquarters in Australia to prepare similar reports needed for the planning and conduct of combat operations.

Although virtually all the work of this unit was devoted to the prosecution of the war, several byproducts of post-war usefulness have been planned and, in part, developed. These include atlases of the geology and mineral resources of many foreign countries; a topographic or terrain atlas; an appraisal of the completeness of information in the fields of the earth sciences in the whole Pacific area; and a report that will define the field of engineering geology, including military geology. Plans also were outlined for peacetime continuation of liaison between the Geological Survey and the War and Navy Departments.

ALASKAN BRANCH

Many years ago Patrick Henry in one of his orations reflected the then current idea of the remoteness of lands in what is now Michigan when he described them as "beyond the most distant wilderness and remote as the moon." Seventy-five years ago our grandsires probably thought in somewhat the same terms of Alaska. Indeed, even in the early 1890's it was a venturesome pioneer who was willing to brave the unknown conditions that must be met in casting his lot with the few settlers that then occupied this northland. Now that we have learned

more about Alaska and are more familiar with the details of how its development has taken place we have become increasingly aware that the winning of the great northwest province has been merely a reenactment of the various steps by which the States have come to their present stages. In Alaska some of these steps are now being taken at greatly accelerated rates, because modern tools and devices facilitate the overcoming of many of the handicaps hitherto imposed by distance and time. No longer is there need to rely on slowly plodding ox teams to cross seemingly limitless plains and bring in supplies and settlers to the remote corners of the domain, or to wait for weeks to elapse in the exchange of communications, or to depend solely on man's strength to perform necessary labor. Instead airplanes, radios, and mechanical devices can perform these various acts quickly and effectively.

However, no matter whether the rate is fast or slow, true progress in any development depends on thorough knowledge of the problems involved. Many mistakes in past practices and in formulating our national policies have arisen through inadequate or incorrect information as to the pertinent facts. Wise laws cannot be enacted and put into operation for the conservation and proper utilization of the Nation's potential resources without adequate knowledge of the geographic and geologic factors involved. Businessmen, investors, and workers cannot fulfill their roles in undertaking enterprises without dependable authoritative data. The selection of sites for business and industrial centers, for transportation lines to serve them, for sources of power to operate the various appliances and services now regarded as necessary by civilized man are all closely tied to the physical features of the country, as expressed in terms of its geography and geology. Even the most casual consideration of most projects calls for analysis of many of these factors.

If, then, the pattern of Alaskan development so far has followed closely that of the States, it seems inevitable that its fuller development may also be expected to follow the more advanced developments in the States. With confidence that this expectation is valid, it behooves us to learn and apply the lessons of the past as well as add to our store of knowledge.

What are the services that the Alaskan Branch of the Geological Survey is prepared to furnish? Full answer to this question would require far more space than can be given here. Therefore, let a few examples suffice to illustrate some of the broader aspects of its work.

Consider the Survey's mapping program for Alaska. This program provides for the complete topographic mapping of the Territory. The resulting maps show lakes and rivers in true position and relation to other features; settlements, roads, railroads, houses, and other works of man; and the character of the terrain—the height of hills and depth of valleys. From such maps, measurements of the direction and dis-

tance between places and things are easily and accurately accomplished; gradients along prospective routes for railroads or roads may be compared; the areas above or below sites for catchment or utilization of water may be computed; special information, such as the distribution of timber and agricultural developments, can be plotted; and military maneuvers can be planned.

No less essential but perhaps less well known than the topographic maps are the geologic maps and reports covering parts of Alaska issued by the Geological Survey, which portray and describe the geologic features of various areas. These maps and the geologic reports are indispensable to those whose business involves knowledge of mineral deposits—their location, their mineral content, and their geologic features, which, when understood, may guide operators in their search for extension of known deposits or lead them to discovery of new ones.

Perhaps a clearer idea of the application of these various studies may be gained by considering typical inquiries about Alaska received recently from various governmental agencies, such as the War and Navy Departments, War Production Board, and Petroleum Administration for War, and from citizens and companies throughout the country. One inquirer wants to know about the character, distribution, and extent of permanently frozen ground as affecting problems of construction; another inquires about the quality and quantity of asbestos or some other mineral in a remote part of the Territory; another would like to know the location of mines at which he might find work; another asks for details of the terrain in certain of the Aleutian Islands; another asks whether certain lands are available for entry as coal lands; and another asks what materials are available near a specified point for supplying a new plant for making cement. Many inquiries are for identification of place names not found on generally accessible maps; others are for identification and information as to the mineral content of specimens of rocks; and innumerable inquiries relate to the availability of water supplies for various purposes. Still other requests are for photographs and reports useful in teaching about Alaska or of general educational value relative to its magnificent glaciers, volcanoes, and other natural wonders.

From the foregoing examples of the services that the Alaskan Branch is called on to render it is apparent that utilization of the Survey's assistance should precede any thoughtful analysis of the worth-whileness of most development enterprises. The set-up of the Survey's activities in Alaska to meet post-war conditions must not await the cessation of hostilities, because most post-war plans involving the development of our natural resources and the utilization of our country's physical features should not even be considered until this basic factual material is available. Because of lack of infor-

mation on the geology and geography of Alaska in the past lives have been lost, worth-while enterprises have been laid aside, and contributions of matériel to the Nation's defense and welfare have been far less than they might have been. Now is none too soon to remedy some of these lacks, whether we face years of additional warfare or are planning for America's eventual after-the-war resumption of national leadership.

The principal new field projects that were undertaken during the season of 1943 to furnish information needed in the Nation's war plans dealt with the general supervision and gathering of information on mineral resources in the five principal regions into which Alaska may be divided; namely, southeastern Alaska, Copper River-Prince William Sound, Cook Inlet-Alaska Railroad belt, Kuskokwim, and western Alaska. Specific investigations were in progress in each of these regions. In southeastern Alaska search was made for molybdenite ores in areas adjacent to Prince of Wales Island; for chromium and nickel ores near Cross Sound and Lituya Bay; for copper-iron ores on Kasaan Peninsula; for lead-zinc ores near Wrangell; and for basic intrusive and magnetic rocks at a number of localities. In the Copper River-Prince William Sound region, in addition to a general examination of most of the old copper-producing localities, intensive search for copper deposits was carried on in the Nizina and Kotsina-Kuskulana districts and at Rua Cove. In the Cook Inlet-Alaska Railroad belt specific projects involved intensive examination of parts of the Matanuska-Moose Creek coal fields, of coal deposits near Costello Creek, of the tungsten deposits near Fairbanks, of lead and zinc ores near Mount Eielson, and of the chromite deposits near Seldivia. In the Kuskokwim region the individual projects included detailed studies of the quicksilver deposits near Decourcy Mountain and reconnaissance of the quicksilver deposits near Cinnabar Creek in the Holitna Valley. In western Alaska investigations were continued on the tin resources of western Seward Peninsula and in the Morelock Creek area of the Yukon Valley, and preliminary studies were made of tungsten deposits near Nome and Solomon, of graphite in the Kigluaik Mountains, of asbestos near Shungnak, and of quartz crystals in the Koyukuk Valley.

For the field season of 1944 the same general supervision of the work in the various regions was maintained. The emphasis that was being placed on discovery of oil in Alaska, however, led to establishing a separate unit to handle all projects having to do with that work, irrespective of their geographic location. Petroleum investigations are in progress in five areas—near Yakataga, Katalla, Iniskin, on the Alaska Peninsula, and in northern Alaska. The Alaskan projects involving other mineral commodities are the following: In south-

eastern Alaska investigations are continuing of the copper-iron deposits near Kasaan, Tolstoi, and Copper Mountain, and of lead and zinc deposits in the vicinity of Tracy Arm. In the Copper River region examination is being made of molybdenum-copper deposits in the vicinity of Nabesna. In the Cook Inlet-Alaska Railroad belt contact is being maintained with a number of miscellaneous prospects that are in course of development, and intensive examinations are under way in both the Matanuska and the Healy River coal fields. In the Kuskokwim region general scouting of areas regarded as likely to contain significant deposits of quicksilver minerals is being continued, and a reconnaissance of the reported ore deposits in the Russian Mountains is being made. In western Alaska a reconnaissance is being made of the coal deposits adjacent to Yukon River from Ruby to Kaltag and near Unalakleet on Norton Sound, the investigation of tin deposits in western Seward Peninsula will be continued, and examinations will be made of certain mineral deposits that have been reported near Shungnak, in the Kobuk Valley.

In addition to these projects a large part of the activity of the Branch has been devoted to the extended mapping program being carried on at the request of and with funds provided by the Army Air Forces. This project, which originally was more or less restricted to mapping parts of Alaska, has proved so useful that gradually it has been expanded to include the mapping of large strategic areas in other countries. At the close of the fiscal year the Alaskan Branch had completed from aerial photographs planimetric maps covering nearly 5,500,000 square miles and, as part of the same project, topographic maps covering 500,000 square miles.

TOPOGRAPHIC BRANCH

The headquarters offices of the Topographic Branch and its Atlantic Division are located in Washington, D. C.; the headquarters office of the Central Division is in Rolla, Mo.; and that of the Pacific Division is in Sacramento, Calif. Section offices are maintained in Chattanooga, Tenn., and Clarendon, Va.

GENERAL OFFICE WORK

During the year the regular program of cooperative mapping was carried on with 17 States, Puerto Rico, and the Tennessee Valley Authority, but the Topographic Branch directed a large part of its activity to producing maps for the War Department in both domestic and foreign areas. Many field engineers were detailed to this assignment, which included the revision by means of aerial photographs of maps of foreign territory covering approximately 26,000 square miles and the compilation of contour maps from older hachured maps cover-

ing 13,000 square miles. Existing maps for an area of 43,000 square miles were assembled in changed format and re-drafted. A considerable amount of map shading on scales of 1:1,000,000 and larger was done for special use of the Army Air Forces. This work for the War Department is in addition to that reported by the Section of Photomapping.

Section of Computing.—The office processing of control surveys made for the topographic mapping of strategic areas continued in unusual volume during the year. These computations and adjustments resulted in the issue of lithographed lists of leveling, transit traverse, and triangulation results for 70, 186, and 12 quadrangles, respectively. Bulletin 930-D was published during the year, the fourth and last part of spirit leveling in Illinois. Manuscript was prepared in part for a bulletin on spirit leveling in North Carolina. Computations and adjustments for routine field projects were continued, and the usual volume of control data was assembled and transmitted to comply with requests from field engineers and correspondents.

Section of Photomapping.—This section maintains offices in Washington, D. C., Clarendon, Va., Chattanooga, Tenn., Rolla, Mo., and Sacramento, Calif. Its principal work is the production of topographic maps from aerial photographs by stereophotogrammetric methods and the production of planimetric maps and planimetric bases for topographic field surveys by both stereophotogrammetric and graphic methods.

Topographic maps of areas in the United States produced during the year by these methods covered approximately 7,120 square miles; planimetric and base maps covered approximately 13,900 square miles. Topographic maps of foreign areas were produced from aerial photographs for the War Department; of these, maps covering approximately 10,000 square miles were completely processed for reproduction, and maps covering 2,700 square miles were delivered in manuscript form. These figures do not include work performed in the Chattanooga office, which is engaged on a cooperative project with the Tennessee Valley Authority and the War Department.

At the principal office of the section, in Clarendon, Va., in addition to the large production facilities, which are operating on a two-shift basis, there are also maintained a central laboratory for designing, testing, repairing, and adjusting all types of special optical and mechanical equipment utilized for our stereophotogrammetric work and a photographic laboratory specializing on research and precision photography required for the other offices.

The Washington office maintains a general file of aerial photographs utilized in the work of the Geological Survey and of aerial photo-

graphic negatives that have been purchased under photographic contracts. Through this office contacts are maintained with other governmental agencies involved in aerial photographic work.

Section of Cartography.—The Topographic Branch cooperated with the Army Air Forces in preparing aeronautical charts, work on which was performed in the Section of Cartography. Cooperation with the Public Roads Administration was continued, with the result that 31 sheets of road maps were prepared and submitted for reproduction.

Work on the International Map of the World on a scale of 1:1,000,000 was continued. Sheets I-18 (Hatteras), K-10 (Mount Shasta), K-17 (Lake Erie), and L-10 (Cascade Range) were in progress, and Sheet K-16 (Chicago) was in course of publication at the end of the year.

Section of Inspection and Editing.—During the year 224 quadrangle maps were edited for publication, 164 of which were for multicolor photolithography and 60 for engraving; 362 quadrangle maps, 21 State maps, and 4 State index maps were prepared and edited for reprint editions; 206 maps and diagrams that had been prepared as illustrations for geologic reports were edited; and 528 proofs of all kinds were read. On June 30 maps in the process of reproduction included 94 for engraving and 64 for multicolor photolithography; maps being edited or awaiting editing included 35 maps for engraving and 128 for multicolor photolithography; and 664 maps remained on hand for preparation for reprinting.

The Section of Inspection and Editing maintains in Clarendon, Va., a small unit to draft maps produced by the Atlantic Division. Part of this staff was employed for about 5,000 man-days in drafting special maps of foreign areas urgently needed for use in the war program.

MAP INFORMATION OFFICE

The Map Information Office continued its work as clearing agency for data pertaining to maps and aerial photographs of both Federal and commercial agencies. The office maintains extensive card-index and map files and is equipped to furnish data to Federal and State institutions and to the public.

FIELD SURVEYS

Topographic mapping was carried on in 34 States and Puerto Rico. Cooperative projects were conducted with 17 States and Puerto Rico and with the Tennessee Valley Authority. The survey of the islands of Puerto Rico and Vieques was completed.

The mapping of 61 15-minute quadrangles and 192 7½-minute quadrangles was completed, and mapping was in progress on 41 15-minute quadrangles and 49 7½-minute quadrangles at the end of the year. In

addition, work on 128 quadrangles was progressing in some one of the steps prior to actual mapping. Of the 253 quadrangles completed and 90 partly completed, 279 are within the strategic area designated by the War Department. For use in the investigation of strategic and critical minerals, including bauxite, lead, zinc, vanadium, magnesite, high-aluminum clay, coal, and iron ore, 10 special large-scale maps were completed and 4 are in progress. Two maps of special areas on a scale of 1:24,000 were completed for the investigation of coal for coking and transcontinental transportation. Two special areas were mapped for river-utilization purposes and one for flood control. The survey of the Olympic National Park in the State of Washington was continued.

A large amount of work each year consists of the remapping on a larger scale and in greater detail of areas that had previously been mapped and reported, which partly accounts for the small increase in the percentage of the United States covered. Of the total area of the United States, 47.4 percent has now been covered by adequate topographic maps produced by the Geological Survey.

Topographic mapping by the Geological Survey in the United States, Puerto Rico, and Hawaii, to June 30, 1944

State	Area mapped during fiscal year 1944 for publication on standard scales, contour intervals from 5 to 50 feet (square miles)				Total area mapped to June 30, 1944 (square miles)	Percentage of total area of State mapped to June 30, 1944	Control, fiscal year 1944		
	Field scale		New survey	Resurvey			Spirit levels (miles)	Transit traverse (miles)	Triangulation stations established
	1 to 24,000 or larger	1 to 48,000							
Alabama	19	292	42	269	25,884	50.2			
Arizona		491	203	288	33,398	29.3	346	95	56
Arkansas	5		5		24,614	46.3	162	77	
California	48	516	228	336	132,404	83.4	170		27
Colorado					58,156	55.8			
Connecticut	472			472	5,009	100.0			
Delaware					2,507	100.0			
Dist. of Columbia					69	100.0			
Florida	2,835		2,835		11,949	20.4			
Georgia	123			123	25,202	42.8			
Idaho		351	351		37,623	45.0			
Illinois		711	705	6	45,018	79.8	24		
Indiana	293		293		7,789	21.5	196	127	
Iowa					14,233	25.3			
Kansas		230		230	65,852	80.0		116	
Kentucky					27,559	68.2			
Louisiana		1,150	1,147	3	17,542	36.2	418	255	
Maine		231	213	18	25,977	78.2	196	59	
Maryland	58			58	10,577	100.0	51	30	
Massachusetts	1,129			1,129	8,257	100.0			
Michigan	312	186	229	169	16,550	28.4	75	29	
Minnesota					9,542	11.4			
Mississippi					8,997	18.9			
Missouri	67	2,773	1,592	1,248	61,527	88.3	17	44	
Montana	12	396	408		39,312	26.7	132		
Nebraska					28,225	36.5			
Nevada		219	219		43,762	39.6			
New Hampshire	124			124	9,304	100.0			18
New Jersey					7,836	100.0			
New Mexico					36,156	29.7	315	19	6
New York	709			709	49,576	100.0	129	76	
North Carolina					19,574	37.1			

¹ Planimetric maps, not included in total surveys, were compiled from aerial photographs with field examination—Michigan, 907; Wisconsin, 837 square miles.
² Mapped on scale 1:31,680.

Topographic mapping by the Geological Survey in the United States, Puerto Rico, and Hawaii, to June 30, 1944—Continued

State	Area mapped during fiscal year 1944 for publication on standard scales, contour intervals from 5 to 50 feet (square miles)				Total area mapped to June 30, 1944 (square miles)	Percent- age of total area of State mapped to June 30, 1944	Control, fiscal year 1944		
	Field scale		New survey	Resur- vey			Spirit levels (miles)	Transit trav- erse (miles)	Triangu- lation stations estab- lished
	1 to 24,000 or larger	1 to 48,000							
North Dakota		713	713		16,828	23.8	359	312	
Ohio					41,222	100.0			
Oklahoma					41,586	59.5			
Oregon		260	260		35,681	36.8	113		
Pennsylvania		1,415	621	794	42,923	94.7		78	
Rhode Island	1			1	1,214	100.0			
South Carolina					15,772	50.8			
South Dakota					20,750	26.9			
Tennessee	328			328	23,998	56.8			
Texas		50	50		92,532	34.6			
Utah					20,119	23.7			
Vermont	85	244	28	301	9,286	96.6			4
Virginia	5	703		708	38,097	93.3	297	321	
Washington		603	449	154	44,175	64.8	72		32
West Virginia		65		65	24,181	100.0			
Wisconsin	75	(¹)	75		20,348	36.2	67	339	9
Wyoming	93	265	282	76	35,642	36.4	9	30	9
Total	6,793	11,764	10,948	7,609	1,433,884	47.4	3,148	2,007	161
Hawaii					6,435	100.0			
Puerto Rico	² 1,401		1,401		3,370	98.8			

¹ See footnote on p. 113.² Contour interval in meters.

WATER RESOURCES BRANCH

Water is one of the Nation's basic assets. It is necessary for all life, for irrigation, navigation, sanitation, and production of power, for certain industrial processes, and for many of the comforts of civilized life. It is a menace to life and property in times of flood. Its deficiency during periods of drought is often calamitous. Water is a varying resource. In all places and times, it is limited in quantity by the amount of water that reaches the earth's surface in the form of rain and snow. The amount available determines the acreage that can be irrigated, the size of power plants, the capacity of industrial plants, and the growth of towns, cities, and communities. In many places the limit of supply available for man's purposes has now been reached; the needs are conflicting, and pressing questions arise relating to priority of rights, superiority of use, and equitable division. Under these conditions reliable information is essential to stability of development, soundness of financing, efficiency of operation, and equity of administration. Congress has authorized the Geological Survey to collect and publish essential facts about the quantity, character, availability, and best methods of utilizing the water resources of the Nation.

COOPERATION WITH STATES AND MUNICIPALITIES

The appropriation by Congress for studies of water during the fiscal year 1944 was \$1,437,700. Of that appropriation, \$1,065,000 was restricted for use in cooperation with States and municipalities, but the 182 cooperating agencies contributed considerably more than that amount, and sufficient additional Federal funds were supplied from the unrestricted part of the appropriation to meet the excess offerings. The amounts contributed by States and municipalities are summarized below :

State:	Contribution	State:	Contribution
Alabama-----	\$14, 375	New Hampshire-----	\$9, 095
Arizona-----	25, 400	New Jersey-----	21, 600
Arkansas-----	10, 450	New Mexico-----	38, 350
California-----	85, 913	New York-----	33, 549
Colorado-----	33, 500	North Carolina-----	24, 000
Connecticut-----	10, 790	North Dakota-----	7, 000
Delaware-----	1, 700	Ohio-----	23, 067
Florida-----	32, 950	Oklahoma-----	20, 530
Georgia-----	15, 000	Oregon-----	27, 040
Idaho-----	26, 167	Pennsylvania-----	31, 100
Illinois-----	15, 113	Rhode Island-----	1, 750
Indiana-----	26, 178	South Carolina-----	9, 700
Iowa-----	25, 970	South Dakota-----	2, 800
Kansas-----	35, 030	Tennessee-----	13, 400
Kentucky-----	19, 896	Texas-----	66, 872
Louisiana-----	31, 600	Utah-----	23, 167
Maine-----	7, 500	Vermont-----	4, 760
Maryland-----	17, 073	Virginia-----	25, 600
Massachusetts-----	15, 750	Washington-----	42, 980
Michigan-----	18, 000	West Virginia-----	9, 000
Minnesota-----	16, 075	Wisconsin-----	8, 263
Mississippi-----	15, 000	Wyoming-----	16, 575
Missouri-----	13, 350	Hawaii-----	44, 352
Montana-----	12, 660		
Nebraska-----	27, 050		
Nevada-----	3, 850	Total-----	1, 110, 890

ACTIVITIES CARRIED ON FOR OTHER FEDERAL AGENCIES

Other Federal agencies provided nearly \$700,000 for water-resources investigations that could not be financed by appropriated funds of the Geological Survey or included in cooperative programs. These agencies are the Office of the Chief of Engineers, Mississippi River Commission, and Office of the Quartermaster General, War Department; Bureau of Yards and Docks, Navy Department; Tennessee Valley Authority; Flood Control Coordinating Committee, Department of Agriculture; Weather Bureau, Department of Commerce; Bureau of Reclamation, Fish and Wildlife Service, National Park Service, Office of Indian Affairs, Office of Land Utilization, and Bonneville

Power Administration, Department of the Interior; Department of State; Defense Plant Corporation; Federal Power Commission; Veterans' Administration; and Federal Works Agency.

WAR AND POST-WAR ACTIVITIES

Requests for special reports on water have continued in large numbers throughout the year. Most of these requests have related to war activities, but increasing numbers of them have related to post-war problems that are now being studied widely. During the year more than 5,000 reports have been made in response to specific requests, 2,263 in the first 6 months and 2,789 in the last 6 months. These are in addition to the regular published reports. They have related to every State and to the Territories of Alaska and Hawaii but particularly to the industrial regions of the East, South, and West.

To record the variations in water supply resulting from fluctuations in precipitation, a widely scattered field force is needed. About 100 field headquarters are maintained, in which the assignments are reasonably permanent and experienced men familiar with local problems related to water are available. Such decentralization also serves well the purpose of cooperation, as close contact is maintained between the Survey personnel and cooperating State and municipal officials, and records and reports are made available currently where urgently needed. During the emergency of war and now in preparing for peace the decentralization has been especially valuable, because men who are experts not only in water but also in local problems have been available in all parts of the country to conduct special field investigations and to furnish promptly and efficiently information not elsewhere obtainable.

The demand for special services related to water as it affects war activities and post-war plans has thrown a heavy burden on the experienced engineers, geologists, and chemists of the Survey at a time when the force has been depleted by enlistment and draft for the armed services and by the assignment of experts to water-supply battalions in the several theaters of war. The maintaining of a force adequate for the performance of work that is essential to both war and peace has been difficult; it has been accomplished only by adding carefully selected replacements to the nucleus of experts.

CONTINUING ACTIVITIES

The operations of the Water Resources Branch are conducted by five administrative divisions—surface water, ground water, quality of water, utilization of water, and power resources. Because of the wide variations in quantity and quality of water, continuity of records is essential both for the emergency problems of war and for the re-

curing problems of peace; it is necessary, therefore, that at least as much of the ordinary activities of the Survey as will suffice to maintain continuity of records shall be carried on, even when the major efforts relate to war problems.

Records of the stage, quantity, or availability of surface waters are collected at about 5,000 gaging stations distributed through every State and the Territory of Hawaii, the number of stations depending upon the funds made available by cooperation with States and municipalities and by transfer from other Federal agencies. The field records are analyzed and released to the cooperating agencies and to the public as promptly as practicable. They are the basis for constructing, operating, and administering municipal and industrial water supplies, irrigation systems, power plants, flood-control works, inland waterways, and similar activities. Cooperation in surface-water studies is effective with about 161 State and municipal agencies, the personnel operating from 63 field offices.

The studies of ground water relate to the waters that lie in the zone of saturation, from which wells and springs are supplied. They cover the source, occurrence, quantity, and head of these waters; their conservation and replenishment; their availability and adequacy for domestic, industrial, irrigation, and public supplies, and as watering places for livestock, and the methods of constructing and utilizing wells and of improving springs. The increasing use of water from wells is causing a great demand for intensive studies of the quantities of ground water that are perennially available. Investigations conducted from 34 field offices were in progress during the year in nearly every State. In 6 States and in Hawaii the work was done in cooperation with 61 State and municipal agencies. Periodic measurements of water levels or artesian pressure were made in about 7,000 observation wells. Investigations were made or are in progress in most of the critical areas of heavy pumping to determine whether shortages in ground-water supplies are being caused by war demands.

Chemical analyses of 2,563 samples of water were made in the water-resources laboratory in Washington and of 6,729 samples in laboratories in Safford, Ariz., Albuquerque, N. Mex., Raleigh, N. C., and Austin, Tex. Many of the samples were collected in connection with studies of water supplies for Army and Navy establishments and for munitions plants and housing developments. Cooperative studies of the chemical character of surface waters were initiated in Louisiana and North Carolina and were continued in Florida, Georgia, New Mexico, and Texas. Samples of water were analyzed for cooperative studies of ground-water conditions in other States. Interpretations of analyses or advice about water problems were furnished to 16 Bureaus in 6 Federal Departments and to 8 independent agencies.

A variety of hydrologic and hydraulic studies and compilations are made on the utilization and control of streams, and a monthly summary, the Water Resources Review, is issued giving stream-flow and ground-water conditions throughout this country and Canada. These summaries are used extensively by many agencies, including major war agencies, engaged in production where floods or droughts are vital. The administration of certain responsibilities relating to permits and licenses of the Federal Power Commission has been continued. Because of the importance of power in the war program this function is increasingly essential. Investigations of water problems along the international boundary between the United States and Canada have been continued for the State Department and the International Joint Commission. Several studies were made that have an important bearing on water investigations and projects to be undertaken after the war.

CONSERVATION BRANCH

The Conservation Branch has two principal functions: (1) Making surveys of the water and mineral resources of the public domain and applying the results to the problems of public-land administration; (2) supervising operations incident to the development of power and to the production of minerals, including oil, gas, coal, potash, sodium, lead, and zinc from public lands, Indian lands, and naval petroleum reserves.

Additional funds made available during the year provided extra assistance and equipment necessary for the undertaking of field investigations and engineering studies and the preparation of reports dealing with power, fuels, minerals, and chemicals essential to the national war program. The results of this activity, if maintained on the present scale, will reveal the presence of new reserves and will provide information essential to the improvement of production practices and the elimination of waste, thereby increasing available reserves and furnishing the basis for sound post-war planning and true conservation of energy resources.

CLASSIFICATION OF LANDS

Mineral classification.—The Mineral Classification Division, in response to war-engendered demand for new sources of oil, gas, coal, potassium, and magnesium from the public domain, continued and increased markedly all phases of its service of furnishing to the agencies of the Interior Department concerned with public-land administration the geologic findings and decisions required by law or policy.

In all, 10,887 cases, each involving one to many geologic determinations, were acted on during the year, an increase of 38 percent over 1943. In addition, initial or revised definitions of the known geologic structure of four producing oil or gas fields were prepared and promulgated, increasing the net area so defined in 9 public-land States to 1,710,931 acres on June 30, 1944; geologic appraisal was made of 60 unit-plan submissions; and 34 special reports were rendered to the General Land Office on new discoveries of oil or gas on or adjacent to Federal lands.

To facilitate the acquisition of the basic geologic data required for the discharge of its increasing duties in connection with public-land classification and leasing-law administration, the Division established during the year regional field offices with a resident geologist in charge of each at Los Angeles, Calif., and Great Falls, Mont., and opened suboffices of its Denver regional office at Casper, Wyo., and Salt Lake City, Utah. From these offices numerous field investigations were carried on during the year in Colorado, Wyoming, Montana, California, and Utah.

Water and power classification.—All new surveys and investigations concerning the water-power resources and storage possibilities of Federal lands were on projects proposed for development to assist in the prosecution of the war or for post-war construction. Topographic surveys were made of 142 linear miles of stream valley and of 1 mineral leasehold, and, in cooperation with the Water Resources Branch, supervision of construction and operation was given to 167 power projects under license from the Federal Power Commission, to 193 such projects under permit and grant from the Department of the Interior, and to 154 in cooperation with the Office of Indian Affairs.

Office studies resulted in the addition of 67,166 acres to power-site reserves and the elimination of 30,650 acres therefrom, with net increase of the outstanding reserves of 23 States and Alaska to 6,671,948 acres; in the publication of maps of 580 miles of river valley and 8 dam sites; in final action involving hydraulic determination on 261 cases received for report from departmental sources and the Federal Power Commission; and in water-power classification on 1,726 cases, which also involved mineral classification. Reservoir-site reserves in 9 States remain unchanged at 137,172 acres.

MINERAL LEASE SUPERVISION

Mine supervision.—The Mining Division supervises operations for the discovery and production of coal, potassium, sodium, phosphate, and oil shale on public lands; of all minerals, except oil and gas, on tribal and restricted allotted Indian lands; and of other minerals on various land grants. The Division serves as consultant to the De-

partment of Agriculture on mining leases under the jurisdiction of that Department and also supervises production of minerals from public lands by the Metals Reserve Co. and the Defense Plant Corporation under authorization of the Secretary of the Interior. The supervisory work, directed from 6 field offices in the western United States and 1 in Alaska, included on June 30, 1944, 636 public-land properties under lease, permit, or license in 15 States and Alaska; 225 Indian properties under lease or permit in 14 States; and 4 secretarial authorizations in 3 States. The total output was valued at more than \$62,000,000.

The Division cooperated with the Departments of War, Justice, and Agriculture, other bureaus of the Department of the Interior, the War Production Board, the Reconstruction Finance Corporation, the Defense Plant Corporation, and the Office of Price Administration by furnishing information on potential sources of minerals necessary to the war program.

The war-induced expansion of mining operations has resulted in an accelerated diminution of the known potash reserves in New Mexico. Under instructions from the Secretary of the Interior the Geological Survey and the Bureau of Mines are cooperatively drilling test holes under contract and have proved additional high-grade potash reserves of national importance in and adjacent to the potash reserve created by Executive Order 6797.

The production of zinc from leased Indian land in Oklahoma has been maintained only by working ores of successively lower grade under the stimulus of production premiums. The Division is now making studies to aid in increasing production by improvements in recovery practices and is obtaining information on the probable reserves of low-grade ore that may be mined by large-scale mechanized operations.

Oil and gas supervision.—The Oil and Gas Leasing Division supervises operations for the discovery and production of petroleum, natural gas, natural gasoline, and butane occurring in public lands of the United States, in naval petroleum reserves, and in all Indian lands subject to departmental jurisdiction, both tribal and allotted, except those of the Osage Nation, in Oklahoma. During the fiscal year 1944 these duties were accomplished through 18 field offices and suboffices in California, Colorado, Montana, New Mexico, Oklahoma, Utah, and Wyoming.

To meet wartime demands, the Division opened new suboffices at Bakersfield, Calif., and Artesia, N. Mex., and, by intensive recruitment, succeeded in building up four special-study groups to aid in the adoption of proper secondary-recovery methods and other engineering practices necessary to conservation and maximum ultimate recovery of petroleum. During the year studies were completed and preliminary

reports prepared on the Hogshooter Field, Okla., the Cole Creek Field, Wyo., the Grayburg Unit Area, N. Mex., and the Buena Vista Front Pool, Calif.

On public lands 5,329 properties were under supervision at the end of the fiscal year, aggregating 3,106,392 acres in 20 States and Alaska.

Drilling on public lands during the year included the spudding of 536 wells and the completion of 506 wells, 350 of which were productive of oil and gas and 156 of which were barren. In all, 11,096 public-land wells, including 5,893 capable of oil and gas production, were under supervision on June 30, 1944. The production of natural gas and gasoline from public lands during 1944 was somewhat less than in 1943, and the production of crude oil was somewhat more.

The efforts to fulfill the need for new petroleum reserves were reflected in an increase of 8 in the number of new unit plans approved during the year, the total being 18; 29 unit plans were terminated because all rights thereunder were relinquished or abandoned, leaving 112 approved plans covering 1,342,149 acres outstanding on June 30, 1944. Production under approved unit agreements constituted about 59 percent of the petroleum obtained from public lands during the year, 69 percent of the natural gas, and 84 percent of the gasoline and butane.

On Indian lands the work of oil and gas lease supervision involved 4,572 leaseholds in 9 States, containing at the end of the year a total of 7,499 wells, 4,012 of which were productive of oil or gas and 201 of which had been completed during the year. Notable increases in production of natural gas and crude oil were reported from the Chickasaw and Choctaw lands in Oklahoma, from the Blackfeet lands in Montana, and from the Shoshone lands in Wyoming. Rentals, royalties, and bonuses accrued from Indian-land operations during the fiscal year are estimated to aggregate \$3,292,305.

On behalf of the Navy Department supervision was continued over operations for the production of oil, gas, gasoline, and butane from 21 properties under lease in Naval Petroleum Reserve No. 2 in California. Production from 259 active wells on this reserve aggregated 1,569,004 barrels of petroleum, 1,373,863,000 cubic feet of natural gas, and 7,494,253 gallons of natural gasoline and butane, having an aggregate royalty value of \$252,629.

WORK ON PUBLICATIONS

Texts.—The publications in the regular series (professional papers, bulletins, and water-supply papers) issued during the year numbered 49, as contrasted with 76 in the preceding year. This substantial reduction reflects adjustment to a war-curtailed publication schedule, with postponement of more general scientific reports and a concentration on the issue of those that would be of greatest direct or indirect

aid to the war program. In addition, 14 miscellaneous pamphlets were published. Work by the editors included the following: 6,686 pages of manuscript edited and prepared for printing; 223 galley proofs and 3,698 page proofs revised and returned; indexes prepared for 17 publications, covering 1,193 pages and consisting of 1,650 index entries. Copy prepared for mimeographing included 127 press releases, comprising 145 pages, and 257 pages of miscellaneous material.

Illustrations.—Twenty-eight reports, containing 475 illustrations, were transmitted to the printer. In addition, 157 maps and sections illustrating deposits of essential strategic minerals were prepared for preliminary release, and 153 proofs and 67 edition prints were examined.

Geologic map editing.—The work of the Section of Geologic Map Editing was varied in type, ranging from simple line drawing and retouching to extremely difficult drawings of complex maps and sections. In all, 119 maps and other illustrations were prepared. Most of these were concerned with investigations directly related to the war minerals program. A large part of the time of 1 illustrator since March has been spent in the preparation of an index map of the geology of the United States. In addition, maps and other illustrations for 5 water-supply papers and 85 maps for bulletins on strategic minerals and 1 professional paper were edited and reviewed during the various stages of their final preparation.

Distribution.—The Division of Distribution received during the year a total of 804 publications, comprising 63 new books and pamphlets and 2 reprinted books, 293 new or revised topographic and other maps, of which 3 maps were first published as "preliminary" editions, 12 Tennessee Valley Authority maps with contours, 421 reprinted topographic and other maps, 3 new advance sheets, and 10 reprinted advance sheets. The total units of all publications received numbered 88,596 books and pamphlets, 5,000 copies of the revised Missouri index map, and 2,363,815 topographic and other maps, a grand total of 2,457,411. The division distributed, or otherwise disposed of, 287,148 books and pamphlets, 624 geologic folios, and 1,462,298 maps, a grand total of 1,750,070, of which 510 folios and 1,232,123 maps were sold. The net proceeds (gross collections less copying fees and amounts refunded) from the sales of publications were \$31,209.15, including \$31,078.50 for topographic and geologic maps, and \$130.65 for geologic folios. In addition to this \$48,942.53 was repaid by other establishments of the Federal Government at whose request maps or folios were furnished. The total net receipts, therefore, were \$80,151.68.

Engraving and printing.—During the year 84 newly engraved topographic maps, 177 multicolor topographic maps (2 of which were originally printed as advance maps), and 26 special maps were printed, making a total of 287 new maps printed and delivered. Reprint edi-

tions of 403 engraved topographic maps and 22 photolithographed State and other maps were printed and delivered. Of new and reprinted maps, 712 different editions, amounting to 2,359,625 copies, were delivered. A large amount of work was done for 53 other units of the Government, including branches of the Geological Survey, and the charges for it amounted to about \$204,000, for which the appropriation for engraving and printing geologic and topographic maps was reimbursed. Transfer impressions and velox prints, numbering 145, were made during the year, and the amount turned over to miscellaneous receipts was \$263.20. Topographic maps and contract and miscellaneous work of all kinds, totaling 3,096,999 copies were printed and delivered. The photographic laboratory made 12,847 negatives, 27,129 prints, 3,310 photolith press plates, 167 intaglio etchings, 3 celluloid transfers, and mounted 810 prints.

LIBRARY

Work for the Military Geology unit of the Survey constituted a major service of the library. The War and Navy Departments, the War Production Board, the Foreign Economic Administration, and other war agencies made increased use of the library's facilities. The total number of readers was 13,163; of these 3,402 were from other agencies. The total circulation of books, pamphlets, periodicals, and maps was 72,853. Acquisitions were slightly greater than in 1943, but still much below the normal pre-war number. The present war work required a somewhat broader field of material, and this is reflected in the type of books and journals purchased. The Bibliography of North American geology, 1929-39—the 11-year cumulative volume, which includes the otherwise unpublished bibliography for 1937-39—was received from the printer in May. It contains 1,546 pages and more than 28,000 entries. The somewhat new format, which makes it much more useful, has been greatly complimented.

FIELD EQUIPMENT

Outstanding improvements in the trimetrogon mapping procedures are resulting from the construction of three stereoblique plotters by the Division of Field Equipment for the Alaskan Branch during the past year. Numerous operations that had been necessary previously in the production of trimetrogon reconnaissance maps will henceforth be reduced or eliminated, and greater speed, accuracy, and lower costs will result from their use. Parts for seven additional models have been fabricated, and these are expected to be completed and placed in operation during the month of July. Activities during the past year have been marked by the unusual number of "dead lines" that had to be met. One such deadline was the result of a sudden decision to re-design and construct for greater portability an ortho-

graphic projection machine to be taken by military geologists into the theaters of war. This machine is used for producing three-dimensional relief diagrams from topographic maps. It was necessary to complete work on it in approximately one-third of the time needed to produce the original model. Another article that was constructed with very limited time allowance was a graph-rectifying device, by which a discontinuous graph on curvilinear coordinates could be mechanically and accurately translated into a continuous graph with rectilinear coordinates. The device provided an infinite selection of changes in scale, both laterally and longitudinally, to any size within approximately 50 to 150 percent of the scales of the original graphs. Other instruments unusual in type and design that were constructed in the Division of Field Equipment are six Hotchkiss superdips, such as are used by geologists in measuring the comparative magnitude of variations in the earth's magnetic field, and a device which produces true perspective drawings of land areas from topographic maps.

FUNDS

During the fiscal year 1944 there was available for expenditure under the direction of the Geological Survey a total of \$11,585,328. Of this amount \$5,576,495 was appropriated directly to the Geological Survey, and \$6,008,833 was made available by other Federal agencies, and by States and their political subdivisions. In addition, \$9,700 was allotted from the appropriation for contingent expenses of the Department of the Interior for miscellaneous supplies.

Funds available to the Geological Survey in 1944 from all sources

General administrative salaries:		
Interior Department Appropriation Act.....	\$189, 670	
First Deficiency Appropriation Act.....	31, 200	
		\$220, 870
Topographic surveys:		
Interior Department Appropriation Act.....	672, 500	
States, counties, and municipalities.....	313, 624	
War Department.....	1, 739, 448	
Tennessee Valley Authority.....	76, 060	
Public Roads Administration.....	42, 169	
Miscellaneous repay.....	95, 807	
		2, 939, 548
Geologic surveys:		
Interior Department Appropriation Act.....	1, 176, 500	
First Deficiency Appropriation Act.....	106, 000	
States, counties, and municipalities.....	22, 322	
Bureau of Mines.....	317, 000	
Board of Foreign Economic Administration.....	64, 000	
War Department.....	166, 400	
Miscellaneous repay.....	355	
		1, 852, 577

Funds available to the Geological Survey in VTDD from all sources—Continued

Strategic and critical minerals:		
Interior Department Appropriation Act.....	\$624, 000	
First Deficiency Appropriation Act.....	68, 000	
States, counties, and municipalities.....	4, 562	
State Department (for work in other American Re- publics).....	74, 172	
Miscellaneous repay.....	388	
	<hr/>	\$771, 122
Mineral Resources of Alaska:		
Interior Department Appropriation Act.....	157, 500	
First Deficiency Appropriation Act.....	20, 000	
War Department.....	711, 952	
	<hr/>	889, 452
Damaging streams:		
Interior Department Appropriation Act.....	1, 312, 900	
First Supplemental National Defense Appropriation Act.....	90, 000	
First Deficiency Act.....	33, 700	
States, counties, and municipalities.....	1, 152, 193	
Permittees and licensees of Federal Power Com- mission.....	27, 366	
Department of the Interior:		
Bonneville Power Administration.....	50	
Fish and Wildlife Service.....	2, 165	
Office of Indian Affairs.....	6, 581	
Office of Land Utilization.....	16, 400	
National Park Service.....	338	
Bureau of Reclamation.....	6, 933	
Department of Agriculture.....	775	
Commerce Department.....	133	
Federal Power Commission.....	153	
Defense Plant Corporation.....	57, 922	
Federal Works Agency.....	9, 618	
Navy Department.....	3, 631	
State Department.....	50, 000	
Rubber Reserve Corporation.....	117	
Tennessee Valley Authority.....	59, 500	
Veterans' Administration.....	100	
War Department:		
Office of Chief of Engineers.....	709, 215	
Mississippi River Commission.....	2, 717	
	<hr/>	3, 542, 507
Classification of lands:		
Interior Department Appropriation Act.....	225, 000	
States, counties, and municipalities.....	1, 500	
War Department.....	4	
	<hr/>	226, 504
Printing and binding, Interior Department Appropriation Act.....		87, 500

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Preparation of illustrations:		
Interior Department Appropriation Act.....	\$22, 925	
First Deficiency Appropriation Act.....	3, 100	
		\$26, 025
Engraving and printing geologic and topographic maps:		
Interior Department Appropriation Act.....	200, 000	
First Deficiency Appropriation Act.....	32, 000	
Miscellaneous repay.....	165, 417	
		397, 417
Mineral leasing:		
Interior Department Appropriation Act.....	475, 000	
First Deficiency Appropriation Act.....	49, 000	
Navy Department.....	20, 000	
Office of Indian Affairs.....	85, 000	
Department of Agriculture.....	674	
Department of Justice.....	158	
		629, 832
Payment from proceeds of sale of water, special account.....		1, 974
		11, 585, 328
Total.....		

Solid Fuels Administration for War

C. J. POTTER, Deputy Administrator



IRREPARABLE harm to the fighting of the war, because of inadequate coal production, was averted during the fiscal year by forthright measures taken by the Solid Fuels Administration for War in cooperation with the coal industry, the mine workers and consumers.

In this period, the Nation's fuel requirements soared to new heights, creating record-breaking demands for bituminous coal, anthracite, and coke.

Lack of manpower and other handicaps, including mine strikes, prevented the coal mining industry from increasing production sufficiently to meet the full requirements of war industries and domestic users and necessitated adoption of a coordinated program to distribute current production to those who needed it most.

Every possible measure was taken to increase production and to distribute mine output so as to avoid distress to domestic consumers and impairment of industrial activity. Early in the period, it was necessary to issue thousands of directions diverting coal shipments to industrial consumers and retail yards in dire need of fuel. Later in the year measures became necessary for general control over distribution of the scarce types of solid fuels.

The Solid Fuels Administration was established 2 months before the start of the fiscal year, succeeding the Office of Solid Fuels Coordinator for War. Within a few days after it was set up, the agency was faced by the coal supply threat which resulted from the first of a series of general mine strikes. These were caused by a breakdown in wage contract negotiations between mine operators and labor. Until the Administration could recruit the trained staff it needed, its skeleton organization was forced to handle the strikes and problems of coal supply chiefly with personnel loaned by other agencies.

Its initial task was that of administering coal mines taken over by the Secretary of the Interior on order of the President but it was relieved of this duty with the establishment of the Coal Mines Administration shortly after the start of this fiscal year. During the period it was administering Government possession, and afterward in cooperation with the Coal Mines Administration to which it was closely coordinated, it concentrated on the job of increasing mine output.

It worked with the War Manpower Commission and the Selective Service System to retain as much manpower as possible for the mines; with the Office of Price Administration to make sure that coal prices were such as to stimulate the maximum production and distribution; with mine operators, unions, and the Coal Mines Administration to see that working conditions in the mines were safe for the miners and with the Office of Defense Transportation to make sure that the supply of coal cars was adequate and that coal was moved expeditiously to the places where it was needed. It cooperated with the operators and the War Production Board to provide essential new and replacement machinery for the mines and with the industry in developing production incentive campaigns. It promoted maximum stocking of coal so as to keep mines in full operation during the war months. These actions assisted in stimulating the production of an all-time record volume of bituminous coal and a wartime peak of anthracite output.

Loss of potential coal production during 1943 and 1944 as the result of strikes and discontent among miners cost an estimated 40 million tons of anthracite and bituminous coal. Added to this was a drain of skilled mine manpower into other industries and into the armed services, thereby constantly reducing mine productive capacity. This problem appeared likely to continue throughout the war since replacements are not available.

Upon the men who remained in the mines—and their average age increased from about 32 years to about 45 years—fell the task of stepping up mine output. While these older men did a remarkable job by increasing the per-man production of the mines, they were unable to mine sufficient coal to fill requirements.

As a result, the Nation's needs had to be met in part by utilizing the reserves of bituminous coal above ground in consumers' stockpiles which had been built against such an emergency under the stimulus of the Administration's predecessor, the Office of Solid Fuels Coordinator for War.

From the 86 million tons of bituminous coal in these stockpiles at the start of 1943, a total of some 30 million tons was withdrawn to meet current needs during the calendar year, and an additional 6 million tons was withdrawn in 1944 before consumption fell below production and permitted the addition of fresh reserves to the depleted stockpiles.

The interruptions to production and the fact that the reserves were unequally spread about the country made the problem of distributing

the available coal supply extremely complicated. Coal distribution, even in peacetime, is a complex job. Grades, types, and sizes of coal vary widely, and consumers' burning equipment likewise varies. Some consumers cannot operate without certain coals; other consumers, because of long use and tradition, are accustomed to particular coals. With the shortages of manpower affecting mines unequally, radical shifts had to be made in the distribution of the output of mines throughout the country to make sure that consumers requiring special coals were able to get them and that consumers got enough of some kind, grade or size of coal for essential needs.

This was a task of enormous magnitude. It meant taking into account the production of about 15,000 mines controlled by 14,000 producers; it meant utilizing efficiently the distributing facilities of 1,500 wholesalers and of tens of thousands of retail dealers; it meant considering the needs of millions of domestic and industrial consumers.

Before the coordinated program necessary properly to balance all the factors entering into this complex situation could be fully developed and effectuated, one local crisis after another had to be surmounted. While much of the Solid Fuels Administration's effort had to be devoted to handling immediate and specific problems, nevertheless, prior to the close of 1943, it was possible to inaugurate broader-range plans and by the spring of 1944 the entire distribution program had been put on a long-range basis.

THE IMMEDIATE PROBLEMS

The first serious coal shortage occurred in the byproduct coke industry, which supplies the steel industry, as a result of decreased output in mines normally serving it, coupled with increased requirements. This was met by emergency directions which diverted coal suitable for byproduct purposes from other industries to the byproduct plants. The second immediate problem was to halt a maldistribution of anthracite among domestic consumers resulting from changes in the pattern of requirements and from deficiencies in the productivity of various mines. The third problem was to increase the flow of coal via the Great Lakes to move a year's supply to upper lake docks before the seasonal close of navigation. The fourth problem was to supply coal to industries with insufficient stockpiles.

After the start of the heating season and throughout the winter months there was superimposed upon these principal problems a whole series of domestic coal shortages throughout the eastern half of the country. Community after community ran short of coal and required emergency assistance. Bituminous coal normally used by industry was rushed into Northeastern States to supplement inadequate supplies of domestic-sized anthracite. Similarly, bituminous coal was diverted into Southeastern States and into Michigan for domestic purposes.

Throughout the Plains States voluntary emergency shipments of coal were moved into hundreds of communities. Part of this domestic crisis was due to a shortage of coal to meet unexpectedly increased requirements which came from a decline in the firewood supply, from conversions to coal by users of oil and gas and from war-created population shifts.

These sweeping problems compelled the Solid Fuels Administration to increase its small initial staff rapidly by drafting trained coal men from other Government bureaus and from the industry.

LONG-RANGE PROGRAMS

Handling of the earlier problems was largely by specific directions to producers to ship coal to consumers who were short. These actions prevented interruptions of the war-production program and general suffering among domestic consumers of coal. As the volume of these directions became unmanageable, it became necessary to issue broad orders to direct the whole flow of coal and thereby eliminate many specific directions.

As rapidly as conditions permitted, the Solid Fuels Administration began to make plans for coal distribution in the months ahead. The first long-range plans covered the winter of 1943-44 and a second series of plans covered the entire coal year of 1944-45. By April 1, 1944, general regulations had been issued laying down a distribution program to continue in effect until March 31, 1945. This program, covering the whole distribution of solid fuels, is designed to spread the supplies expected to be available as fairly as possible. Cut-backs in the domestic consumption of the scarcer solid fuels are provided to assure that most domestic consumers may receive up to nine-tenths of their normal requirements of coal.

To draw up these programs it was necessary to collect a large volume of production and distribution statistics. A steady flow of this information to the Solid Fuels Administration was thereafter required. Upon the basis of these reports it was possible to keep reasonably informed on over-all coal supply and distribution and to determine changes necessary in the pattern of coal distribution.

To assemble this information, full use was made of the statistical services of the former Bituminous Coal Division and of the Bureau of Mines. But with the termination of the Bituminous Coal Division in August 1943 a large share of this statistical work fell upon the Solid Fuels Administration itself. Before the end of the fiscal year, all this work was turned over to the Bureau of Mines in the interest of the most efficient coordination.

In developing its new programs, the Solid Fuels Administration relied in large measure on the experience and advice of the coal industry. A series of industry committees provided continued close contact of the agency with producers, transporters and distributors of coal.

The primary committee is the Solid Fuels Advisory War Council, first set up early in 1942 by the Solid Fuels Coordinator for War. Its counsel has been secured on every important program undertaken by the Solid Fuels Administration. Contacts with soft coal producers are maintained through advisory boards for the 22 bituminous coal mining districts.

Advisory committees have been established by the Solid Fuels Administration to cover the supply and distribution of anthracite, of bituminous coal and of coke for domestic use. To maintain contact with the thousands of retail dealers, a National Retail Distribution Committee meets regularly to make recommendations.

Dealers throughout the country have been organized into committees to function as an emergency distribution system prepared to avert the development of acute shortages by keeping the Solid Fuels Administration currently informed on area supply conditions. The same committees will function, when necessary, to pool dealer and community resources and take other steps to meet unavoidable emergencies. This flexible system is adaptable to varied local conditions.

ANTHRACITE DISTRIBUTION

Anthracite, the primary fuel for household and other domestic uses in New England and the Middle Atlantic States, provided the Solid Fuels Administration with the most difficult retail distribution problems met in 1943-44. Responsible for this were the sharply increased demands for domestic sizes due to the influx of war workers into eastern cities, to heavy seaboard conversions from fuel oil, gas and fuel wood, to the withdrawal of much coke from the domestic market, to heavy consumption in the winter of 1942-43 which had exhausted normal dealer inventories and to large new requirements for the military services.

Partly due to these changes in demand and partly to changes in the productivity of various mining operations, a serious maldistribution of the available hard coal was far advanced before the Solid Fuels Administration could halt it. Some retail dealers had received large supplies of anthracite and had oversupplied their customers and others had received little or no coal and their customers were undersupplied.

An emergency program to halt this maldistribution was instituted by the Solid Fuels Administration shortly after mid-June 1943. This program was enlarged on September 1 by ordering a redistribution of current production among wholesalers as a means of bringing retail dealer receipts nearer a common level and by cutting back 10 percent under the 1942-43 receipts the quantities individual dealers could receive. At the same time, the Office of Price Administration was given authority to limit the distribution of hard coal from retailer

to consumer. In November 1943, the Office of Price Administration relinquished this control and the Solid Fuels Administration itself instituted a dealer-consumer limitation program.

While these measures improved the situation, the earlier maldistribution could not be fully corrected and, as the winter progressed hundreds of householders in community after community ran out of coal simultaneously. Emergency diversions totaling some 300,000 tons of coal were required during the winter months to relieve distress. Moreover more than 825,000 tons of hard coal were ordered transferred from one wholesaler to another to level the coal year distribution. To supplement inadequate anthracite supplies, coal from Northern and Southern Appalachian bituminous mines was diverted into seaboard communities. Emergency organizations of several types helped to distribute the limited supplies of solid fuels to householders who ran short in many of these communities.

The supply of anthracite available for domestic distribution in the 1944-45 coal year is running more than 6,000,000 tons short of estimated requirements. A similar shortage existed in the 1943-44 coal year.

A new control program, developed from the 1943-44 coal year experience and designed to spread equitably the limited production, was instituted on April 1, 1944, for the 1944-45 coal year. This limits domestic consumers to seven-eighths of their normal supply and provides better controls over distribution from the mines to assure that the output is distributed fairly among dealers.

Increased output of fine sizes of anthracite, suitable only for industrial use, threatened for a time in the fiscal year to clog up the anthracite car supply by the inability of producers to market the coal. However, the Solid Fuels Administration undertook a program to find additional uses for these fine sizes and the situation had been helped before the year's end.

BITUMINOUS COAL DISTRIBUTION

Approximately 90 percent of the Nation's coal output is bituminous coal which varies widely in type and quality depending on the mine and the area from which it comes. Since it is the chief industrial fuel, as well as the domestic fuel for millions of consumers, supply deficiencies could interfere seriously with the whole war program.

Shortages in the supply of high grade eastern-mined coals, which are required for coke making in the expanding steel industry and for the production of metals and certain strategic chemicals, created difficulties early in the fiscal year. As time went on, these shortages extended into the domestic supply which, in large areas, was threatened. Consumers, both industrial and domestic, who were unable to secure the eastern coals then turned to midwestern coals and these new and

heavy demands extended the shortages into those fields. Consumption requirements exceeding the output were met by diversions from industrial users who had stockpile protection.

Diversions of current production were accomplished, first, by specific directions which ordered coal shipped to a consumer who was short, and, second, by the institution of regulations which restricted the amount of coal industries were permitted to procure currently in accordance with the protection represented by their stockpiles. The first method, which continued to be necessary in some instances even after general regulations were instituted, necessitated learning from whom the coal would be taken and making sure that it was the type which was suitable for the consumer to whom it was directed. Under the second method of general regulation, industries with ample stockpile protection were compelled to reduce current purchases proportionately, and industrial users with little or no coal on hand were permitted to buy beyond current requirements to build up their protection.

The volume of specific directions issued at times during the fiscal year laid a heavy burden upon the staff of the Solid Fuels Administration. In all a total of 6,541 directions for the shipment of bituminous coal were sent out covering a total of 10,417,496 tons.

Because production of many captive mines which supplied coal to the byproduct coke industry had declined seriously, the problem of supplying the proper coal for coke manufacture was one of the first handled by the office. To reduce the flow of directions diverting coal suitable for byproduct and special purposes away from industrial consumers who had been using it for steam generation, producers were required eventually to give a first preference, before filling any other orders, to the needs of the byproduct industry and to users of special purpose coals.

Late opening of the 1943 navigation season on the Great Lakes and the mine strikes which interfered with the normal movement of coal to the lakes had held the movement up the lakes before midsummer to a dangerously low point. To force additional coal up the lakes, producers were directed to fill orders for coal to be moved by lake, second only to the top preference given to byproduct and special purpose coal. Extremely heavy shipments followed during the last few months of the navigation season, with the result that by the end of 1943 the total movement from Lake Erie ports was within 2,000,000 tons of the 1942 shipments. The preference for lake-borne coal was continued in the 1944-45 program with the additional requirement that shipments be made on an equal monthly basis throughout the navigation season, thereby eliminating need for heavy late season movements.

Although the Pacific Northwest had been expected to provide serious problems in the winter of 1943-44 and the Solid Fuels Administration took steps to prepare for them, a combination of circumstances

favorable to the area carried it through the winter without special trouble. Production of coal mines in the Pacific Northwest grew better, the volume of coal imported from Canada was increased and, unexpectedly, a large flow of coal was available from mines in Colorado and Utah. This coal normally would have been moved to the Plains States, but a blocked railroad tunnel necessitated its movement elsewhere.

Although the winter was mild in the Northwest, in the Southeast it was 15 percent colder than normal. The Southeastern States are dependent normally on the same Southern Appalachian mines which supply the Great Lakes trade. Insufficient production in the mines coupled with the heavy movements to the lakes decreased the coal available for the Southeast.

To correct this situation between January and March 1944, producers normally supplying the Southeast were required to fill all outstanding retail orders from that area on their books. Approximately 400,000 tons of coal were moved into Southeastern States in two weeks and the situation was relieved.

The heavy requirements for Southern Appalachian coal for by-product purposes and for the Great Lakes movement likewise brought repercussions in other areas, such as Michigan, where domestic consumers ran short of the coal they normally received all-rail from the mines. Shipments direct from mines either by voluntary arrangement with the producers or by specific direction assisted in relieving these shortages. Communities in Western Kentucky, Western Tennessee and other East South Central areas normally receiving high volatile coals from midwestern mines also suffered periods of shortage due to the heavy demand for those coals. Emergency shipments from the mines relieved the deficiencies.

The supply of bituminous coal for the Nation's railroads, which ordinarily consume 23 percent of the bituminous coal output, ran perilously low several times during the winter. Emergency action was required to keep some of the biggest lines in full operation. After consultation with the railroad industry, arrangements were made to substitute available coal for some of the high grade eastern coal the railroads ordinarily used. This has resulted in a largely increased use by railroads, even in the East, of middle western and strip-mined coal. Railroads normally supplied with eastern coal from the Great Lakes docks are now taking midwestern coal moved by way of Lake Michigan.

With the end of the heating season in the spring of 1944, the Solid Fuels Administration controls over the distribution of bituminous coals were relaxed as far as practicable to encourage industrial consumers to rebuild their depleted stockpiles as rapidly as coal became available, thereby fully utilizing mine capacity. The modifications

were first applied to midwestern coals and then were extended to various eastern coals as the heavy demands for those coals declined. No modifications, however, were made in the controls over Southern Appalachian-mined coal which remained in short supply.

Since it was evident that the available tonnage of domestic sizes of Southern Appalachian coals would continue below requirements, a new Governmental control was put into effect on April 1, 1944, limiting the amount of such fuels dealers could furnish to domestic consumers during the warm months for storage purposes. Under this regulation, which was of temporary character, an equitable distribution of the limited supply expected to be available during the spring and summer months was instituted. A program to supplant this temporary action and to control the distribution of scarce bituminous coals throughout the 1944-45 coal year was being formulated at the end of the fiscal year.

DOMESTIC COKE DISTRIBUTION

The responsibility for the equitable distribution of domestic coke was delegated by the War Production Board to the Solid Fuels Administration on December 31, 1943. Temporary regulations were instituted for the remainder of the winter providing that coke be supplied only to consumers with limited stocks. In the 1944-45 coal year program the distribution of domestic coke was coordinated with that of other domestic solid fuels. In the New England and Middle Atlantic States coke is controlled under the regulations which govern anthracite. In the remainder of the country it is controlled under the regulations which govern the distribution of scarce bituminous coal.

To increase the supply of fuel available for the Northeastern and Middle Atlantic States, producers were persuaded to reclaim usable beehive coke which had accumulated in refuse piles near the ovens. This coke has helped materially in supplementing the supply of fuel available to domestic consumers, but the supply is running short and is expected to become exhausted within the next few months.

Because some of the reclaimed coke was being marketed without proper preparation, the Solid Fuels Administration established a maximum permissible limit for ash content to insure that unsatisfactory fuel was kept off the market.

COAL PRODUCTION

Definite contributions to the coal industry's remarkable production record in 1943 and in the first half of 1944 were made by the Government's coal agencies, the Solid Fuels Administration for War and the Coal Mines Administration. Output in 1943 was estimated at 589,000,000 tons of bituminous, an increase of some 6,000,000 tons over

1942 and the highest production on record, and at 60,644,000 tons of anthracite, highest since 1930. This was accomplished in spite of the continuous attrition of mine manpower and the losses of potential production during the strikes.

The two Government agencies helped to bring harmony between management and labor, helped to make 6-day operation general throughout the industry and secure cooperation of the industry in reducing production losses at holiday and vacation times. The Coal Mines Administration, through the Government-labor agreement, lengthened the working day. The Solid Fuels Administration for War took every available step to maintain mine manpower, to provide essential machinery and equipment and to assist in the extension and development of the mines.

Much of the increased production has been in the low grade and strip-mined bituminous coals and in the fine sizes of anthracite, all of which are suitable only for some industrial purposes. Production of the eastern-mined bituminous coals, essential to the byproduct and metallurgical industries and for domestic use, and of domestic sizes of anthracite continue far short of requirements. Careful control of the distribution of these scarce coals, both hard and soft, is required to assure that the consumers who must have them receive at least enough for their minimum needs.

THE COAL OUTLOOK

Programs of the Solid Fuels Administration for War designed to promote equitable distribution and assure the coal supply for essential users during the next fiscal year should prevent much of the maldistribution which would otherwise be caused by production deficiencies in particular anthracite and bituminous coals. Moreover, an extensive system of field offices, coupled with the work of industry committees, should provide a rapid check on coal supply conditions and permit action to be taken in time to avert the development of emergency conditions.

Also, in the event that unavoidable emergencies arise, the machinery is now functioning to divert coal rapidly to meet the immediate needs of industrial and domestic consumers.

Under present conditions, the individual industrial and domestic consumer will get the greatest coal protection by cooperating with his supplier to:

1. Store as much of his equitable share of coal as his supplier can furnish before the start of the next heating season.
2. Substitute available and suitable alternative coals, as far as possible, for the use of the scarce fuels.
3. Exercise the utmost conservation in the use of the fuel that he is able to obtain.

Coal Mines Administration

C. J. POTTER, Deputy Administrator



THE NATION'S coal mining industry, of which possession was taken by the Government when it was paralyzed by a general strike, was back in private control before the end of the fiscal year, with harmony restored between management and labor and with production at a wartime peak.

Affairs of the Coal Mines Administration, set up by the Secretary of the Interior to administer Government possession of the mines, were being liquidated as the fiscal year ended.

All but 2 of the mines had been turned back to their owners 13 months after possession of some 3,300 strike-bound pits was taken by the Government to restore and maintain full coal production essential to the successful prosecution of the war.

During the period of Government possession :

A strike-bound, demoralized industry was restored to full operation without bloodshed or use of force, despite the almost hopelessly tangled relations between the mine workers and the operators.

Working time was substantially increased and the miners redoubled efforts to get out the coal under a Government wage contract which provided for no increase in the basic rates of pay specified by their pre-war contract with the operators.

All previous bituminous coal production records were broken and anthracite was at wartime maximum in an industry that for years has failed to operate in the absence of a contract between its owners and employees.

Mine workers and operators were finally brought together on a mutually acceptable wage contract within the National Stabilization Program, and the mines were quickly restored to private possession and control.

The Secretary of the Interior first took possession of the coal mines on May 1, 1943, under an Executive order of the President after general strikes had practically halted mining operations and curtailment of war production was being threatened by coal shortages. The strikes resulted from a break-down in wage contract renewal negotiations between the operators and mine labor.

The initial take-over was carried out by the Solid Fuels Administration for War. However, that agency had been established primarily to regulate wartime coal distribution and early in July 1943, the Secretary set up the Coal Mines Administration to administer Federal possession of the coal pits.

After the first take-over, the miners voluntarily returned to work under arrangements made by the Secretary for operation under Government control. On June 25, 1943, the War Labor Disputes Act (Smith-Connally Act) became law, requiring a return of Government-possessed private properties to their owners within 60 days after they had attained the productive efficiency prevailing prior to the take-over. Under the terms of this law, and under the existing circumstances the mines were all returned to their owners by October 12, 1943, although no wage contracts for their operation had been concluded.

Sporadic strikes again broke out a day later, the miners refusing to stay on the job in the absence of a wage contract.

By November 1, strikes had become widespread and production had practically ceased. A new Presidential Executive order was then issued authorizing and directing the Secretary of the Interior once again to take possession of all mines in which production had been stopped or was threatened by strikes. The new order directed the Secretary to “* * * offer the duly constituted representatives of the workers’ own choosing a contract or contracts governing the terms and conditions of employment for the period of the operation of the mines by the Government * * *.”

The Secretary immediately called in representatives of the United Mine Workers of America and on November 3, after but a few hours of actual negotiation between representatives of the workers and of the Coal Mines Administration, reached an agreement as to the terms and conditions of employment to govern both bituminous and anthracite mines in the Government’s custody.

This agreement continued in effect various changes in the former contracts which had been ordered by the War Labor Board and further, provided for an increase in the workday and for payment in the bituminous mines for portal-to-portal travel time in accordance with principles formally announced by the War Labor Board.

This contract was subsequently approved by the War Labor Board as being within the Stabilization Program.

Under the new Government-United Mine Workers agreement, so far as bituminous coal was concerned, assuming that 45 minutes were spent daily by the miners in travel inside the mine between the mine mouth and the working face, the miners agreed to work 8 hours a day at actual coal production instead of the 7 hours spent under the previous industry agreement. This new agreement later became the basis for a new contract between the operators and mine labor.

Under the agreement, payment of a basic wage of \$8.50 per day in the bituminous mines was authorized. This was the amount the miners would have earned for 8 hours of actual work under the old contract. Of this sum, 50 cents was counted as basic compensation for portal-to-portal travel time.

The contract provided no increase in the basic wage rate of \$1 per hour for straight time and \$1.50 per hour for overtime but it recognized that the bituminous miners were entitled to pay for inside travel time as well as worktime.

Under the new contract, the basic wage obtainable by inside day men in bituminous mines was \$57.06 per week for the new 8-hour work-day as contrasted to an average of \$45.50 per week for the 7-hour day under the old contract. The change required the men to stay underground 9 hours per day, which includes an average of 8 hours productive work, 45 minutes of travel time and 15 minutes for lunch, to earn \$8.50 per day.

The agreement between the Government and the United Mine Workers of America similarly provided for increased work by the anthracite miners. Under this agreement hard-coal miners contracted to reduce their customary 30-minute lunch period to 15 minutes. The 15 minutes given thereby became productive time for which compensation would be paid at the rate of 37.8 cents per day for each miner—the average overtime rate for that time on the job under the old industry contract.

In mid-November the Secretary of the Interior called together 29 of the principal owners and operators of bituminous coal and anthracite mining properties and urged them to negotiate a contract with the mine workers, pointing out that the execution of a firm contract was essential to settlement of the Nation's coal troubles. Two days later he convened a joint conference of the bituminous coal operators and representatives of the United Mine Workers to start them on the resumption of negotiations to work out a joint wage agreement within the framework of the November 3 Government agreement and the decisions of the National War Labor Board.

As a result of the deliberations of this group, an industry agreement was worked out to continue in effect until March 31, 1945. The agree-

ment was modeled on the Government contract and provided for a retroactive payment of \$40 in settlement of portal-to-portal travel time claims. At the request of the negotiators, the Secretary called a meeting in Washington on December 17, 1943, at which representatives of approximately two-thirds of the Nation's bituminous coal tonnage approved the new Supplemental Wage Agreement. The agreement was then submitted to the War Labor Board.

In the spring of 1944 widespread unrest developed among soft coal miners as a result of failure to execute the agreement and delay in making the \$40 retroactive payment. On May 19, 1944, the Supplemental Wage Agreement was approved by the War Labor Board and the Director of Economic Stabilization. The approval covered the entire agreement including the \$40 retroactive pay provision.

In the anthracite industry negotiations between operators and the miners eventuated on March 8, 1944, in a contract to remain in effect until April 30, 1945. The contract continued the provisions of the Government agreement as well as the other modifications which had been directed previously by the War Labor Board and compromised several controversies which had not yet been settled. It received War Labor Board approval on April 7. This contract was finally ratified by the mine workers after a tri-district convention in mid-June.

The Secretary of the Interior terminated Government possession of mines operated by the members of the Coal Producers Association of Illinois on December 20, 1943, after a contract had been executed with the Progressive Mine Workers Union labor in those mines. Possession of other mines was retained by the Coal Mines Administration after the receipt of an opinion of the Attorney General to the effect that the War Labor Disputes Act did not require that possession of mines be terminated if the absence of a firm wage contract constituted a continued threat to the maintenance of coal production.

On May 31, 1944, the Secretary terminated Government possession of bituminous coal company properties in six production districts which had executed the bituminous wage contract and had indicated their readiness to put it into effect immediately upon termination of Government possession. Between May 31 and June 21, mines of additional companies were released as information was received that they had either executed or were about to execute the wage contract and were ready to put it into effect.

On June 21, the Secretary released the mines of all coal companies, both anthracite and bituminous, then remaining in Government possession, except two. These were the bituminous mines of the Jewell Ridge Coal Corporation of Tazewell, Va., which was testing the va-

lidity of portal-to-portal payments in Federal courts. They were still in Government possession at the end of the fiscal year.

Administration of Government possession of the mines in 1943-44 was carried out with practically no interference with the normal management of the mining properties, and the coal mining operations continued to be for the financial account of the coal mining companies.

Executive heads of the various coal companies were designated as Federal operating managers of the mines and field staffs of Government trained men were established in the production districts to maintain contact between the Coal Mines Administration and the operating managers. The staff of the Coal Mines Administration itself was kept at minimum size by utilizing as far as possible the services of trained men already serving the Department of the Interior in the Solid Fuels Administration, the Bureau of Mines and the Bituminous Coal Division until that division was terminated in August 1943.

Mine output increased impressively during the period of Government possession in spite of steady manpower drains, the serious production losses in the strikes and sharp increases in the average age of miners. For 1943 as a whole, bituminous production totaled 589,000,000 tons, the highest output on record. Anthracite output totaled 60,644,000 tons, the highest production in 14 years. In the first half of 1944, soft-coal production increased 12 percent and anthracite 13 percent over the first 6 months of 1943.

Besides the longer working day provided under the Government-mine workers' agreement, several programs sponsored by the Government undoubtedly contributed to this achievement. Most important of these was the 6-day-week program. Shortly after the Government takeover, instructions were issued to all operating managers to afford the men an opportunity to work the sixth day. This resulted in more general 6-day operation than had been the case previously.

The miners were afforded an opportunity to work during the usual holiday and vacation periods. As a result, very substantial tonnages of coal were produced on various days in 1943 and 1944 ordinarily observed as holidays in the mines. Production was also maintained during the scheduled vacation period of 1943 and operators and miners in 1944 made supplementary agreements to eliminate the vacation period.

A Sunday work program was instituted in the anthracite mines in February 1944, by agreement with the operators and miners. In the four Sundays of that month, nearly 600,000 tons of hard coal were added to the Nation's supply. At the same time, the month's output on the usual working days was raised 100,000 tons over that in January.

While the mines were in Government possession, Coal Mines Administration officials worked continuously to settle and prevent the day-to-day strikes which ordinarily occur in individual mines as a result of local disputes. Other programs included an investigation of the operation of company-owned commissaries and an intensification of health and safety activities. Fewer lives were lost per million tons of coal mined between November 1, 1943, and May 30, 1944, than in any comparable period on record.

Petroleum Conservation Division

J. W. STEELE, Acting Director



THROUGH foresight of Congress the Connally "Hot Oil" Act was enacted February 22, 1935, delegating to the President prescribed powers "to regulate interstate and foreign commerce in petroleum and its products by prohibiting the shipment in such commerce of petroleum and its products produced in violation of State law, and for other purposes." Primarily designed "to encourage the conservation of deposits of crude oil within the United States" the Petroleum Conservation Division was created to effectuate the expressed intention of Congress.

Acting through the Secretary, as the designated agent of the President, the functions of Petroleum Conservation Division are to assist in the prescribed administration of the act, to cooperate with oil and gas producing states in the prevention of waste and the adoption of uniform oil and gas conservation laws, and to keep informed as to the movement in interstate commerce of petroleum and its products with respect to its parity between supply and consumptive demand.

Regulations were promulgated requiring, among other things, the keeping of books and records and the filing of reports by those respectively engaged in producing, shipping or transporting, and refining petroleum within designated areas.

FEDERAL PETROLEUM BOARD

Federal Tender Board No. 1 was established at Kilgore, Tex., to enforce the Connally Act by administration of regulations promulgated thereunder and to regulate the movement in interstate commerce of petroleum from designated areas. This Board, under supervision of the Petroleum Conservation Division, continued its prescribed func-

tions until October 27, 1942, when it was superseded by the present Federal Petroleum Board in pursuance of Order No. 1753-A.

While the Connally Act is applicable to any State having conservation laws regulating production of petroleum, regulatory operations of Federal Petroleum Board are now confined to 106 counties in Texas, the 2 principal oil producing counties in New Mexico, and the entire State of Louisiana. The major oil producing and refining sections in the Southwest are within these areas. Eliminating fields of minor commercial significance, there are 557 oil fields, containing 64,584 oil wells, producing daily an average of 1,914,500 barrels of crude oil; 79 refineries processing daily an average of 1,446,000 barrels of petroleum products; and 128 gasoline plants producing daily an average of 105,500 barrels of casinghead gasoline and liquefied petroleum gases.

The counties within Texas and New Mexico which were excluded from the designated areas contain fields incapable of producing oil in excess of the amounts permitted by State laws and are therefore not subject to prohibitions prescribed by the Connally Act. The administration of prescribed regulations would, in such fields, be an unwarrantable burden on the industry and an unnecessary expense to the Government. For similar reason, the required filing of reports by producers has been suspended in certain fields within the designated areas.

The enforcement of the act and administration of the regulations is essentially a specialized field operation requiring, among other things, physical inspection of properties and facilities of oil operators. This function is necessary to maintain effective control over the interstate movement of petroleum and petroleum products. As a result of this control, illegal practices are reduced and a maximum compliance with conservation laws is maintained in oil operations.

Extensive activities of Federal Petroleum Board have been somewhat curtailed by reduction in experienced personnel and other wartime handicaps, yet the volume of criminal investigative operations has been maintained at a comparatively high level.

During the fiscal year 41 criminal investigations were initiated which, together with 4 investigations in progress at the close of the preceding year, were disposed of as follows:

One case was successfully prosecuted; 27 were concluded administratively because of insufficient and inconclusive evidence; and 2 were closed by action of the Attorney General. At the close of the year, 2 cases were pending with the Department of Justice, 3 were pending trial on dockets of United States District Courts, 1 case was in process of transmittal to the Department of Justice for prosecution, and 5 cases remained under investigation.

At the beginning of the year eight criminal cases were pending with the Department of Justice. Two cases were successfully prosecuted, five were closed because of inconclusive evidence, and one was pending June 30, 1944.

Of seven criminal cases pending in Federal courts at the beginning of the year, six were successfully prosecuted and one remained pending trial on June 30, 1944.

In the nine cases successfully prosecuted fines aggregating \$7,430 were assessed and several suspended sentences were imposed.

General Land Office

FRED W. JOHNSON, Commissioner



NEW LEGISLATION to modernize present Federal land laws is one of the requirements essential to the most effectual use of the millions of acres of public land in the continental United States and Alaska under the jurisdiction of the General Land Office. Only through the enactment of such remedial statutes can the maximum benefits under national conservation safeguards be assured with which to meet current and post-war demands for the utilization of natural resources. Moreover, this fundamental need, firmly established by land administration experience in connection with the war, is an integral factor in the adequate handling of the after-the-war responsibilities of this Federal organization which for 132 years has served as the official real estate agent of the Government.

The needs for up-to-date laws are numerous and are reflected in virtually every field of public land administration. Specifically, however, there are at least five major points at which service to the public is being hampered by lack of adequate statutory authority to act. These are outlined in the following :

RECOMMENDATIONS

1. Mechanized warfare has shown beyond a doubt that minerals are the sinews of modern war and unequivocally demonstrated the necessity for the highest degree of efficacy in our national mineral economy. That goal is not possible of attainment without a rejuvenation of our Federal mining laws. The experience of the first few months of the emergency when our admittedly superior technical and industrial skill was handicapped by a lack of readily available raw mineral materials, must not be repeated. The gravity of the situation is aggravated by the fact that generally speaking, the United States had the materials at all times, but because of antiquated statutes, was unable to find out what and where they were.

Specifically, the vast areas of public lands and lands acquired under the National Industry Recovery Act, the Bankhead-Jones Farm Tenant Act and various relief appropriation and rehabilitation acts constitute a veritable storehouse of essential minerals. Under present statutes, no method exists by which the United States may catalog and in cooperation with private initiative develop the resources on those acquired lands through leases based on sound principles of conservation. Such legislation as will enable the marshalling of our full complement of mineral resources is a necessary adjunct to adequate stock piling not only for current needs but also for future post-war or emergency demands. Moreover, the application of the leasing system to the acquired lands would be particularly advantageous, since it would allow those lands, which are in large part situated in or near well-settled areas, to be used contemporaneously for mining and for numerous essential surface uses.

Similarly, except for the fuel and fertilizer minerals in the public lands, no authority at present exists for supervising the mining of other minerals owned by the United States. No real mineral conservation is possible without such authority. A general leasing system would supply not only the power to conserve but would enable the Government to classify and catalog its mineral resources on these lands also. Finally, the accumulation of knowledge of the allocation of mineral deposits which would naturally result from a leasing system, would prove a valuable defense element in time of war.

2. One of the elements essential to successful administration of the public domain is complete, authentic information as to the character and status of the land. At the present time, evidence of the filing of thousands of unpatented mining claims is not made a matter of Federal record, but is merely registered in county recording offices. The enactment of legislation to enable the recording of such evidence in the General Land Office is urgently recommended. The decided advantage of such a system was clearly demonstrated during the earlier stages of the war when time-consuming search of county offices had to be made before land could be made available for troop-training and other military purposes.

3. One of the most serious handicaps to proper administration of the public domain during the post-war period is expected to be the lack of any facilities by which detailed information can be secured concerning the real-estate holdings of the various branches of the Federal Government. The establishment within the General Land Office of a centralized, consolidated inventory of all such land records is recommended as a solution of this problem.

4. Plans for land settlement in Alaska call for the utmost in service and safeguards for the public if development of the Territory is to be attained on a permanently stabilized basis. Protection against ill-

advised use of the public domain in Alaska, similar to that afforded on the mainland through the requirements for classification of land tracts for the best use to which they may be put, would do much to promote the stability of its economic future. The passage of legislation making such classification statutes applicable to the public domain in the Territory is urgently recommended.

5. The need for the utmost development of natural resources consistent with nonwasteful use is apparent from even the most cursory survey of post-war requirements. The world-wide pressure for forest products resources, food, fiber, or leather furnished in part from the public domain will call for the highest possible efficiency in the administration of the public lands. Greater protection of the public lands and their resources from dissipation would be afforded by the enactment of a uniform Federal trespass law.

POST-WAR PLANNING

Besides the necessity for modern laws, an adequate response to the prospective heavy demands for natural-resource materials in the rehabilitation of a post-war world entails a need for coordinated planning after the war. Such a program encompassing many aspects of settlement, resource development and other problems in land administration already has been set under way by the General Land Office. The scope of this work is indicated below.

ALASKA

Popular interest in the Territory of Alaska has reached new heights. The presence of American troops, the construction of the military highway system, and the influx of civilian workers on the many construction projects in Alaska have focused attention upon the possibilities of the area for permanent homes. In advance of anticipated post-war demands, trained technicians were sent to the Territory by the General Land Office near the end of the fiscal year, in order that plans could be ready for an orderly development of land-settlement activities which will safely avoid the disastrous ghost-town experiences of earlier settler days on the mainland. Meantime, deluged with requests for information, the Office distributed tens of thousands of leaflets and other publications setting forth the basic requirements for land settlement in the Territory under Federal law. The principal point stressed in all this material is the fact that, contrary to popular belief, it is not possible to secure public land on an "order by mail, sight unseen" basis, since Federal statutes require personal inspection and full knowledge of the general characteristics of any piece of land for which application may be made.

Coupled with the land settlement problem is the need for the identification through official surveys executed by the Cadastral Engineering

Service of additional tracts of the public land in the Territory. Some idea of the task confronting the General Land Office in this respect may be gained from the fact that only 2,322,079 acres of the total land area of 365,481,600 acres have as yet been surveyed. While, of course, all of the remaining 363,159,521 acres of unsurveyed land will not be included in even the most extensive post-war plans, since it contains mountainous terrain and other tracts not adaptable to use, nevertheless the cadastral measurement of land areas as a step toward proper settlement activities will be a necessary part of the post-war program.

The resumption of tourist travel in Alaska and the growth in the population expected to result from the increased settlement after the war will involve greater responsibilities for forest fire protection than those now borne by the Alaskan Fire Control Service. This branch of the General Land Office, which has just completed its fifth year of operation can, upon the cessation of the war emergency, be expanded to meet the urgent needs of post-war conditions in the Territory.

SOLDIER SETTLEMENT

American service men and women have become more land-conscious than any group of comparable numerical strength in recent years. Trained in camps far from their homes, and later transferred to foreign lands, they have acquired a yearning for a home of their own, which in many instances means a homestead on Government land. The furnishing of an adequate number of land areas to meet that demand is another high priority problem facing the General Land Office in the postwar era. Its solution is complicated by the fact that homesteading, as popularly understood, was first set under way by President Abraham Lincoln 82 years ago and that, as a consequence, good farm land upon which an agricultural living can be made as required by the homestead law, is scarce on the vacant, unappropriated and unreserved public domain in the United States which still remains in Federal ownership. This does not apply to the public land in Alaska, where good agricultural areas still are open to settlement, nor, obviously, to such farm lands as may be made available on Federal reclamation projects.

Meanwhile, another and broader opportunity for land settlement by World War veterans as well as civilians is afforded under the terms of a law which authorizes the lease or sale of not to exceed 5 acres of public land for home, camp, cabin, health, convalescent, recreational, or business purposes. Popularly known as the "small sites" act, this law does not require the making of a living by agriculture upon the land. In order properly to care for the postwar expansion in this type of land settlement, field parties of the General Land Office were engaged during the past year in the classification of areas of the public domain suitable for such use, and informational material setting

forth the location of the tracts and the legal requirements for their settlement was made available to the public.

The gratitude of the Nation for its fighting forces has always been reflected, after other wars, in the granting of special privileges to veterans in the acquisition of the public land. Credit for military service, for example, was given in meeting the time requirements involved in securing land under the homestead laws. The extension of similar credit to veterans of this war is authorized in legislation advocated by the General Land Office which had passed the House of Representatives, but not the Senate, by the end of the fiscal year. Its final approval will prove another favorable factor in soldier settlement plans in the postwar period.¹

TRAINING AREAS

A segment of the public domain equal to half the total land surface in New York State has been directly dedicated to war purposes. Some set aside for national defense use even before Pearl Harbor brought a formal declaration of war, these 15,400,000 acres withdrawn by public-land orders or Executive orders swiftly were transformed into troop training areas, target ranges, tank maneuver grounds, aerial bombing ranges, and other forms of military reservations. All of these lands were mustered into active service only for the duration of the war, with the stipulation that the tracts would return to their "civilian" status in the public domain 6 months after Presidential proclamation that the emergency is at an end.

The fitting of these "demobilized" lands into the post-war economy will constitute another element in General Land Office activities. Some of the tracts, formerly so isolated as to be of minor use, now are made more accessible by the construction of military roads and other improvements. Whether tracts of such a type will present additional opportunities for small site or other form of settlement after the war is a major angle to the postwar land administration problem.

NATURAL RESOURCES

A broader responsibility in the conservation of natural resources on the public domain forms still another factor in General Land Office operational plans for the period after the war. Widening the scope of these activities, Congress during the past fiscal year passed a law extending the policy of sustained yield timber management to all the public land. The application to the entire public domain of this principle which has been so successful in the development and pro-

¹ This act (Public 434) was approved by the President on September 27, 1944. It gives credit up to 2 years for military service in meeting residence and cultivation requirements under the homestead laws, and grants veterans during the next 10 years a 90-day preference right of application under the homestead or desert land laws, and the small site leasing act.

duction of forest products on 2,500,000 acres of revested Oregon and California railroad grant lands, is calculated to prove a distinct contribution in the solution of postwar economic problems.

The resumption on an enlarged scale of operations by the Range Development Service, curtailed during the emergency, will be an integral part of plans for securing the maximum benefits from the use of natural resources on the public domain in the production of food after the war. This program of conservation carried on in cooperation with livestock men who use the public range outside Federal grazing districts for feeding and watering their cattle or sheep will provide technical assistance in combatting soil erosion, the construction and improvement of watering facilities, and the fencing and reseeding of grazing areas.

The part that the public lands may play in the expansion of airborne transportation facilities after the war already is a matter of study by the General Land Office. Under existing Federal statutes, it is the responsibility of the office to lease portions of the public domain for use as airfields by municipalities or private individuals; consideration currently is being given to the problem of whether amendment of the laws might not be advisable to permit the leasing of public lands for landing fields and repair shops in glider operations as well as airplane flights.

THE YEAR IN REVIEW

With many of its field offices reporting an upswing in "over the counter" business similar to that which prevailed in the General Land Office as a whole, a review of activities for the fiscal period ending June 30, 1944, reveals an outstanding record of accomplishment under national conservation policies.

RECEIPTS AND EXPENDITURES

Not the least of the year's achievements was the financial benefit accruing to the American taxpayer from the General Land Office operations. Total receipts for the 1944 fiscal year were \$14,355,342, the highest since 1924, and more than \$4,597,000 greater than the previous fiscal period. This was the third time since 1880 that receipts of the General Land Office have exceeded \$14,000,000.

Total operating expenses of \$2,321,664 were only \$17,000 more than the previous year, with the result that the ratio of receipts to expenditures in 1944 was \$6.18 in income for every \$1 of outgo, the highest ratio in a decade and nearly double that attained in 5 of the last 10 years.

MINERAL WORK BREAKS RECORDS

All records for the largest amount of money ever offered to the United States Government for the privilege of drilling for oil on one

acre of Federal land were shattered twice in the same year by the General Land Office in leasing the public land for development of petroleum resources during the 1944 fiscal period. Oddly enough, both record-breaking bids were offered for land in the same area—the Elk Basin oil and gas-producing field in Wyoming. In August 1943 a bid of \$5,800 smashed all previous high offers for 1-acre drilling rights. Three months later, a bid of \$26,216.21—nearly five times greater than the previous high mark—was made to set a new world's record for peak value per acre of Government oil land. This unprecedented price was offered for land in the Elk Basin field which comprised one of seven parcels in the area which aggregated approximately 75 acres.

Nearly 3 million dollars was paid the Government during the year as bonus bids for the privilege of drilling for oil, a profit to the taxpayer which does not take into account the additional rental and royalties from production on the lands which accrue to the Federal Government under General Land Office lease operations. Federal lands in Wyoming made the largest contribution in bonus-bid revenues, the lease of 2,849.05 acres bringing a bonus of \$2,844,028.46. The lease of lands in Montana, New Mexico, Oklahoma, Utah, and Wyoming brought a combined bonus bid score for the year of \$2,874,454.

The net result of these and other financial transactions conducted by the General Land Office in the mineral field during the year was the collection of receipts totaling \$11,791,097. This constituted the second highest cash proceeds from mineral activities to the Government during the 24 years of operations under the Mineral Leasing Act of 1920, the peak of \$13,631,840 having been reached in 1924.

Bringing about a 25 percent increase in the amount of coal produced from the public lands during the year, the General Land Office contributed 9,061,045 short tons of fuel to keep war factories in operation in 1944. During the same period, a 10-percent increase was attained in the amount of petroleum produced from the public domain, 15 percent in potassium salts, and 18 percent in sodium salts.

Besides these direct contributions from the public domain, more than 70,800,000 acres were withdrawn for various war uses in connection with the development of strategic minerals, and 43,000 acres were provided under special licenses to defense plants for the extraction of strategic minerals.

BEST LAND USE STUDIED

Complex problems ranging from determining the status and disposal of 11 million acres of land ceded to the United States 75 years ago by the Ute Indians of Colorado to the designation of tracts suitable for settlement by returned war veterans placed heavy burdens upon the technical branches of the General Land Office during the 1944 fiscal year. Serving as the channel for authentic information and

statistical data upon which governmental procedures and Federal legislation may be based, the Research and Analysis Division completed its Federal land inventory covering four Western States and registered notable progress in the compilations affecting other areas of the public domain. Carried out with the assistance of the Civilian Public Service Camp in Elkton, Oreg., the inventory makes available for the first time in public land administration activities a complete set of county maps encompassing Nevada, New Mexico, Utah, and Wyoming, and showing the location of the public-land tracts and the several agencies of Government which exercise jurisdiction over the areas as of 1941.

Coequal with the task during 1944 of assembling and interpreting data on the scope, location and character of the public lands was the responsibility of the Land Classification Division in protecting the areas from unwise or wasteful use. A prerequisite to the disposal of any portion of the public domain under national conservation policies written into the Taylor Grazing Act of 1934, land classification involves the scientific determination of the best use to which the land may be put, and the approval or rejection of land use applications on the basis of these findings. One of the outstanding accomplishments of the Division during the year was the classification in advance of applications for use of areas of the public lands suitable for lease by ex-soldiers and others for home, camp, health, convalescent, recreational, or business purposes. In this way, opportunity has been afforded for speedy action on this feature of post-war land settlement problems.

OREGON AND CALIFORNIA REVESTED LANDS ADMINISTRATION

The furnishing of forest products for war and the taking of definite steps toward permanent economic stability of the lumbering industry and communities in the post-war period was the twofold task accomplished by the Oregon and California Revested Lands Administration during the 1944 fiscal year. This branch of the General Land Office was established in 1938 to carry out provisions of Federal law which require sustained-yield forestry management practices on 2,500,000 acres of land formerly included in a grant for construction of a railroad between Oregon and California, but now reverted into Federal ownership. Under the sustained-yield method of forestry management, timber-cutting is limited to the extent which will insure a continuous supply of raw materials for the industry and communities dependent upon it for existence. Replenishment of the forests is fostered through tree planting, reseeding of denuded areas, fire protection and other forest conservation practices.

Containing one of the finest stands of Douglas Fir trees in the United States, the Oregon and California lands have been called upon for valuable contributions to the Nation's war needs, furnishing forestry products ranging from heavy construction and bridge timbers to airplane woods. In the past year, sales of timber from these lands exceeded 390,063,000 board feet, valued at \$1,361,991. More than \$900,000 of the proceeds from these sales are scheduled to be paid to the 18 counties in Oregon in which the lands are situated, in accordance with Federal statutes.

Plans to activate the program for setting up operating units in the Oregon and California land structure laid aside on account of the war emergency, were carried forward during 1944. Under this program, the economic selfsufficiency of the lumbering industry and communities in the region will be sought through the establishment of a marketing area to be served by the unit through a continuous flow of forest products insured under sustained-yield timber cutting.

Further augmenting the post-war program for betterments in the industry on the Pacific coast is the planting of seedlings on the denuded land by the Oregon and California organization. Utilizing the services of Civilian Public Service Camp enrollees, a total of 1,650,000 young trees were planted during 1944. Many of these seedlings were grown in nurseries maintained by the General Land Office.

CADASTRAL ENGINEERING SERVICE

Scientific land measurements which have been basic in the administration of the public domain since the earliest days of the Republic were carried on by the Cadastral Engineering Service in 1944 as an essential part of the conduct of the war. Differing from the type of survey work which involves primarily the recording of geologic, geographic, or historic features of the terrain, cadastral surveying consists of careful measurement of areas on the ground, for use in connection with administration of the public lands, and the recording of such measurements by the placing of monuments or other markers, and the preparation of maps scientifically compiled from field notes made by trained engineers at the time of the on-the-ground measurements.

Although sharply curtailed by wartime restrictions upon funds, personnel, and materials, these survey activities nevertheless were maintained in 17 States and Alaska during the year. Centering its operations primarily upon projects directly connected with the war, the Service, through 86 field groups and facilities maintained in 13 public survey offices, responded to requests for technical assistance from the Army and Navy and 6 other agencies of the Government, in addition to the work-schedule of the General Land Office.

As a result of these operations, more than 1,352,800 acres of land were surveyed or resurveyed during the course of the year, embracing projects essential to the war-connected livestock industry, timber resources, and power sites for war and post-war purposes. Meantime, approximately 44 million acres of land await survey by the Service as the result of approved projects. Study of these projects with a view to their inclusion in an expanded survey program to be undertaken with the return of normal peace-time conditions, formed a part of the workload in the last fiscal year.

BRANCH OF FIELD EXAMINATION

One of the primary agencies of Government in bringing about the best use of the public lands in the interest of conservation and the public welfare is the Branch of Field Examination. Its activities during 1944 ranged from finding new pastures for ranchers engaged in raising livestock for the war to the subterranean tracing of depositions which 42 years ago resulted in the unlawful mining and removal of more than 200,000 tons of coal from the public domain.

Particularly important to the war are the operations of this organization in the investigation of mining claims on sites selected for military purposes. As a result of these examinations, undertaken at the request of either the War or Navy Department, many thousands of abandoned claims have been eliminated with a saving of thousands of dollars in the acquisition of the lands. In one region alone, it was discovered that, out of several thousand mining locations examined, only three were maintained in accordance with existing law, and these three were appraised and purchased by the War Department.

The examination of land upon which is based the rejection or approval of plans for its use under the public land laws, is a major responsibility of the Branch. Similar investigatory work in connection with tracts of the public domain outside Federal grazing districts which are sought for livestock raising, was another task confronting the field examiners in 1944. In the course of these latter operations, some isolated areas overlooked by the ranchers and aggregating more than 150,000 acres were brought to the attention of the livestock men and made available for lease in order that the war food supply might be increased.

With its staff of trained technicians including mining and civil engineers, geologists, lawyers, auditors, timber cruisers, range specialists, and others experienced in land investigations, the Branch during the year handled many difficult and unusual types of cases. In the field of trespass upon the public lands there was, for instance, the case where trees had been lifted bodily and planted miles away, for landscape purposes, and, in the case of the pilfered coal, the BFE men had to dig their own mine shafts and face the dangers of fire damp

to determine the extent of the damage inflicted upon the public domain resources nearly a half-century ago.

ALASKAN FIRE CONTROL SERVICE

The Alaskan Fire Control Service completed its fifth year of activity on the public domain in Alaska in 1944 with a record of the lowest fire losses yet sustained during its operations in the Territory. However, despite cooperation between the various Federal agencies and the military forces in Alaska, coupled with unusually favorable weather conditions from the standpoint of fire protection, the Service nevertheless was called upon to suppress 61 fires which burned 53,686 acres during the year. Handicapped by restricted funds and personnel, it was powerless to undertake suppression work on 13 fires in other areas which consumed more than 180,000 acres.

From the military point of view, much valuable assistance was given in the prosecution of the war by the activities of the Service in the last 12 months. Numerous fires endangering military installations, encampments, equipment, etc. were suppressed by the personnel and equipment of this General Land Office agency. In addition, radio stations and other air navigational facilities were several times saved from destruction or impairment, while the air-lanes were kept unusually free of smoke, thus partially removing one of the annual hazards formerly confronting all air transportation in interior Alaska.

One of the world's largest single fire-fighting districts, the responsibilities of the Alaskan Fire Control Service embrace more than 250 million acres of public domain, including approximately 40 million acres of forests, 110 million acres of open woodland and grassland and 100 million acres of sometimes dry and inflammable tundra areas.

GRAZING ON PUBLIC LANDS

More acres of public land outside Federal grazing districts than ever before were utilized under lease from the General Land Office in 1944 for the production of food, fiber, and leather for military and civilian needs. Registering an increase of more than 400,000 acres over the previous year, a total of 12,440,210 acres of public land in continental United States and Alaska were made subject to use under 10,020 separate leases involving annual rentals of \$227,308.

In addition to the activities for augmenting the Nation's supply of livestock products afforded by the leasing of the public lands for grazing, the operations of the Range Development Service form an integral part of the progressive permanent land administration program under the supervision of the General Land Office. Although its activities were restricted by wartime personnel and material shortages, this Service nevertheless worked on 134 projects designed to improve

stock raising conditions on more than 800,000 acres. Equipped to carry forward a broad program of range improvement; its work includes the development of watering facilities, replenishment of forage through reseeding and control of soil erosion. Working in close cooperation with the stockmen who contribute a portion of the labor and funds necessary to undertake the projects, the Service is prepared to put into effect a broad schedule of improvements when normal employment and supply conditions are restored.

THE PUBLIC LANDS

AREA OF THE PUBLIC LANDS

The area of public lands remaining in Federal ownership, including Indian trust and tribal lands, as of June 30, 1944, amounted to about 400 million acres in the public land States, and about 365 million acres in Alaska. Approximately 393 million acres of these public lands were vacant and unreserved as follows: 37 million acres in the States outside of Federal grazing districts; 131 million acres within such districts; and 225 million acres in Alaska.

Of the approximately 778 million acres remaining in Federal ownership in the States and Alaska, 118 million acres in the States and 363 million acres in Alaska were still unsurveyed as of June 30, 1944.

The total acreage patented with minerals reserved to the United States was increased during the year to 48,688,421 acres, as shown by the following table:

Acreage of lands patented with minerals reserved to the United States, as of June 30, 1944

Type of mineral reservation	Patented during fiscal year 1944	Total patented through June 1944
Reservation of all minerals:		
Under Stock Raising Act.....	38,803	33,570,958
Under other acts.....	116,303	2,325,572
Total.....	155,106	35,896,530
Reservation of specific minerals:		
Coal.....	15,948	10,870,531
Others ¹	11,649	1,921,360
Total.....	27,597	12,791,891
Grand total.....	182,703	48,688,421

¹ Includes coal reserved in combination with other minerals.

LEASES AND PERMITS

During the year an additional area of 594,366 acres was brought under lease, including mineral licenses and permits, making a total of 15,913,927 acres under lease at the end of the year. The types of leases in force June 30, 1944, are shown by the following tables:

Mineral leases, permits, and licenses outstanding,¹ as of June 30, 1944

Mineral	Leases		Permits		Licenses		Total	
	Number	Acres	Number	Acres	Number	Acres	Number	Acres
Coal.....	340	72,514	86	74,979	104	4,060	530	151,553
Oil and gas.....	² 5,238	2,970,918					5,238	2,970,918
Phosphate.....	9	5,364					9	5,364
Potash.....	20	47,292					20	47,292
Sodium.....	4	1,874	73	109,499			77	111,373
Total.....	5,611	3,097,962	159	184,478	104	4,060	5,874	3,286,500

¹ Does not include permits granted to Federal war agencies.
² Does not include 18 leases within naval reserves (9,199 acres).

Leases other than mineral leases outstanding, as of June 30, 1944

Type of lease	Number	Acres	Annual rental
Aviation.....	43	28,936.27	\$525.00
Fur farm (Alaska).....	19	133,810.00	775.00
Grazing (Alaska).....	9	1,168,953.93	1,269.35
Grazing (Oregon and California).....	192	306,302.79	7,444.13
Grazing (Taylor Act, sec. 15).....	10,020	10,964,952.78	218,594.60
Recreational.....	22	21,049.78	¹ 1,372.63
Scrugham Act.....	8	798.89	² 19,605.00
Small sites (5-acre tracts).....	403	1,989.96	³ 1,995.00
Water well.....	12	480.00	485.50
Others.....	3	153.01	10.00
Total.....	10,731	12,627,427.41	252,076.21

¹ Does not include rental of 1 lease, the rental of which is based on receipts.
² Sale price of timber authorized to be cut.
³ Does not include rental of 4 business site leases, the rentals of which are based on receipts.

In addition, 634,800 acres were being used at the end of the year by Federal and local agencies, private individuals, and corporations under permit by the Commissioner of the General Land Office. War agencies held temporary Departmental permits for the use of about 22 million acres of public lands.

HOMESTEADS, SALES, AND OTHER ENTRIES

A decline in the number of entries on the public lands in continental United States was experienced during the year, the number of new homesteads decreasing from 213 during the fiscal year of 1943 to 158 during 1944. The number of new homesteads in Alaska, however, increased from 79 to 94.

The following tables show the new entries and selections allowed, the entries finally approved, and the patents and certificates issued during the year. At the end of the year 4,302 entries embracing 663,796 acres were pending awaiting further compliance with the public land laws by entrymen or final action by the General Land Office.

Original entries and selections¹ fiscal year 1944

Type of entry or selection	Public lands		Ceded Indian lands		Total	
	Number	Acres	Number	Acres	Number	Acres
Homestead entries:						
Stock raising.....	5	2,320.00			5	2,320.00
Enlarged.....	3	785.74			3	785.74
Reclamation.....	12	1,336.53	1	180.00	13	1,516.53
Forest.....	4	306.52			4	306.52
Sec. 2289 R. S., et al.....	133	14,939.01			133	14,939.01
Total homestead entries.....	157	19,687.80	1	180	158	19,867.80
Other entries and selections:						
Desert land entries.....	30	4,246.05			30	4,246.05
State selections.....	109	58,359.02			109	58,359.02
Timber and stone applications.....	3	99.78			3	99.78
Mineral applications and adverse claims.....	69	7,964.78			69	7,964.78
Town lots ²	24	(³)			24	(³)
Other.....	3	42.82			3	42.82
Total other entries.....	238	70,712.45			238	70,712.45
Grand total.....	395	90,400.25	1	180	396	90,580.25

¹An original entry or selection is one made in pursuance of an act of the Congress which prescribes the terms and conditions under which patent may be issued or other evidence of title granted. An original entry becomes a final entry upon compliance by the entryman with further requirements of the law, such as residence or additional payment, and upon the issuance of a final certificate. A State selection becomes final upon certification by the Commissioner of the General Land Office.

²Town lots upon which only part payment was made.

³Area not tabulated.

Final entries¹ fiscal year 1944

Type of entry	Public lands		Ceded Indian lands		Total	
	Number	Acres	Number	Acres	Number	Acres
Homestead entries:						
Stock raising.....	56	26,685.35	1	400.00	57	27,085.35
Enlarged.....	5	1,096.03			5	1,096.03
Reclamation.....	139	15,640.81	9	972.49	148	16,613.30
Forest.....	3	135.31			3	135.31
Commuted.....	1	141.68	16	1,178.78	17	1,320.36
Sec. 2289 R. S., et al.....	80	6,948.43	8	520.00	88	7,468.43
Total homestead entries.....	284	50,647.51	34	3,071.27	318	53,718.78
Other entries:						
Desert land entries.....	22	2,731.38			22	2,731.38
Public auction sales ²	135	11,031.17			135	11,031.17
Timber and stone entries.....	3	99.78			3	99.78
Mineral entries.....	98	7,881.68			98	7,881.68
Town lots.....	207	(³)	48	(³)	255	(³)
Miscellaneous cash entries.....	54	8,962.06			54	8,962.06
Other.....	7	430.40			7	430.40
Total other entries.....	526	31,136.47	48		574	31,136.47
Grand total.....	810	81,783.98	82	3,071.27	892	84,855.25

¹A final entry is one upon which final certificate has been issued showing that the law has been complied with and that in the absence of irregularity, the entryman or claimant is entitled to a patent. If the requirement of the law has been met, the equitable title to the land passes to the claimant upon the issuance of the final certificate.

²Isolated tracts.

³Area not tabulated.

Patents and certifications ¹ fiscal year 1944

Type of patent	Public lands		Ceded Indian lands		Total	
	Number	Acres	Number	Acres	Number	Acres
Homestead patents:						
Stock raising.....	75	38,803.29			75	38,803.29
Enlarged.....	9	1,503.36	2	200.00	11	1,703.36
Reclamation.....	159	16,023.11			159	16,023.11
Forest.....	4	109.76			4	109.76
Commuted.....			1	40.00	1	40.00
Sec. 2289 R. S., et al.....	96	8,437.34	1	160.00	97	8,597.34
Total homestead patents.....	343	64,876.86	4	400.00	347	65,276.86
Other patents:						
Desert land.....	26	3,637.65			26	3,637.65
Public auction ²	132	10,808.07			132	10,808.07
Timber and stone.....	3	240.00			3	240.00
Mineral.....	100	7,487.05			100	7,487.05
Indian.....			128	³ 6,649.51	128	6,649.51
Miscellaneous cash sale.....	448	9,265.75			448	9,265.75
Exchange.....	125	195,597.80			125	195,597.80
State grants.....	31	76,919.73			31	76,919.73
Curative and supplemental.....	191	(⁴)			191	(⁴)
Other.....	86	5,753.95			86	5,753.95
Total other patents.....	1,142	309,710.00	128	6,649.51	1,270	316,359.51
Total all patents.....	1,485	374,586.86	132	7,049.51	1,617	381,636.37
Certified to States.....		20,087.88				20,087.88
Grand total.....	1,485	394,674.74	132	7,049.51	1,617	401,724.25

¹ Where upon final examination it is found that an entry or selection is in proper form and that the law has been complied with, a patent conveying the legal title to the claimant is issued. In the case of certain State selections, the legal title is conveyed upon approval thereof by the Secretary of the Interior and certification by the Commissioner of the General Land Office.

² Isolated tracts.

³ Indian tribal lands.

⁴ Acreage not counted because previously reported.

LAND GRANTS

Title to 102,185 acres was conveyed during the year in satisfaction of grants of land made to the States and railroads by the Congress for public purposes. Grants to States included 75,180 acres of park selections, 17,426 acres of indemnity school land selections, 2,662 acres selected for miners' hospitals, and 1,740 acres of swamp land. The Northern Pacific Railroad received 5,177 acres patented to it pursuant to the Transportation Act of 1940. In addition to these grants, 25 patents were issued to States to give them additional evidence of title to 569,575 acres of previously granted school sections.

A total of 249 applications for rights-of-way were approved during the year under laws which provide for the granting of rights-of-way over the public lands for telegraph and telephone lines, public roads,

pipelines and other purposes. Of the applications approved, 81 involved permits or easements calling for an annual rental of \$2,520 and 33 were temporary rights-of-way over the Oregon and California lands with an annual rental of \$340.

LAND EXCHANGES

Exchanges of land with private parties and local governments during the year resulted in the addition of 144,904 acres to grazing districts in exchange for 153,314 acres of Federal land; 13,553 acres to Indian reservations in exchange for 18,063 acres; 2,219 acres to the Oregon and California lands in exchange for 840 acres; and 361,778 acres to national forests in exchange for 23,381 acres of land and sufficient timber to equalize the values involved.

RECEIPTS AND EXPENDITURES

Receipts from all sources during the year totaled \$14,355,342. Mineral rentals, royalties, and bonuses accounted for 82 percent of the total receipts and sales of timber from the Oregon and California and Coos Bay lands for an additional 13 percent. The remaining 5 percent was realized from fees and commissions, sales of public and ceded Indian lands, rentals, fines and penalties, copying fees, and from miscellaneous sources.

Of the total receipts, 37 percent will be distributed to various States and counties and 43 percent will be credited to the reclamation fund. Except for \$13,098, which will be credited to Indian trust funds, and \$50,617 which will be credited to the range improvement fund, the remainder will be covered into the general fund of the Treasury.

Expenditures from appropriations amounted to \$2,321,664 distributed as follows: general, \$857,495; surveys, \$560,766; field examination, \$331,461; administration of the revested and reconveyed lands, \$257,966; district land offices, \$250,727; range improvements, \$32,986; and fire control in Alaska, \$30,263. Expenditures, aggregating \$286,374, were made from funds transferred to the General Land Office for the emergency protection of certain public lands and for soil and moisture conservation operations.

The following table shows the receipts earned during the year, by sources and by Treasury accounts.

Disposition of receipts of the General Land Office,¹ fiscal year 1944

Source of receipts	Covered in the Treasury earmarked for—				Total
	General fund	Reclamation fund	States and counties	Indian trust funds	
Sales of public lands.....	\$25,095.57	² \$80,000.00	² \$2,000.00	-----	\$107,095.57
Fees and commissions.....	10,264.76	² 40,000.00	-----	-----	50,264.76
Mineral leases and permits:					
Mineral Leasing Act.....	1,091,397.48	5,729,836.78	4,092,740.56	-----	10,913,974.82
Red River oil and gas lands.....	-----	-----	3,582.93	\$5,971.54	9,554.47
Potash.....	58,788.08	³ 358,754.91	220,455.30	-----	637,998.29
Other.....	⁴ 229,570.31	-----	-----	-----	229,570.31
Total mineral.....	1,379,755.87	6,088,591.69	4,316,778.79	5,971.54	11,791,097.89
Oregon and California grant lands..	885,112.83	-----	885,112.82	-----	1,770,225.65
Coos Bay grant lands.....	4,969.21	-----	² 20,000.00	-----	24,969.21
Taylor Act grazing leases.....	50,616.58	⁵ 50,616.58	101,233.17	-----	202,466.33
Rights-of-way leases.....	30,408.75	-----	-----	-----	30,408.75
Sales of reclamation town lots.....	-----	⁶ 13,608.65	-----	-----	13,608.65
Sales and lease of Indian lands.....	-----	-----	-----	7,126.23	7,126.23
Copying fees.....	17,343.36	-----	-----	-----	17,343.36
Miscellaneous.....	340,735.33	-----	-----	-----	340,735.33
Grand total.....	2,744,302.26	6,272,816.92	5,325,124.78	13,097.77	14,355,341.73

¹ Before final settlement of all accounts by the General Accounting Office.

² Estimated.

³ Includes \$50,117.50 collected in California under act of Oct. 2, 1917 (40 Stat. 297).

⁴ Includes \$20,257.66 collected in Wyoming under act of June 26, 1926 (44 Stat. 1621), \$193,195.80 collected in California under Executive order 9087 dated Mar. 5, 1942, and \$16,116.85 collected in Alaska, of which \$260 were collected under the Mineral Leasing Act of 1920.

⁵ Range improvement fund.

⁶ Includes \$1,250 from sales of reserved reclamation lands.

Office of Land Utilization

LEE MUCK, Assistant to the Secretary



THE activities of the Office of Land Utilization are primarily of an advisory and coordinating nature. The assumption of administrative functions that should be performed by the bureaus and other units which form a part of the departmental organization are assiduously avoided. The office aids in every possible way in the formulation of plans for the improvement of administrative activities and takes the lead in the presentation to the Congress of the appropriation needs of the Department as a whole for soil and moisture conservation operations, white pine blister rust control, and emergency forest fire protection.

When such appropriations are authorized, they are allotted to the various action agencies of the Department in proportion to requirements as revealed by detailed reports. In such apportionment the office utilizes the experience gained by members of its force during many years of practical administration in responsible units of the Federal Government over widely distributed areas. The details of expenditure and the field supervision of construction, protection, and related activities are left primarily to the discretion of representatives of various administrative units. Supervision by the Office of Land Utilization is confined to the guidance of the action agencies in the selection of projects which can unquestionably qualify as appropriate activities under the justifications that have been submitted to the Bureau of the Budget and the Congress and upon the basis of which it is assumed the appropriations were made. The supervision of appropriations and coordination of types of projects to be undertaken is supplemented by field inspections and conferences with those in direct charge of field activities for the purpose of insuring that the final results achieved are consistent with the general purposes of the Department.

In the soil and moisture conservation program emphasis is constantly placed upon the restoration to former productiveness of range

lands and farm lands that have been subjected to improper use and it is insistently required that proper use be established as a condition precedent to the expenditure of Federal funds in a restoration plan. Attention is centered upon the proposition that only when the recovery of a range and the restoration of agricultural productivity can not be effected through the utilization of natural processes should expensive methods of control be used. The recuperative powers of nature are astonishingly effective in the correction of unfavorable conditions when the destructive agencies are removed. The artificial reseeded of a range may secure no better result than carefully regulated grazing will effect at a much lower cost. The construction of expensive masonry structures for the protection or restoration of eroding farm lands is authorized only when it is reasonably apparent that less heroic measures will not be effective.

In the problem of protecting forests from fire, disease, and insects there is generally less occasion for cautioning against precipitate expenditures than there is for encouraging alertness. The suddenness with which a forest fire may develop into an uncontrollable conflagration and the insidious manner in which a forest disease or insect infestation may spread before detection demand constant vigilance and prompt suppression without too anxious a calculation of the initial cost. The Office of Land Utilization need offer no apologies for its persistent advocacy of increased measures of forest protection, especially for the vast resources of Alaska which have never received the protection which their economic importance justifies.

SOIL AND MOISTURE CONSERVATION OPERATIONS

Under the provisions of the Soil Conservation Act of April 27, 1935 (49 Stat. 163), and the President's Reorganization Plan No. IV (54 Stat. 1234), soil and moisture conservation projects on lands under the jurisdiction of the Department of the Interior are coordinated through the Office of Land Utilization.

The impact of the war had a restraining effect on the scope and amount of work undertaken and, accordingly, the soil and moisture conservation program of the Department has been restricted to avoid conflicts in the use of labor, equipment, or materials that might be needed in the prosecution of the war. The practices and procedures followed have been adjusted to a wartime economy, with the emphasis on those projects and operations which would contribute to the winning of the war. Special emphasis has been placed on projects such as range reseeded, small water developments, water spreading, vegetative gully control, and similar projects that are low in cost, that can largely be accomplished through the use of local materials, and that fit in with the cooperation obtained from the users of the land.

Much of the soil erosion and water losses from the lands under the jurisdiction of the Department was occasioned by unsatisfactory use conditions on the upper portions of the various watersheds. These conditions were the result of ill-advised use or misuse over a long period of time. Continued use of these lands was necessary in the war program and the procedures adopted gave consideration to the necessity of maintaining use while correction of the unsatisfactory conditions was occurring. Accordingly, a major part of the effort of the Office of Land Utilization in the coordination of the program for the Department as a whole was to secure a maximum amount of cooperation from the users of lands under its supervision. This procedure was devised to develop interest in conservation by the users of the Federal lands and to accomplish a larger amount of work by obtaining contributions of labor, materials, and money. During the past year these contributions in value amounted to 50 percent of the amount appropriated by the Congress.

Close cooperation also was maintained by field offices of the land-management agencies with local soil conservation districts, pursuant to an interdepartmental cooperative agreement between the Department of Agriculture and the Department of the Interior, which recognized that the conservation of soil and moisture on Department of the Interior lands was a segment of the over-all national conservation policy.

The funds available during the past year, namely \$1,333,200 were less than at any time since the program started, but much progress was made in soil and moisture conservation by reason of the high degree of cooperation which prevailed.

The Department now is well organized for the prosecution of a sound program of soil and moisture conservation that is understood and supported by the land-management agencies and by a constantly increasing number of the users of its lands. With the continuation of the necessary funds for the work during the post-war years, marked progress can be made in the restoration and rehabilitation of those lands under the jurisdiction of the Department which now are in an impoverished condition. The program as a whole has been designed and procedures have been set up to effect a complete and coordinated rehabilitation program on a sound, practical basis.

COORDINATION OF WATER PROGRAMS

In recognition of the fact that programs designed to attain a closely coordinated plan in the field of land use could not be fully realized without a similar degree of coordination in the field of water development programs, the Water Resources Committee was established within the Office of the Secretary by Departmental Order No. 1946 under

date of May 2, 1944. The Water Resources Committee acts in an advisory capacity to the Secretary and its functions concisely stated are: the assembly of essential information covering the water-development programs of the bureaus and offices of the Department and other Federal, State, and private agencies; the review of all basic water-development projects or programs proposed to be undertaken by the bureaus and offices of the Department; the preparation for submission to the agencies concerned with water-development programs of statements covering various aspects of such programs with a view to providing definite information thereon and reconciling such conflicts with respect to water use as may develop; the conduct of hearings on problems concerned with the use and development of water resources for the purpose of resolving questions concerning policy; and the formulation of such recommendations to the Secretary as will insure an all-inclusive departmental water conservation policy.

The plan of coordination of land-management and water-development programs, which has been established in the office of the Secretary of the Interior, is a major forward step in the field of administrative management. It insures effective coordination at the top level of administration and the objective sought is achieved through the effective correlation of operating relationships at the lower administrative levels concerned with action programs in the field of land management and water utilization. The time is at hand when these principles of administrative coordination and integration should be extended to all Federal agencies engaged in these fields, for the effective use of land and water will not be at its best until all agencies dealing with these functions have coordinated and integrated their responsibilities and activities.

LAND CLASSIFICATION AND LAND POLICY

Because of the extensive areas and the variable character of the lands under the jurisdiction of the Department of the Interior, there is urgent need for the development of a unified policy of land management. As a part of the staff work for the Departmental Land Policy Committee, the office is cooperating with the land-management bureaus of the Department in preparing a succinct statement of the Department's policies for administering the agricultural, grazing, forest, wildlife, mineral, water, and recreational resources under its control; for acquiring lands needed for essential public purposes; and for disposing of public lands suitable for private ownership. The objectives sought are the clarification of existing policies, the coordination of conflicting policies and procedures, and the formulation of new policies where existing policies appear to be inadequate to protect or advance the public interest in the Federal lands.

PLANNING POST-WAR PUBLIC LAND IMPROVEMENTS

An integral part of the war program has been the planning for maintenance of employment in the post-war demobilization period, during which time men in the armed forces and workers in expanded war industries may be released faster than peacetime industries, with their difficult problems of reconversion, can absorb them. To provide a reservoir of employment opportunities, the land-administering agencies of the Department, in response to a letter from the President dated May 22, 1943, have submitted budgets for planning and blueprinting of construction projects which would produce, if needed, all or any part of an estimated 1,550,000 man-years of employment. The Office of Land Utilization assisted in the preparation of these programs for presentation to the Bureau of the Budget.

FOREST MANAGEMENT

The effect of the World War upon forest administration has been especially significant. The very unusual demand for forest products has been accompanied by a marked shortage of manpower and by an effort to control prices of logs and of manufactured forest products. Every facility for an increase in production has been afforded by the Department. Some operators have been able to increase their production. However, the total production from Department of the Interior lands has shown a reduction in volume over the preceding year. The total cut from Oregon and California revested and reconveyed grant lands was slightly below 400 million board feet with a stumpage value of \$1,321,641. The cut from Indian lands was 423 million board feet with a value of \$1,766,192. Relatively small amounts were cut from public lands in Alaska and the United States.

The act of August 28, 1937 (50 Stat. 874), providing for a conservative administration of the Oregon and California revested and reconveyed grant lands, was the first recognition in Federal law of the principle of cooperative sustained yield in forest management. During the past year this Department joined with the Department of Agriculture and other agencies in requesting from the Congress general legislation that would authorize sustained-yield agreements for all classes of public land administered by the Secretary of the Interior and the Secretary of Agriculture for timber production purposes. This important legislation was secured in the act of March 29, 1944 (Public, No. 273, 78th Cong.).

WAR RELOCATION AUTHORITY

The President, by Executive Order 9102 of March 18, 1942, created the War Relocation Authority, a nonmilitary agency with authority to formulate and carry out a program for the planned and orderly re-

location of persons evacuated from military areas. Acting pursuant to this Executive order, agreements were entered into between the Department of the Interior and the Director of the War Relocation Authority providing for the location of evacuee communities on lands under the jurisdiction of the Department. Agreements were consummated covering lands within the Tule Lake Reclamation Project, Calif., the Minidoka Reclamation Project, Idaho, the Heart Mountain Reservation Project, Wyo., the Colorado River Indian Reservation, Ariz., and the Gila River Indian Reservation, Ariz.

By Executive Order 9423 of February 16, 1944, the President transferred the War Relocation Authority from its status as an independent agency to the Department of the Interior. This action had the effect of eliminating any necessity for continuing further liaison activities by the Office of Land Utilization.

FOREST AND RANGE FIRE CONTROL

With \$530,000 appropriated by the Interior Appropriation Act of 1944, together with \$231,708 previous year balances reappropriated, the emergency fire control program of the Department of the Interior was continued during the year. This program, an essential war activity, supplements and augments normal fire protection for the forest and range resources situated on the forest, brush, and grass lands of the Department located within a 300-mile zone of the Atlantic and Pacific coasts and the Gulfs of Mexico and California.

There are approximately 400 million acres of forest, brush, and grass lands requiring protection from fire under the jurisdiction of the bureaus and agencies of the Department of the Interior in the continental United States and Alaska. Of this total acreage approximately 272 million acres lie within critical zones and have required special protection during the war. These lands support some of the finest stands of virgin timber left in the United States, together with other resources all of which are playing an important part in the present war emergency. Protection of these resources from sabotage, direct enemy action, and normal fire risks is a major responsibility of the action agencies of the Department of the Interior.

The responsibility of the Department to protect the resources and related strategic facilities located on or adjacent to lands under its jurisdiction has been most satisfactorily met during the past 2 years. The normal fire control protection organizations, assisted by approximately 500 trained guards and standby crewmen made available through the emergency fire protection program, were able to hold fire losses to low levels, and thus prevent the disruption or destruction of important war activities.

Cooperation between the Department of the Interior, the Department of Agriculture, and the War Department continued at a high level throughout the year. The Forest Fire Fighters Service perfected its organization and trained approximately 200,000 volunteer civilian fire fighters for prevention and suppression work in 44 States. The assistance rendered by the Forest Fire Fighters Service to all organized fire protection agencies has proved to be very valuable and especially so to some of the action agencies of this Department.

Excellent results have been achieved in the coordination of fire control work on all Department of the Interior lands during the war. However, provision has yet to be made for increased regular appropriations which will insure adequate protection for the entire 400 million acres under the management of this Department.

· WHITE PINE BLISTER RUST CONTROL

White pine blister rust control operations on lands administered by the Department of the Interior were continued during the fiscal year 1944. These operations are designed to protect the valuable five-needle pines from the white pine blister rust, a fungus disease of foreign origin which became established in this country approximately 30 years ago. The actual control work consists of the eradication of Ribes (currant and gooseberry bushes), the alternate hosts of the disease. The act of April 26, 1940 (54 Stat. 168-169), provides that all white pine blister rust control operations be combined as one appropriation to be carried in the annual appropriation act of the Department of Agriculture. For the fiscal year 1944, \$170,747 was appropriated for white pine blister rust control work on Department of the Interior lands and made available to the National Park Service, the Office of Indian Affairs, and the Oregon and California Revested Lands Administration of the General Land Office.

Progress in the control operations on Department of the Interior lands during the war has been necessarily slow and has barely kept pace with the spread of the disease. In the calendar year 1943, 9,446 acres were worked for the first time and 15,143 acres were reworked.

CIVILIAN PUBLIC SERVICE CAMPS

Section 5 (g) of the Selective Training and Service Act of 1940, approved September 16, 1940 (54 Stat. 885), provided that persons who by reason of religious training and belief were conscientiously opposed to participation in war should not be subject to combatant training and service in the land or naval forces of the United States, and further provided for the assignment of such conscientious objectors to noncombatant service or to work of national importance under civilian direction.

Prior to July 1, 1943, all Civilian Public Service camps were sponsored by the National Service Board for Religious Objectors and the costs of operating the camps, except as to the work program, was financed by that organization. On July 1, 1943, Civilian Public Service Camp No. 111 was organized at Mancos, Colo., under the supervision of the Bureau of Reclamation, and full responsibility for both housekeeping and the work project at this camp was assumed by the Government. Two other government-operated camps, namely, Civilian Public Service Camp No. 128 at the Deschutes Reclamation project (Oregon), and Civilian Public Service Camp No. 135 at the Seney National Wildlife Refuge (Michigan), were placed in operation during the year.

All camps on Department of the Interior lands, of which there was a total of 11 at the close of the year, continued to give first priority to the protection and conservation of natural resources, including fire, insect, and disease control.

PRISONER-OF-WAR CAMPS

On November 8, 1943, the Secretary advised the Provost Marshal General of the War Department that the Office of Land Utilization had been selected to represent the Department of the Interior with respect to all proposals pertaining to the use of prisoner-of-war labor on Department of the Interior lands.

Following the establishment of this liaison relationship a request was made to the War Department for clarification of its policy with respect to the compensation to be paid by Federal agencies for prisoner-of-war labor. As a direct result of this request the War Department issued instructions which provided that the sponsoring Federal agency reimburse the War Department for the aggregate cost of prisoner-of-war labor at the rate of 80 cents per day for wages and approximately 65 cents per day for subsistence.

As of June 30, 1944, only one contract had been consummated with the War Department by an agency of this Department, namely, the Fish and Wildlife Service. However, it is expected that this source of labor may prove helpful in relieving shortages which have developed in connection with slash disposal on Indian reservations and in the construction of access roads.

Grazing Service

C. L. FORSLING, Director



THE IMPORTANCE in war of land, minerals, food, fibre, and other materials derived from the soil has been emphasized throughout the fiscal year. To help mobilize these resources on grazing district lands so they may be utilized to the full extent in the war program has been foremost in the work of the Grazing Service. Many of its peacetime "musts" have been postponed until victory is won.

The Federal range is extensively used in many ways for the training of men and the development of machines and skills for war. Practice bombing ranges, flying schools, mine roads, supply dumps, and many other similar activities and uses tell the story of the part these lands are playing in the war program.

Range Administration.—In the 10 years since the passage of the Taylor Grazing Act progress has been made in the accomplishment of the proper use of the grazing district range. This has made it possible for these lands better to play their part in the production of livestock for war needs. Regulation of the range has eliminated the migrant herds which formerly menaced the stability of the local livestock industry. The consumption of vast quantities of forage by horses that are no longer useful as domestic animals has been greatly reduced, and the reduction in overstocking coupled with better seasonal use affords better growth of forage.

Most effective of all perhaps has been the stabilization in the use of the range by the dependent livestock operators and the elimination of ruthless competition. Those who are entitled to use the range now have reasonable assurance that they will have the benefit of the available forage and may plan their livestock operations with greater certainty.

In spite of these accomplishments, however, numerous jobs remain undone. Many areas need closer determination of grazing capacity and the application of better management practices in order to restore

the productivity of the range which was dissipated through the long period of unregulated use. The complicated land ownership pattern which developed prior to the establishment of the grazing districts calls for the development and execution of land exchanges whereby private, State, and railroad land is exchanged for Federal range and the exchange of use of land to simplify range administration to the advantage both of the Government and the range users. Vast areas need to be reseeded. Many improvements such as watering places, drift and division fences, and other facilities should be constructed to afford better management and more even utilization of the grazing resources. Protection from fire is still inadequate. Rodent control, to reduce the waste of range feed, needs to be expanded. These are jobs to be undertaken as soon as enough manpower and enough facilities are available.

It is the wartime policy of the Grazing Service to assist and encourage stockmen in every way possible, consistent with long-time policies, to produce more meat, wool, and other livestock products to meet the needs of war. It includes the following general principles: (1) increased use of Federal range wherever possible and consistent with good range management; (2) removal of surplus horses and the harvest of surplus game and their diversion to food channels; (3) increased protection to reduce the loss of forage and damage to the productive capacity of the soil by fire; (4) the adoption of practices and emergency activities, such as opening snow-blocked trails, to reduce livestock losses; (5) better management of both range and livestock.

Increased range use was attained by allowing extended grazing periods, by a system of war emergency licenses and by the trend of the industry toward more cattle and fewer sheep. During the fiscal year, 1,497 war emergency licenses were issued for 70,319 cattle, 993 horses, 145,700 sheep, and 4,513 goats.

A comparison of range use during the years 1940 to 1944 (using 1940 as 100 percent) shows that the number of animals licensed and permitted have been increased by 6 percent in the 5-year period and the total amount of range use permitted has been increased by 15 percent.

Whether this increased use is consistent with the sustained yield and further increase in productive capacity of the range is a matter for immediate consideration after the close of the war. The extra use has been permitted as a temporary war-emergency measure and must be curtailed wherever necessary as soon as the emergency has passed.

Action under the Secretary's orders of March 16, 1943, and January 29, 1944, resulted in the removal of 32,920 surplus horses from grazing districts, an increase of 7,647 over the number removed in 1943. A total of 77,163 horses have been taken from the Federal range and adjacent territory during the past 2 years. These have been diverted

to many useful purposes. At the same time, thousands of acres of range formerly used by these horses have become available for cattle, sheep, and wildlife.

Despite an increased harvest of big game in grazing districts, the numbers increased by about 30,000 over the previous year. Cooperative game counts in sample areas and inventories gathered from many sources indicate that approximately 535,000 big game animals inhabit grazing districts during a part or all of the year.

Licenses and permits.—The number of licensed operators increased from 22,019 to 22,562, a gain of 543, and involved 10,694,305 livestock, by classes as follows: cattle, 1,990,272; horses, 127,701; sheep, 8,482,387; goats, 93,956. The statistical detail is shown by regions on table I at the end of the chapter.

The trend toward more cattle and fewer sheep in grazing districts followed the national wartime pattern. In the 5-year period (1940–44) cattle numbers licensed have increased 27 percent and sheep have decreased 16 percent. Sixty-four percent of the range operators were on a term permit basis at the close of the year.

Criticisms from many quarters calling attention to illegal use of the range are supported by records which show a greater number of trespass cases during 1944 than for any previous year. Current high prices for livestock, coupled with the extra grazing load and inadequate facilities for complete range supervision have encouraged trespass. This circumstance is in need of correction and can be met if and when additional personnel is provided.

Range surveys and utilization checks.—Range surveys were completed on 738,630 acres and grazing capacity estimates rechecked on 6,281,565 acres during the year. The area covered by original range surveys (598,463 acres) was the smallest coverage since the inception of this type of work in 1936. To date 114,326,240 acres have been covered by range surveys in 10 States. Since the pattern of grazing use as well as of land ownership is interwoven with Federal, State, and private lands, such surveys include a comprehensive examination of all the lands involved. Approximately 100 million acres to be surveyed in grazing districts are included in plans for post-war work, as it is anticipated that our trained personnel, many of whom are now serving in the armed forces, will again be available.

Appeals and hearings.—During the fiscal year, 142 appeals from administrative decisions were filed, an all-time low. Of these, 67 were disposed of and 75 were pending at the close of the year. Twenty of the cases disposed of were settled without formal hearing. Ten decisions of examiners were appealed to the Secretary.

Land activities.—For the third successive year primary emphasis in grazing district land matters was given to military needs. During the fiscal year 1944, 1,357,000 acres were eliminated from grazing districts

for war purposes and 11,676,000 acres were involved in military use permits. These include bombing ranges, gunnery ranges, precision bombing sites, airfields, storage dumps, depot installations, chemical warfare proving grounds, troop maneuver areas, rights-of-way for telephone lines, water pipe lines, and military roads. The livestock producers cooperated to the fullest extent in adjusting their range affairs in order that military requirements could be met.

Certain land uses for military purposes became unnecessary during the year. Also, certain military programs demanded only temporary occupancy of public lands for training purposes and, having served the purposes for which they were withdrawn, they were restored to grazing use. During the year, 1,351,000 acres of such lands were returned to Grazing Service Administration.

As of June 1944, 24,168,532 acres of grazing district lands in nine States were used for military purposes, of which 14,428,919 acres are federally owned.

There are a number of reasons why these lands are selected for military uses despite their importance for food production. Among these are: (1) their relatively low cost to the Government, (2) distance from population and industrial centers, and (3) favorable climate and topography for large-scale training operations.

Military agencies were assisted by the Grazing Service in the joint examination of areas proposed for withdrawal, special use, and alternate use. Maps, data, and technical assistance were furnished in connection with the appraisal of ranch and range areas to establish equitable settlement values under the act of July 9, 1942 (Public, No. 663, 77th Cong.). Advice and liaison were provided the Army Claims Board and enabled it to settle more promptly for alleged damages to private property in connection with troop maneuvers.

Prior cooperative agreements with bureaus in the Department were continued and new agreements for further cooperation on mutual problems were initiated. Close cooperation in these and related activities helped to maintain balanced livestock activities in the regions while affording both grazing and military uses of a number of important range areas.

Careful study was given to post-war uses of lands now devoted to military operation. Substantially all of these lands will be restored to grazing administration when they have fulfilled their present purposes. As a result of these uses and the various types of installations considerable repair is anticipated not only of the land itself but also of the livestock facilities.

Under the act of June 5, 1942 (Public, 586, 77th Cong.), the Grazing Service reported favorably on a number of applications to purchase timber growing on the Federal range, when the investigation showed that the lumber was to be used in connection with production of equipment for war.

At the beginning of the fiscal year, 209 applications were pending in the Grazing Service, involving rights-of-way, entry, exchange, and sale under sections 6, 7, 8, and 14 of the Taylor Grazing Act and the 5-acre law of June 1, 1938. Seven hundred and thirty-two such cases were received during the year, and 747 were disposed of, leaving a total of 283 pending at the close of the year. Favorable action was taken on 8 motion-picture permits, 72 cases involving disposal of improvement on canceled homesteads, and 564 applications for domestic use of timber within grazing districts.

Since actions on land matters having to do with war needs took precedence, full progress on earlier plans for consolidation of the federally owned land by the exchanges for private, State, and county land and by additional leases under the Pierce Act was retarded in some regions. Detailed, long-time plans to fit into range development and post-war activities were under way in 10 districts, involving approximately 40,000,000 acres in 10 States. These were in the process of preparation in written form at the close of the year.

Status of grazing districts.—Orders were issued establishing 2 additional grazing districts during the year, bringing the total to 60 in 10 States. Data and other essential material were assembled looking to the establishment of other districts or the addition to established districts in 3 States. Status changes during the year included, in addition to military withdrawals, 36 orders vacating former reclamation withdrawals, totaling 550,000 acres; revocation of stock driveway withdrawals involving 720,000 acres; and allocation of 50,600 acres for development under the Department's reclamation program. Grazing district acreages are shown by regions on table II at the end of the chapter.

Funds.—Congress provided \$1,070,700 for the operation of grazing districts during the fiscal year 1944. Of this amount \$978,700 was for over-all administration, including presuppression of range fires; \$83,000 for construction and maintenance of range improvements; and \$9,000 for leasing of lands under the Pierce Act. Contributed funds and allotments for soil and moisture conservation work, for fire suppression, and for miscellaneous items totaled \$912,283.55. The Public Roads Administration transferred to the Grazing Service \$1,446,500 for construction of access roads under the Defense Highway Act, as amended.

Grazing fees.—Earned grazing fees in the grazing districts totaled \$813,351.96. Of this amount \$406,584.32 was paid to the States affected and \$183.43 was deposited to the credit of Indians under provisions of the Taylor Grazing Act. State revenues derived from grazing fees during the 9-year period, 1936 to 1944, now total \$3,062,047.34. Moneys paid to States as a result of grazing fees earned in the fiscal year 1944 are as follows: Arizona, \$18,484.26; California, \$10,087.20; Colorado, \$27,056.36; Idaho, \$37,321.96; Montana, \$28,-

515.37; New Mexico, \$60,337.92; Nevada, \$65,051.35; Oregon, \$26,980.31; Utah, \$74,063.15; Wyoming, \$58,686.14. The flat rate of 5 cents per month per head for cattle and 1 cent per month for sheep over 6 months of age, with some exceptions, continued to be charged as the grazing fee in grazing districts. The authorizing act provides for "the payment annually of reasonable fees in each case to be fixed or determined from time to time." The task of determining a "reasonable fee" for the wide variety of conditions found on the public range in 10 Western States is not a simple one. The fact finding and analysis necessary to its accomplishment were interrupted on the entry of our country in the war by other activities incident to meeting war needs. This undertaking cannot be delayed much longer.

Audits.—Audits were completed in 6 of the 10 regions during the year. It was impossible to keep current this important phase of the work due to the shortage of personnel qualified to handle these matters.

Job load analyses.—Analysis of work load in the grazing districts, begun 2 years ago, was completed during the fiscal year just closed. The data were assembled and a method of rating the districts on the basis of minimum personnel needs was developed. They emphasize the excessive overtime of present personnel and that many jobs are being slighted because of inadequate manpower.

Training and personnel.—The high percentage of personnel turnover, particularly clerical, has made on-the-job training a daily requisite. In the conduct of action programs and to meet changing conditions incident to war demands, conferences were held at all levels in the national, regional, and district offices as often as time and funds would permit.

Temporary wage employees decreased 36 percent and salaried workers increased 10 percent during the year. The number of employees in military service totaled 173 at the end of the year, an increase of 39.

Equipment and supply.—The state of repairs of power machinery and automotive equipment needed to prosecute action programs is at a low ebb and great difficulty was experienced during the latter part of the fiscal year in obtaining competent repair of units. Maintenance costs of old, worn-out units have been excessive.

Range development.—To conserve manpower and material, primary consideration has been given to maintenance work on existing range improvements for the duration. Approximately \$150,000 was expended during the year for this purpose. However, in addition to public funds the ranchers in many localities contributed an unrecorded amount of labor in maintaining thousands of small projects of various types, mainly springs, wells, reservoirs, corrals, and fences. Whenever new construction was undertaken during the year the matter was first considered on its merits. That is, whether it would pro-

mote beneficial use of the range, add to food supplies, and aid producers to overcome critical labor shortages. In this light a considerable number of fencing and water development projects were pushed to completion. On one-half of all the range-improvement projects completed during the year, stockmen furnished either the labor or the material or both. Despite the handicaps occasioned by shortage of parts, the facilities such as windmills, pumps, and other installations at principal stock-watering places were maintained in serviceable condition. This was accomplished by use of salvaged equipment and substitutes in certain instances. A summary of range improvement projects completed is shown on table III at the end of the chapter.

Under section 4 of the Taylor Grazing Act fences, wells, and other facilities for handling of permitted livestock on the range may be constructed and maintained by the range users. A total of 432 permits to construct and maintain such improvements and 92 permits to maintain existing facilities were issued during the year. These have an estimated value of \$332,572.50, an item of expense that is borne by the range users themselves.

Soil-and-moisture conservation.—Soil-and-moisture conservation work to restore depleted range lands was conducted during the year on 60 of the 95 project areas approved by the Office of Land Utilization. Gully plugging and area treatment to arrest wind and water erosion and fencing to prevent misuse of treated areas comprised the principal class of activity in this connection. Since the rehabilitation of ranges is integrated with activities authorized by the Taylor Grazing Act, the soil and moisture conservation work was augmented by contributions from the range improvement funds and by donations from cooperating individuals and groups.

Range protection.—Range fires consume large quantities of resources needed for victory. They draw manpower from important work, aid the Axis, and prolong the war. Everything possible is done to keep such fires down to an absolute minimum.

Due to a late spring in 1944 fire occurrence during the latter half of the fiscal year was only about 50 percent of expectations. Throughout the past year weather conditions were more favorable from a fire-hazard standpoint than for many years. Encouraging results from training and organization for fire suppression are shown by a reduction in both number of fires and acreage burned.

A burn of three-quarters of a million acres is too great a loss, however, considering in addition to the value of the forage destroyed the interruption of going livestock operations, the damage to the productive capacity of the range, and the soil erosion and watershed menace thus created.

In training and educational programs emphasis is given to fire prevention. During the year, 86 training meetings for per diem guards and 114 meetings for training under the Forest Fire Fighters Service Cooperative System were held in grazing districts. At these schools a total of 3,419 men received instruction in techniques. In addition, 1,373 cooperative fire fighters, mostly farmers and stockmen, were given spot training in fire fighting methods and prevention. Since almost 80 percent of the fires that occur on the Federal range are man-caused the protective measures include constant educational campaigns. As a result of these cooperative efforts, which were aided by favorable weather conditions, the 1,085 fires last year burned 748,138 acres as compared to 1,128 fires which burned 1,734,992 acres the previous year.

Drafting.—During the year the drafting facilities of the Grazing Service continued to serve the Army and other war agencies at the expense of much needed regular work. About 60 percent of the volume was for various branches of the Army and included blueprints, photostats, tracings, drawings, and drafting of air bases, buildings, installations, supply depots, land status plats, etc. At the peak of Army demands for this type of work, the Grazing Service recruited, trained, and supervised certain temporary employees attached to the War Department pay roll.

Access roads.—One of the outstanding Grazing Service contributions to the war program is the construction of access roads to sources of raw materials. From the inception of the access road program in 1942, 1,570 miles of such roads have been built to 20 types of metals, minerals, and other war materials in 8 States. During the fiscal year 788 miles were completed at a cost of \$1,171,293. As a part of the Department's war program, the building of these roads has stimulated the small, independent operator to rush his diggings, and the emphasis on production of these vital materials has shifted with the progress of the war. For instance, in the early days of war production great shortages existed in the steel alloy materials. The road program then was directed to deposits of vanadium, chromium, manganese, and tungsten. Later the needs for coal, timber, petroleum, and certain non-metallic minerals shifted the emphasis to such products. There are many rungs in a ladder which reaches from the bottom of a mine shaft to a battle front, and an access road is one of them. Over such roads go truck loads of mica, gilsonite, manganese, vanadium, lead, zinc, coal, and many other basic ingredients of tanks, planes, guns, explosives, and precision instruments.

Post-war plans.—During the year the Grazing Service submitted to the Department general plans for a much needed post-war range-improvement program, which would employ 31,000 men for a 3-year

period at an estimated cost of \$226,000,000. This involves 60,000 projects of 16 major types, widely distributed in 60 grazing districts, and can be implemented within 3 months after victory. The plan contemplates 150 camps of 100-man capacity as well as the employment of 7,500 men on work convenient to their homes. Of the total expenditures contemplated in this program nearly \$200,000,000 would be for wages in 200 counties. Already 5 percent of the listed projects have been approved as to location and type of structure. To expedite the program in the event of an unemployment problem after the war, funds are needed now to provide the necessary detailed surveys, specifications, and plans for launching the program promptly at the proper time. In accordance with the President's request of May 23, 1943, and supplemental Department instructions, the Grazing Service submitted in August 1943 an estimate showing the need for \$3,000,000 to cover detailed engineering and planning costs of its post-war program.

TABLE I.—Number of licensed operators and livestock in grazing districts by regions, June 30, 1944

Region	Licensed operators	Cattle	Horses	Sheep	Goats	Total livestock
Arizona.....	612	98,062	2,253	140,558	11,145	252,018
Colorado.....	2,150	187,506	7,332	746,320	152	941,310
Idaho.....	3,355	214,394	17,440	1,237,313	35	1,469,182
Montana.....	3,200	223,772	25,583	1,080,040	57	1,329,452
Nevada-California.....	1,690	394,186	17,051	960,999	3,084	1,375,320
New Mexico.....	2,828	293,034	12,483	678,066	47,449	1,031,032
New Mexico, 7.....	1,935	5,405	7,424	140,705	22,834	176,368
Oregon.....	1,473	231,238	16,883	373,084	-----	621,205
Utah.....	3,809	178,810	8,087	1,520,629	8,950	1,716,476
Wyoming.....	1,510	163,865	13,165	1,604,662	250	1,781,942
Total.....	22,562	1,990,272	127,701	8,482,376	93,956	10,694,305

TABLE II.—Status of grazing districts—approximate acreages of Federal land as of June 30, 1944

State	Number of districts	Gross area	Withdrawn by establishment of grazing districts	Other Federal land	Total Federal land administered by the Grazing Service	Other land ¹
Arizona.....	4	18,171,400	8,847,274	819,879	9,667,153	8,504,247
California.....	2	8,050,300	2,584,237	812,399	3,396,636	4,653,664
Colorado.....	8	15,903,700	7,645,973	654,561	8,300,534	7,603,166
Idaho.....	5	21,867,600	12,326,501	762,200	13,088,701	8,778,899
Montana.....	6	31,968,700	5,781,597	924,357	6,705,954	25,262,746
Nevada.....	5	48,560,200	33,586,969	549,700	34,136,669	14,423,531
New Mexico.....	7	39,747,400	14,263,675	684,369	14,948,044	24,799,356
Oregon.....	7	20,346,500	12,400,385	157,763	12,558,148	7,788,352
Utah.....	11	37,487,800	21,343,546	2,155,525	23,499,071	13,988,729
Wyoming.....	5	22,506,100	13,500,878	1,096,329	14,597,207	7,908,893
Total.....	60	264,609,700	132,281,035	8,617,082	² 140,898,117	123,711,583

¹ Includes State, private, county, and certain withdrawn lands which the Grazing Service does not administer.

² In addition, the Grazing Service administers 1,306,885 acres of non-Federal land within grazing districts in 6 States under leases authorized by the Pierce Act of June 23, 1938, and under cooperative agreements with the owners.

TABLE III.—*Cumulative summary of range improvement projects*

Type of project	Unit	Completed, fiscal year 1944	Total com- pleted or ac- quired from April 1935 to June 30, 1944
STRUCTURES			
Spring developments.....	Number.....	110	¹ 1,952
Reservoirs (stock water).....	Number.....	313	¹ 2,882
Wells (stock water).....	Number.....	89	¹ 767
Pipe and tile lines.....	Lineal feet.....	17,510	¹ 318,690
Ditches.....	Miles.....	4.5	57.7
Truck trails.....	Miles.....	244	¹ 13,905
Stock trails and driveways.....	Miles.....	66	¹ 3,171
Bridges (over 20-foot span).....	Number.....	12	196
Fences.....	Miles.....	345.2	¹ 6,479
Corrals and holding traps.....	Number.....	41	¹ 402
Cattle guards.....	Number.....	66	652
Dipping vats.....	Number.....	1	5
Firebreaks.....	Miles.....	870	3,695
Telephone lines.....	Miles.....	4.5	286
AREA TREATMENT			
Rodent control.....	Acres.....	276,716
Insect pest control.....	Acres.....	2,700
Range revegetation (seeding).....	Acres.....	41,083
Noxious weed eradication.....	Acres.....	788

¹ The total number of completed projects as reported for the period 1935 to June 30, 1944, includes projects acquired, such as drought relief and other emergency structures which are now recorded as grazing district improvements.

Fish and Wildlife Service

IRA N. GABRIELSON, Director



THIS Service is the Federal custodian of the Nation's vast fish and wildlife resources, and in cooperation with the various State and Federal agencies, organizations, and individuals has the responsibility to see that this valuable natural asset is fully maintained and wisely managed.

America's predominant position in the commercial fishing industry of the world must be maintained. Post-war competition among nations for the food resources of the high seas and even of coastal and the larger inland waters will be greatly intensified. That the resources may be utilized in accordance with sound principles of conservation and management the Service is helping the commercial fishery industries to organize for expansion and is acquainting them with the most modern technological and scientific methods.

At the present time fishery products rank fifth among food resources of the Nation, and in addition supply vitamins, oils, fish meal for livestock and poultry foods, and byproducts for industrial uses. If the fishery industries are to maintain a constant flow of these materials essential to our economy, and if they are to realize in the near future the potential 7-billion-pound yield of fishery products a year, governmental assistance will be necessary in the form of scientific direction. The providing of facilities for technological engineering and scientific improvement of fishing and of processing, distributing, and marketing fishery products is well adapted to a post-war program of public works. Such facilities will include experimental stations and research laboratories, vessels for the development and exploration of fishing grounds, and fact-finding surveys to provide comprehensive inventories of the status of the industry.

Hunting, fishing, and recreation play such an important part in the life of the American people that planning and construction projects designed to perpetuate the wildlife resources are being given a prominent place in post-war planning.

A 3-year development program for wildlife conservation has been outlined. Work plans are now available for the employment of some 12,000 persons. In addition it is estimated as a result of these projects that another 4,000 persons will receive employment from private industry in the production of materials, supplies, and equipment. Additional programs are being formulated that will provide at least 8,000 persons with employment in development operations and 1,500 persons with employment in private industry. This 3-year program for the continuation of wildlife development projects will cost approximately \$115,000,000.

The Fish and Wildlife Service program for the protection, development, and utilization of fish and wildlife resources involves a wide variety of activities. The more important of these are: Construction and development of wildlife refuges, fish hatcheries, and rearing ponds; stream and lake improvement; tree planting on refuges; range revegetation; marsh conditioning; and other management practices including controlled burning, as well as prevention and suppression of uncontrolled fires—all designed to improve living conditions for wildlife.

ECONOMIC FISHERY INVESTIGATIONS AND PROGRAMS

Studies in fishery economics have been completely adjusted to war needs. For the first time data have been collected from fishery unions on membership and movements. Tables have been established which indicate the classification of labor in the fishery industries according to sex, age groups, and occupations. Occupation titles and definitions also have been studied. The material was successfully used in presenting to the War Manpower Commission and the Selective Service System the case for adequate recognition of the needs and importance of the fishery industries.

These labor studies will be the bases for analyses of post-war labor problems which will extend especially to wages and hours, to collective bargaining, and to the seasonal character of fishery labor. It is planned to establish a labor unit for the specific purpose of collecting data and studying the problems involved. This will contribute indirectly to reemployment after the war and to the solution of the fishery industries' social security requirements which up to now have not received adequate consideration in Federal and State legislation.

A survey of the financial condition of fishery cooperatives was made for a report to the Ways and Means Committee of the House of Representatives on a bill which provides for the exemption of cooperatives from certain taxes. The material collected will be the basis for future studies on cooperatives, a type of fishermen's association which will be of increasing importance in the post-war period.

A survey made in 12 cities during January and February for the purpose of determining the effect of Office of Price Administration's retail Maximum Price Regulation 507 on the retail price and consumption of fresh fish indicated that the regulation was beneficial as it made available to a large number of consumers an increased poundage of fish at lower prices. To prevent disruption of the usual channels of production and distribution, a survey of 1942 fresh-fish prices was outlined, conducted, and supervised in cooperation with Office of Price Administration in order to find a fair and equitable basis for fish prices at production and wholesale levels. The same consideration prevailed in an extended study of cost increases in the fishery industries from 1941 to 1943 and to prevent an eventual unadjusted recession of prices to pre-war levels. The cost survey will establish samples of cost ratios for normal and for war years to which any individual enterprise can compare its own costs and profits. Both the price and cost surveys will be continued, the results being important to the solution of post-war problems.

CONSUMER RELATIONS

Efforts made during the fiscal year to obtain maximum benefit for consumers have led to wider dissemination of fishery facts and to the marketing of new and little used varieties of fishes. Although these programs develop slowly there is every reason to expect that their war impetus will be effective in promoting increased fish consumption to a considerable degree in the post-war period.

COLLECTION AND PUBLICATION OF FISHERY STATISTICS

The collection and publication of information relating to the quantity and value of the commercial catch of fishery products in the United States, the employment of fishermen, shore workers, fishing craft and gear in the industry, and the production of manufactured fishery products was continued. Due to the loss of agents to the armed services and also through the assignment of members of the statistical staff to assemble information required by war planning and regulatory agencies, it was necessary to curtail the regular statistical surveys. However, the collection and publication of certain additional current information required by the industry and Federal agencies concerned with the fisheries was undertaken.

FISHERY MARKET NEWS SERVICE

This service assists the orderly marketing of fresh, frozen, and cured fishery products by disseminating to fishermen, shippers, wholesalers, buyers, and consumers, current information on production, shipments, prices, supply, and demand. Field officers at New York, Boston, Chi-

cago, Seattle, and New Orleans, issued daily and monthly reports during the entire fiscal year, but the Jacksonville office was closed after only 2 months' operation, due to curtailment of funds. In addition to the supply and demand data in the daily reports and monthly summaries, the market reports reprinted all Federal orders, in full or in condensed form, which affected fishery production, marketing, or supply. The inclusion of these regulations, immediately upon issuance, provided the only current source of such information to the fishery industries.

Fishery Market News, a monthly review, also carried special articles of interest to the industry, more complete texts and interpretations of Federal orders, and a monthly index of Federal regulations. Market News data has been extensively utilized by other Federal agencies to determine ceiling prices on fishery products, in transportation studies, in allocating catches, and in distribution surveys. The demand for these data and the need for expanding and adapting Market News procedures to meet war requirements is expected to continue in the post-war period when production and distribution problems, though different, will be equally acute. To meet these demands, additional Market News offices will be required to collect data for those sections of the country from which current information on production, imports, markets, and distribution is not now being received.

STUDIES TO IMPROVE METHODS OF PRODUCTION AND USE OF FISH

The fishery technological laboratories at Seattle, Wash.; College Park, Md.; Ketchikan, Alaska; and Mayaguez, P. R., continued to be completely occupied with researches aimed to relieve difficulties caused by material and manpower shortages that have handicapped the fishery industries. Such difficulties may exist for a considerable time in the post-war period, particularly if large quantities of fishery products are required for export. Current technological advances therefore, will have continuing and world-wide application.

Specially prepared packs of all types of fish and shellfish, both fresh and processed, were subjected to storage and shipping tests to determine the most practical solution to the critical tin shortage. After many field and laboratory tests, recommendations were made for the most effective use of available fibers for cordage and nets. Chemical and bacteriological studies resulted in improved methods for extracting agar and related seaweed gums. Investigations of present and possible vitamin-A resources provided information for their intelligent exploitation. Improved methods of handling and processing fish livers also were developed.

To increase the Nation's food supply, the laboratories developed new canned fish products and demonstrated the utility of numerous kinds of fish and shellfish formerly neglected. In order to increase the utili-

zation of fish as food, improved handling and processing methods and new recipes were evolved.

Upon its request, the Army Quartermaster Subsistence Laboratory was furnished technical assistance in solving fishery problems by the detail of an experienced fishery technologist.

On the basis of completed and proposed researches, the laboratory staffs are prepared to make recommendations which will enable the fishery industries to satisfy the expected demands of post-war markets for improved methods, equipment, and products.

THE ROLE OF GAME FISH AND HATCHERIES

Since the outbreak of hostilities, the general public has realized more than ever before the tremendous value of this country's fishery resources. While at the present time first place must be assigned to the amount of nutritious food involved, the recreational value of angling is of utmost importance under the stress of wartime living. Continued maximum use of the fishery resources cannot be attained by a static policy of merely guarding them against unwise utilization. Therefore, the Division of Game Fish and Hatcheries has realigned its program to include management principles. Up to a short time ago the Division had been concerned largely with producing hatchery stock—the raw material of fisheries management. While for various reasons it will not be possible to put this revised program into full operation until the post-war era, the foundation is being laid as rapidly as manpower will permit.

During the present emergency, the value of a properly constructed and managed farm pond has been fully demonstrated. Such ponds are producing thousands of pounds of edible fish annually, but owing to restrictions upon the heavy equipment required for constructing the impoundments, the program has not reached its peak. When conditions return to normal, it is anticipated that in some States 45 percent of all farms will have one or more ponds. The Division of Game Fish and Hatcheries is expanding its studies on the stocking and managing of farm ponds for the purpose of obtaining more fundamental information so that greater yields may be derived from the ponds that are developed in the future.

BIOLOGICAL INVESTIGATIONS OF THE FISHERIES

The very nature of biological control of the fisheries and the necessity for keeping in mind future goals as a guide for current action has stimulated careful thought on plans to be consummated after the war. Restriction of theoretical studies was continued as more men than during last year were detailed to the staff of the Coordinator of Fisheries. Unpredicted changes have occurred in the fisheries of the Nation, changes the significance and magnitude of which must

be noted now so that their bearing upon the future management will not be forgotten.

As usual the work was conducted on a regional basis. In the North Atlantic area studies related especially to the rosefish and yellowtail flounder, the yield of which will decrease considerably unless practical remedial measures can be developed. On the other hand, fishing pressure on both the haddock and lobster populations has been reduced considerably as the result of wartime boat and manpower shortages. Observations on their recovery will be of aid in maintaining and increasing the yield in post-war years.

In the Middle Atlantic area studies of the shad fisheries indicate that all the major producing streams can be restored to full production by the abatement of pollution, in some cases, and by provisions for a larger spawning reserve in others.

Investigations in Alaska were directed toward maintaining maximum production of the fisheries and toward collecting data for their proper management in the post-war period. These were concerned particularly with the salmon populations of Bristol Bay, Brooks Lake, and Karluk River. The commercial catch of pink salmon in southeastern Alaska was disappointing with a total production of 1,035,000 cases, only a fourth of the 1941 yield. Studies carried out at the Little Port Walter Station indicated an unfavorable change in returns in the "test stream" at this location. Herring production in Alaska showed a substantial increase with a total yield of 84 million pounds as against 38 million pounds for 1942. Predictions of the age-composition and probable abundance of herrings were made for the season of 1944, from which it appears that the prospects of this fishery are very good.

The sablefish industry has expanded rapidly under wartime demands, the commercial catch of the past season amounting to approximately 4 million pounds. A survey was undertaken to appraise the probable effect of this increased fishing intensity and to determine the need for regulation. This species has been accepted as an excellent food fish and it is probable that there will continue to be a considerable demand for it after the war.

In South Atlantic and Gulf areas observations on the effects of war conditions on our shrimp fisheries have been continued. This information will be of great value in the formulation of principles for future management. Close watch and collection of data on the fast-expanding offshore shrimp fishery have been maintained as developments there will be important in the future of the industry.

Research on the pilchard fishery of our southern Pacific coast is directed toward learning the size and productivity of the resources and toward measuring the response of these quantities to different levels of fishing intensity. Results achieved during the past year have demonstrated that fluctuations in year-class strength are highly

correlated with fertility of the sea, as reflected by surface salinity. The abundance of the resource was found to be indicated, to a high degree, by the size of the two age classes which ordinarily dominate in the California fishery and by the amount of fishing effort 3 years previous to each season. With the return of post-war facilities, considerable benefits may be expected to accrue to the industry from the increased understanding of the trends and fluctuations in the pilchard fishery.

In the Great Lakes area, exhaustive studies are needed on the lake trout, the most valuable of the Great Lakes commercial species. It is especially urgent that the relative effectiveness of artificial and natural propagation of the species be investigated.

Analysis of conditions, which in the past have been impeding the progress of the shellfish industry, shows that depletion of natural oyster grounds and pollution of inshore waters are the two principal factors responsible for decline in the production of oysters and clams, and that introduction of a definite State-management plan of exploitation is necessary for the rehabilitation and planned utilization of these natural resources.

The rapid development of many new industrial processes, and sanitary engineering procedures, attendant on the war have created water-quality problems which will persist to the serious detriment of the proper post-war development of national fisheries unless adequately controlled. Accordingly, systematic studies of these new effluents and other substances which can affect our aquatic resources detrimentally have been made or are in progress to provide specific scientific definitions of the hazards which these materials present to fish and other aquatic life.

After determining the noxious fractions of the various wastes and effluents, attention has been given to the chemical and physical properties of these fractions looking toward their transformation into innocuous or useful products. Practical approaches for the elimination of harmful effluents by utilization have been suggested to the managers of several plants and are now in successful operation. This work has increasingly demonstrated that practically all industrial pollution is not only unnecessary, but that in many instances commercially feasible processes of utilization can be developed which will pay part or all of the elimination expenses and may even show a profit.

War conditions have closed several plants that formerly poured large quantities of destructive wastes into certain streams and it has been possible to observe the return of these streams to normal fish productivity after cessation of the industrial pollution. These findings show that following the elimination of industrial pollution many streams will return rapidly to valuable fish production. It has

been found that very dilute pollutants present in quantities much too small to be directly harmful to fishes may, nevertheless, in time completely eliminate all fishes from the polluted waters.

PROTECTION OF THE ALASKA FISHERIES

Protection of the fisheries of Alaska has continued with the purpose of permitting maximum commercial utilization of the resource consistent with a stabilized yield on a high level of productivity in perpetuity. Every question raised with regard to promulgation or adjustment of regulations has been answered in favor of conservation as against exploitation.

The need for greater production of food fishes, during the war years and in the post-war period, has not gone unrecognized, however. Increased emphasis has been placed on careful observations of fishery runs; regulations have been made more flexible to permit announcements of seasonal extensions when runs are above expectations; as a result, in 1943, 119 additional fishing days were permitted, and catch limitations on herring were raised 6,250,000 pounds. An increase of 36,536,405 pounds of fishery products over 1942 production was realized, of which 24,032,224 pounds represented the increase in the output of canned salmon.

FUR-SEAL INDUSTRY

The year ending June 30, 1944, was notable in that the take of 117,164 fur-seal skins on the Pribilof Islands was the largest number ever secured under controlled conditions. The largest previous annual take was 110,585 skins in 1874. The byproducts plant produced 782,000 pounds of seal meal marketed primarily for stock and poultry feed, and 75,259 gallons of seal oil sold for leather-tanning processes.

In May 1944, the natives of the Pribilof Islands, together with supervisory personnel, were returned from Funter Bay in Southeastern Alaska, to the Pribilofs from which they were evacuated for security reasons in June 1942. This will reestablish sealing and foxing activities on a normal basis, and permit the expansion of the present byproducts plant, for which funds have been appropriated, to utilize all seal carcasses on St. Paul Island.

During the fiscal year 1944, two public auction sales of fur-seal skins were held at St. Louis, Mo., for the account of the Government. On November 1, 1943, 17,525 dressed, dyed, and finished skins sold for \$717,147.40 and on June 19, 1944, 21,742 skins were sold for \$795,397. Also, 3 confiscated skins were sold for \$1.50. In the same period, 230 skins were sold at private sales for promotional purposes, under special authorization of the Secretary for \$11,165. Total gross sales during the year amounted to \$1,523,710.90.

Of particular interest to conservationists was the act of February 26, 1944, giving effect to a provisional fur-seal agreement entered into

with the Canadian Government in 1942, and superseding the acts of April 21, 1910 and August 24, 1912. The terms of the new law, made necessary by the abrogation of the fur-seal treaty of 1911 by Japan, 6 weeks before the outbreak of the present war, provide for continuing protection of the fur seals of the North Pacific, and for a division of the skins on the basis of 80 percent to the United States and 20 percent to Canada.

COOPERATIVE PREDATOR AND RODENT CONTROL

Predator and rodent control operations conducted on a cooperative basis with other Federal agencies, States, counties, municipalities, livestock grower and farmer organizations, and individuals played an important role in furthering food and fiber production and conservation. Sheep, cattle, and poultry were saved from destruction by coyotes and other predators and stored foodstuffs, agricultural crops and other vital materials were protected from the onslaughts of rats and field rodents.

In predator control operations 118,879 predatory animals were taken, consisting of 108,050 coyotes, 1,170 wolves, 8,900 bobcats and lynx, 167 mountain lions, and 592 stock-killing bears. Rodent control operations included the treatment of 12,336,172 acres of infested lands for the control of field rodents and the treatment of 377,499 premises to control common house rats.

The operation of the combined projects involved the expenditure of \$845,908 from Service funds, \$579,885 from cooperating States, and \$1,302,554 from cooperating counties, livestock grower and farmer associations, and others. The Service's Supply Depot at Pocatello, Idaho, prepared and distributed 647,655 pounds of rodent bait materials to cooperators and processed other supplies and equipment.

Control operations were not conducted without many difficulties inherent in wartime conditions. There was a dearth of trained predatory animal hunters and rodent control workers, and a shortage of automotive and other equipment in face of the fact that increasing predator and rodent populations demanded greater, rather than diminished, control efforts. The Service continued to cooperate with the Army and Navy on numerous military reservations in the control of rats and field rodents to protect food supplies and to alleviate the threat of rodent-borne diseases.

LOSSES REDUCED THROUGH ORGANIZED CONTROL WORK

Where predatory animal and rodent control work has been intensively prosecuted, substantial benefits have accrued.

For example, one hunter in Presidio County, Tex., held losses among 40,000 sheep and goats to 11 sheep killed by coyotes. Another hunter in the same county kept losses among 11,000 sheep down to 35 killed

during the year. Crane County, Tex., ranchers report that predator control has made possible an 80 percent, instead of a 40 percent, lamb crop.

While the foregoing examples are typical of many areas, the general predator problem is definitely more acute. This is reflected by the fact that although a yearly take of 100 predators by an individual hunter was considered excellent work a few years ago, today many hunters are destroying predators at the rate of 400 to 600 or more annually.

Previous to control work in Flathead County, Mont., the loss to wheat, oat, barley, and truck crops amounted to 3 percent annually because of ground squirrel depredations. On a monetary basis, this loss exceeded \$54,000. Organized control during the past 5 years, costing \$6,200, effected a net saving in crops of approximately \$48,600. In Ravalli County, Mont., where sugar beet, pea, and truck crops were involved, the returns from ground squirrel control were \$10 for each \$1 expended. The Mayor of Marshfield, Oreg., reports that at least \$25,000 worth of food and other merchandise has been saved during the year because of organized cooperative rat control.

POST-WAR ASPECTS

Post-war control of injurious mammals will be greatly aided by the existence of our field organization—kept going as efficiently as possible during the war—through which expansion of projects may be facilitated. Greater effort must be applied after the war to regain control of predator and rodent populations that have locally increased rapidly in numbers. The upswing of predatory animal populations began at the onset of the financial depression when low fur prices removed the incentive for private trappers to take predators for their pelt values. The situation was aggravated because at that time, when accelerated organized control effort was needed to fill the gap, Federal and cooperative appropriations for the purpose were decreased. The effects of subsequent advances in fur prices, which ordinarily would have stimulated predator control, were neutralized because private trappers began to find more remunerative employment in defense and war industries or entered the military forces. These factors have operated to remove an important check on predators, the numbers of which have continued to increase alarmingly. The manpower shortage has also served greatly to curtail organized rodent control operations and thus has permitted rodent pests to continue their upward population trends. Livestock, crop, and foodstuff damage by predators and rodents has also increased proportionately. As manpower and equipment again become available, expansion of sorely needed mammal control can be realized.

The urgency of rodent and predator control to protect vital food resources has occupied a prominent part in the thinking of more and more people during the period of war. The impression thus left will serve to stimulate cooperative measures to protect and conserve vital food resources in times of peace, which will be needed to rehabilitate our own and the war-torn nations. The widespread interest in rat control, especially stimulated during the war to curtail food loss and to protect human health, will increase in the post-war era.

WILDLIFE CONSERVATION LAWS AND REGULATIONS

Realizing that an increased demand for hunting opportunities will immediately follow the war, the Service is administering the Federal conservation laws and regulations to assure an adequate supply of wildlife at that time. These laws include the: (1) Migratory Bird Treaty Act, (2) Lacey Act, (3) Migratory Bird Conservation Act, (4) Migratory Bird Hunting Stamp Act, (5) law protecting wildlife and property on Federal refuges, (6) Black Bass Law, (7) Bald Eagle Act, and (8) the Alaska Game Law.

The 60-odd United States game management agents, working singly or in cooperation with State officers and United States deputy game wardens, obtained 1,985 convictions during the past fiscal year. With an expenditure of only \$15.75 by game management agents, 3 persons were convicted of serious violations and fined \$700. In addition, the agents worked with farmers in controlling migratory birds threatening damage to agricultural crops and detected and reported to the proper Federal authorities suspicious characters and acts inimical to the welfare of the Nation.

Importation permits issued and the number of animals and birds imported increased as the submarine menace eased. The greatest increase was in monkeys, used largely in medical research laboratories; 7,728 arrived compared to 3,675 the previous year. Mongooses are prohibited by law from entry, but 2 were brought in without permits. One was discovered in New York, the other in Philadelphia. Both were asphyxiated and their skins preserved for science.

Approximately 40 percent of the enforcement agents in the Territory of Alaska have entered the armed forces, but, by making a few replacements and by the increased use of airplanes, it was possible to obtain fairly satisfactory results. Valuable assistance was furnished the armed forces and Federal Bureau of Investigation by enforcement agents. The problems of wildlife protection in the Territory increased in proportion to the influx of men of the armed forces and war workers. The problems were largely solved by arrests, speedy convictions, and cooperation on the part of the military authorities and of project superintendents.

NATIONAL WILDLIFE REFUGES

In general, the refuges enjoyed satisfactory water conditions, the nesting season was successful, and the production of wildlife food was favorable. The refuges also contributed materially to the war program through the production of food, furs, and other essentials.

In 1943, livestock grazing to the extent of 279,358 animal months' use was provided and 15,836 tons of hay were harvested; the cultivation of 21,173 acres of refuge land by private individuals and refuge personnel produced 456,887 bushels of grain and other crops. These represent increases amounting to 177 percent for cattle grazing, 161 percent for hay production, and 182 percent for cereal crops as compared with 1940. These increases were due, first, to the fact that while most refuges were not in full production in 1940, subsequent proper management has increased utilization possibilities; and second, to operations in accordance with the Department's policy to make available in the war program all possible resources of the Department.

The restoration of drained marsh areas has served to increase substantially not only the numbers of waterfowl but also of fur animals, the pelts of which are of great value in outfitting troops in northern climates. Approximately a million fur animals have been taken on the National wildlife refuges between 1936 and 1944. During the 1943-44 trapping season, a total of 185,130 fur animals was taken or 148 percent of the 1940-41 catch.

An increased use of wood products was permitted during the year. As much pulpwood, posts, ties, firewood, and lumber was removed as practicable without adversely affecting the primary purposes of the areas.

Where circumstances permitted, refuge waters were managed for fish production. Consequently, more use was made of their fishing waters than ever before. Recreational fishing totaled 149,941 man-days and resulted in the taking of 760,511 fishes. An additional 964,432 pounds of rough fishes were removed by commercial fishermen.

The total revenue from economic uses on National wildlife refuges including the disposition of big game animals, fur animals, and surplus products was \$244,700, which was deposited in the Treasury.

The occupation of the Netherlands West Indies by the enemy stopped the importation of kapok. In the hunt for a substitute, the fully ripened seed heads of cattails appeared to be the best for use in life preservers, sleeping bags, mats, and pads. National wildlife refuges proved to be among the best sources for this cattail fluff. The 70,000-acre Mud Lake National Wildlife Refuge in northwestern Minnesota was opened to the local residents for harvesting this crop, their income from the fluff amounting to \$34,050.

The population of migratory waterfowl, estimated during the spring of 1944 as 125,350,000 birds, was probably the greatest since the early 1920's. At least a fifth of these birds was reported using the National wildlife refuges. Populations of upland game birds and animals on these areas have also increased favorably. Hunting possibilities on lands adjacent to the refuges as well as on managed hunting units have been benefited. On certain refuges, surpluses have been used for restocking public lands with low game populations.

Fire protection on the forest, grass, and marshlands of the national wildlife refuges continued a major objective. This phase of refuge administration is particularly important not only to protect refuge resources from fire but to prevent the spread of fires to adjacent forest and grazing lands. Funds amounting to \$30,000 were provided during the year under the appropriation "Fire Protection of Forests, Forest Industries, and Strategic Facilities (National Defense)" for the purchase of additional fire-fighting equipment and the employment of lookouts, patrols, and standby crews to augment fire prevention and fire suppression on nine timber-producing refuges located within 300 miles of the coasts.

Lands aggregating 1,845,000 acres were made available on 35 national wildlife refuges within the United States for Army and Navy use as bombing ranges, artillery ranges, aerial gunnery ranges, training grounds, air bases, tank maneuvering areas, docking facilities, and as sites for chemical war munition plants.

The following areas were established as national wildlife refuges during the year: Box Butte, a reservoir of 2,210 acres in Dawes County, Nebr., part of the Mirage Flats Reclamation project, for the protection of migratory waterfowl (Public Land Order, October 30, 1943); Mesilla, an area of 500 acres in Dona Ana County, N. Mex., and El Paso County, Tex., as a resting area for migratory waterfowl (Public Land Order, April 6, 1944); Monomoy, a 3,000-acre peninsula located on Cape Cod in Barnstable County, Mass., one of the finest wintering concentration areas for waterfowl along the New England Coast; Santa Ana, consisting of 1,886 acres in Hidalgo County, Tex., acquired on September 1, 1943, the best remaining habitat on the American side of the Rio Grande for the chachalaca, white-winged dove, white-fronted pigeon, and red-billed pigeon—it will provide a refuge also for black-bellied tree ducks.

LAND ACQUISITION

The Division of Land's activities have been directed to the acquisition of those new refuges and additions to old ones where the emphasis is uppermost on post-war developments. Plans have been formulated for expansion of the work immediately upon the termination of the

war. The Division, as in the preceding war years, has delegated a very substantial part of its manpower to aiding the Navy Department in land acquisition.

WILDLIFE RESEARCH

The wildlife research program has been planned and conducted on the principle that constructive vision and foresight are essential to getting needed information and in making it available for current wildlife management programs and post-war plans. In recognition that the wildlife resources of the continent will be called upon to make an important contribution to the rehabilitation of the American citizenry and soldiers, the scientific staff has been reorganized to economize on time and cost so that the utmost could be accomplished in meeting present needs and in laying a sound foundation of biological facts for post-war programs. Cooperative efforts were enlarged with other Federal, State, and local agencies. These have included public-land management agencies, as the Forest, Park, Indian, and Grazing services and those concerned with flood control, navigation, power development, and reclamation. Extensive studies have been made to develop new poison products and methods of application in rodent-control operations and to devise improved methods of using available supplies of toxic agents heretofore commonly employed but largely cut off by war conditions. Marked progress has been made in these fields and also in the use of deterrents and frightening devices through investigations by our research laboratories and through cooperation with the Office of Scientific Research and Development of the National Research Council and with Federal, State, and local health agencies, including those of the Army and the Navy.

Looking to post-war construction and development work, there is the greatest need for effective coordination among the various land-use agencies, particularly the Corps of Engineers of the United States Army, the Reclamation Service, and the Tennessee Valley Authority. Huge impoundments are being blueprinted by these agencies and plans for wildlife development on these reservations are being made at the same time with a view to increasing their productivity for wildlife. Studies have revealed in some instances that a few minor modifications in plans will provide means whereby water can be effectively controlled for maximum production of wildlife food and habitat requirements.

Work and recreation out-of-doors appeal to a great many people. This Service is receiving many requests from military personnel and veterans who are now making plans for after the war. They are interested in such vocations as hunting, fishing, trapping fur animals, raising fur animals and game in captivity, and growing rabbits for

food and fur. These enterprises require no heavy work and are admirably suited for those who prefer the out-of-doors or can do only light inside work.

Blind people in increasing numbers are finding rabbit raising both profitable and practicable, and the Library of Congress has received requests frequently for literature on the subject in braille. Permission to transcribe Conservation Bulletin 25, "Rabbit Raising," into braille in order that information on the production of domestic rabbits for food and fur may be made available to the adult blind, was requested of the Service by the Library of Congress.

A book entitled, "What is Farming?" has been prepared for the United States Armed Forces Institute and this Service has contributed material and illustrations for the chapter, "Unusual Kinds of Farming." This includes information on fur animal and game farming, rabbit raising, and fish propagation. It is written at high school level and is intended to serve as an orientation course in agriculture. The book will be used by men in the armed services who have an interest in agriculture. More intensive courses in these subjects also are being provided.

After the last war, veterans were encouraged to invest their money in get-rich-quick schemes in the production of fur animals, including rabbits. To avoid a recurrence of this evil, the Service is cooperating with the War Department and the Veterans' Administration to inform military personnel and veterans accurately in order to prevent their being exploited by unscrupulous persons. Material calling attention to the danger of exploitation by high-pressure promoters has been included in the books, *What is Farming?* and *Managing a Farm*, which will be distributed by the United States Armed Forces Institute to military personnel.

Post-war plans for rehabilitating fur farming have been discussed at numerous wartime agricultural conferences for fur farmers. This Service has taken an active part in this post-war planning and will put forth every effort to restore fur farming during the period of readjustment. This activity is an important part of our agricultural development and fits in well with conventional farming.

All the help that we can give will be provided for the returning servicemen and others who wish to engage in fur farming, rabbit raising, trapping, and all the other pursuits in the field of fur resources. Enormous demands for development of this natural asset that have been put aside during the war await satisfaction. A great effort will be made to prevent pressure groups from exploiting any individual who is desirous of rehabilitating himself through business endeavor in the wildlife field.

FEDERAL AID IN WILDLIFE RESTORATION

Despite the war and a further reduction in appropriation, the Federal Aid in Wildlife Restoration program continued to operate effectively during the year.

The cooperating States emphasized particularly the purchase of lands of little agricultural value to provide a basis for post-war development projects. The International Association of Game, Fish, and Conservation Commissioners also has urged the State fish and game departments to plan projects of a developmental nature for post-war attention. The Association was actuated to a considerable extent by the fact that on July 1, 1943, the special Federal Aid in Wildlife Restoration fund contained \$9,441,557, representing the excess of collections over appropriations since 1938. Anticipating liberal appropriation of this accumulated money during the post-war period, the States desire to have ready ample plans so that construction and other restoration measures can be started with the minimum of delay.

Wildlife, including fishlife, is an important feature of outdoor recreation which has always played a prominent part in the American way of life. It is primarily responsible for luring thousands of people outdoors to our National parks and forests, and to the fields and streams. After the present conflict, Americans will require even greater wildlife resources for public enjoyment. In addition to their value in maintaining public health by inducing recreational activities, our abundant wildlife resources normally comprise a basic source of raw materials as fur, meat, and other industrial products, and in time of war they have developed even greater value.

Office of The Coordinator of Fisheries

IRA N. GABRIELSON, Deputy Coordinator



THE United States fisheries are in a condition more nearly approaching normal than at any time since the war began. The fleet, which lost some 700 of its finest craft through requisitioning for military service, is being restored to a size comparable with its pre-war strength. Not only is the fleet nearing its normal size, but it has been kept in good repair and will soon consist of a larger proportion of new vessels than ever before. Nets of practically all kinds are available in adequate supply and shortages of the best types of cordage for marine use are being met in reasonably satisfactory fashion by substitution. On the other hand, severe shortages of manpower persist in some sections of the industry. In the field of marketing and distribution, refrigeration facilities and storage space are generally insufficient and transportation is inadequate to the demands at certain seasons and in some localities. These remaining difficulties, however, are chiefly of a kind that affect the full and efficient utilization of the catch. The basic machinery of production has been restored to good order and the condition of the fishery resource itself is sound.

The improved condition of the fishing industry is reflected in the statistics of production. The total yield in 1943 was 4 billion pounds, a substantial gain over the 3,700,000,000 pounds landed in 1942 and approximately equivalent to the catch of the pre-war year 1940, when production totaled 4,059,524,000 pounds.

The upward trend begun in 1943 has continued into 1944. Total production in the major fisheries made encouraging increases in the first 6 months of 1944 as compared with the previous year, although catches of a few important species are somewhat smaller than last year.

Especially encouraging is the gain in the New England vessel fish-

eries, which last year operated under a severe handicap because of the loss of many medium and large trawlers taken for military service. With the entrance of new vessels into the fishery and the return of a number of these boats to active fishing, landings gained 16 percent during the first half of 1944, compared with the same period last year.

In 1944 the important tuna fishery of the Pacific coast, which ranks fourth in productiveness among all fisheries of the United States and Alaska, is showing a gain of 50 percent in its landings. The pack of Maine sardines has increased 54 percent over the first 6 months of 1943, which will aid in supplying war-increased demands for canned fish. The Pacific mackerel fishery, on the other hand, again shows a reduction in its catch, but this industry is one that is normally subject to great fluctuations of yield, and the decline probably is not entirely due to war conditions. Similarly, the production of shrimp during the first half of 1944 has been disappointing, but the small catch has been due in large part to a scarcity of shrimp on the fishing grounds. A noticeable increase in the catch began during June, however, and with the months of heaviest landings still ahead, the year's production of shrimp may make a better showing.

Viewing the fisheries as a whole, a survey of production made by the Coordinator's Office at the end of June 1944, showed that the smaller catches in certain fisheries, compared with last year, have been more than offset by gains in others. The catch during the first half of the year normally amounts to only a fourth of the year's total, so it is too early to forecast with assurance the total production for 1944. It is believed, however, that it may reach 4,300,000,000 pounds.

This improvement in the condition of the fisheries has been brought about by unceasing effort and close cooperation on the part of industry and Government. When the Office of the Coordinator of Fisheries was established in July 1942, the fisheries of the Nation were in a serious condition of disorganization. The story of the effect of war on the fisheries has been told in many places, and need be only briefly summarized here.

The immediate loss of a large part of its most effective machinery of production crippled important segments of the industry at the outset of the war. The vessels requisitioned for the Army and Navy were, for obvious reasons, the largest and fastest boats in the fleet. The catching capacity of the pilchard fleet, which normally supplies a fourth of all fish caught in the United States and Alaska, was reduced materially. The Alaska salmon fishery lost the greater part of its floating equipment. In New England, the number of large trawlers was reduced one-half. On a somewhat lesser scale, the same condition prevailed in most important fisheries employing boats of any considerable size.

Security regulations placed restrictions on the movements of fishing boats, excluded enemy aliens from fishing crews, and reserved many formerly important fishing areas as mine fields or for target practice.

Repairs to vessels and engines were difficult to secure in busy shipyards, even when the necessary materials could be obtained. Netting was needed by the Army and Navy for camouflage, and supplies of manila, the cordage best adapted to marine operations, were shut off when the Japanese occupied the Philippines. In addition to these difficulties with operating equipment, an estimated one-fourth of the men who normally earn their living directly in the fisheries had either entered the armed services or had abandoned fishing to engage in other industries.

Confronted with this situation, the Coordinator's Office undertook as its first and most urgent task the restoration of vessels and other instruments of production to the fisheries. At the same time it gave its attention to the matter of reconciling the various security regulations and obtaining amendments or relaxations where possible so that the industry might have greater freedom of operation.

BUILDING UP THE DEPLETED FISHING FLEET

The Coordinator's Office immediately began negotiations through the War Shipping Administration to arrange for the return of vessels requisitioned for military service as soon as circumstances should permit their release. In some instances, a large number of boats had been taken as a precaution against emergencies which, fortunately, never materialized. This was true of the Alaska salmon fishery. Representatives of the Coordinator's Office were therefore able to arrange for the return of most essential vessels, cannery tenders, and boats to this industry before the opening of the 1943 season. Construction of new boats for specific military purposes gradually supplied the needs of the Army and Navy and in many instances the Coordinator's Office has been able to demonstrate that the requisitioned fishing vessels would be of greater service to the nation if returned to active fishing.

The total returns of requisitioned fishing vessels now amount, it is estimated, to about 40 percent of those originally taken. These include, in addition to the floating equipment of the salmon fishery mentioned above, vessels returned to the Pacific pilchard fishery, the New England vessel fisheries, the Atlantic coast menhaden fishery, and the sponge fishery. Additional craft probably will be returned in the near future because of the volume of new construction for the military services; some fishing vessels, however, will necessarily continue in active military service until the end of the war.

Much larger additions to the fishing fleet are being made through new construction. The role of the Coordinator's office in this program has been to allot controlled materials through the War Food Admin-

istration, approve authorized production schedules, and grant preference ratings to applicants who wish to construct vessels. During the period from May 13, 1943, to July 1, 1944, the Coordinator authorized the construction of 1,010 new fishing vessels. Of these, 661 were scheduled for completion by July 1, 1944; the balance during the second half of 1944 or sometime in 1945.

Construction needed merely as normal replacements for vessels lost at sea or worn out during the year is estimated at about 275 boats annually. However, the mounting volume of new vessel construction is such that, coupled with the return of requisitioned boats, it is considered that the fleet will shortly be restored to approximately its pre-war size, although shortages may remain in certain fisheries.

SECURING MATERIALS FOR REPAIR AND OPERATION

In addition to facilitating the construction of new vessels, the Coordinator's Office has sought to keep the existing fleet and shore processing facilities in good operating condition by providing materials for repairs and replacements.

During the period from April 1, 1943, to June 30, 1944,^d applications for more than \$1,185,000 worth of controlled materials and products destined for use in fishing vessels, engines, and shore processing plants were approved by the War Production Board on the Coordinator's recommendation. Applications for controlled materials included more than 11,670 tons of carbon steel, alloy steel, and copper and aluminum products for use in the construction of vessels and engines. Manufactured items for which priorities are required totaled more than \$4,428,000 worth of equipment including various types of engines, machines, refrigeration equipment, and canning machinery. The total number of individual transactions involved in the granting of priority assistance amounts to 891 for the period from April 1, 1943, to June 30, 1944, exclusive of vessels and marine engines.

By acting as a direct claimant in securing allocations of fish nets, twine, and cordage for the domestic fisheries, the Coordinator's Office has been successful in averting any serious shortage of netting with consequent interruption of production. Military needs for camouflage netting, which required a large percentage of the output of the fish net manufacturing industry until late in 1943, were satisfied by that time and the military contracts were cancelled. However, heavy demands for lend-lease and other foreign shipment remain and the normal flow of nets from the manufacturers to the distributors and users cannot yet be resumed. Vigilance and careful assessment of these various demands are still necessary to insure an adequate supply of netting for our domestic fisheries.

FISHERY MANPOWER

Maintaining production in the fisheries requires the maintenance of personnel for producing the catch and processing it for distribution and consumption. Like all other industries, the fisheries have lost many able and skilled young men to the armed services and the war industries. The problem of the Coordinator of Fisheries has been the extremely difficult one of attempting to protect fishery labor that is essential to production, of permitting the drafting of fishermen and processors who are less essential or less productive, and of assisting in recruiting replacements for the unavoidable manpower losses. This task has required the harmonizing and coordinating of the policies of the various Governmental agencies concerned with military and industrial manpower.

During the earlier part of the war the Coordinator's Office was moderately successful in obtaining deferment for men of all age groups who were felt to be essential to the effective prosecution of the fisheries. More recently, however, with a change in the policy of the Selective Service System regarding the deferment of men under 26, the fisheries have lost many highly skilled men for whom no satisfactory replacements can be found. In some localities, fishing vessels are tied up for lack of captains or crews. Without additional men to operate them, a number of the vessels recently built or returned from military service may remain inactive.

In addition to attempting to secure the deferment of essential men, the Coordinator's Office has considered various methods of recruitment, and in cooperation with other agencies has applied the most promising. Neither the use of prisoners of war nor the importation of foreign labor has proved practicable on a large scale. Some of the field representatives of the Coordinator's Office have been successful in programs of direct recruitment of fishermen. On the Coordinator's recommendation, the War Manpower Commission, through its local offices, has conducted manpower surveys for the fisheries and in some instances has undertaken active recruitment campaigns. Improved facilities have been obtained here and there for transporting cannery and other workers from outlying towns to ports of landing where fish are processed. These activities have helped in some measure to alleviate the situation, but a critical shortage of manpower persists in some fisheries. This situation is undoubtedly the most important obstacle to maximum fishery production.

SPECIAL PROGRAMS OF OPERATION

The role of the Coordinator's office has for the most part been confined to placing in the industry's hands the instruments of production and removing, insofar as it was possible to do so, restrictions and

hindrances to their effective use. In a few instances, however, it has proved necessary to exercise additional authority derived from the various Executive orders based on the Second War Powers Act, and to assume the broader powers of actual cooperative management of the Alaska, and later of the Puget Sound, salmon fisheries and the Pacific pilchard fishery.

SALMON CONCENTRATION PROGRAMS

The concentration program for the Alaska salmon fishery, which was inaugurated in 1943 and repeated at the request of the industry in 1944, was made necessary by the unusual situation in which the industry found itself at the close of the 1942 season. The loss of its floating equipment has already been described. In addition, it was expected that no more than 50 or 60 percent of the normal supply of labor would be available in 1943. Shipping facilities for transporting labor and canning equipment to Alaska for the comparatively brief fishing season were at a minimum.

To make the best possible use of available supplies and labor, the Secretary of the Interior issued an order concentrating the canning of salmon in 77 of the largest and most modern plants rather than in the 120 previously used. The concentration program was designed to make possible a reduction in manpower requirements by 5,030 persons, in north-bound passenger accommodations by 3,933 persons, in north-bound tonnage by 17,724 tons, in floating equipment by 86 tenders and 50 scows, and in fishing apparatus by 48 traps, 25 purse seiners, and 67,130 fathoms of gill nets. So effectively did the program operate in 1943 that 5,396,509 cases of salmon were packed during the season, an increase of 307,400 cases over the previous season.

With labor and transportation difficulties somewhat eased in advance of the 1944 season, it was possible to make certain relaxations in the program for this year, although it continues the essential features of the original concentration order. Continuation of the concentration plan after 1944 will be dependent on conditions and on the sentiment of the industry.

The success of the Alaska salmon concentration program in 1943 so impressed the salmon industry generally that the operators of the 11 canneries in the Puget Sound area petitioned the Coordinator of Fisheries to establish a similar program for that branch of the industry. Accordingly, a program was outlined in consultation with representatives of the industry. Under this program, 9 firms are operating jointly in the largest and most efficient cannery of the area, 2 plants are operating independently, and a smaller cannery has been designated a standby plant for use in case of emergency. The plan represents a saving of 525 cannery workers and 27 tenders and fishing

boats, which are thus released for use in other fisheries, and a considerable saving in fuel oil and critical repair and other maintenance material. A concentration program is particularly desirable in Puget Sound during the 1944 season, which is one of the "off years" in which relatively small runs of salmon are to be expected. In 1945, however, heavier runs should occur, and the desirability of modifying or abandoning the program will be given due consideration before the season opens.

PILCHARD PRODUCTION PLAN

Because of the heavy volume of its normal production, and also because of the great importance of its products to the war program, the effective operation of the Pacific pilchard fishery is a matter of national importance. Landings of pilchards normally amount to about one billion pounds annually, or a fourth of all the products of the fisheries of the United States and Alaska. Out of this catch, three to five million cases of canned pilchards or California sardines are packed, and over 14 million gallons of oil and 75,000 tons of meal are processed. Since 1941, the Government has requisitioned over half the canned pack each year for military and lend-lease requirements.

In an effort to secure maximum production and effective utilization of the catch, some degree of control over the pilchard fishery was instituted by the War Production Board in 1942. This control was not effective in accomplishing the desired results, however, and after the delegation of authority in this field to the Office of the Coordinator of Fisheries, the industry requested the issuance of new Government controls which would meet the requirements of the situation. In the early months of 1943 conferences were held with industry consultants, and mass meetings of fishermen, boat owners, and cannery and reduction plant operators were held in several cities in California. A plan was evolved which met the approval of the industry and was accordingly adopted. It provided for distributing the fishing activity and catch on the basis of (1) the Government requirements for canned sardines and sardine meal and oil; (2) the necessity of maintaining an even flow of raw material into the various ports and plants to insure that the equipment and manpower would be available at all times for processing the catch; and (3) the condition of fishing in the waters adjacent to each port.

In general, the Coordinated Pilchard Production Plan was well received and generally successful during the operating season of 1943-44. Aside from minor administrative difficulties, the chief difficulty was to maintain a fleet of sufficient size to supply canneries and reduction plants in the San Francisco area. This condition was aggravated by poor runs of fish and interruptions of fishing by unfavor-

able weather. The season's production in California as a whole was 473,450 tons, a decline of 9 percent from the previous 5-year average. Owing primarily to the shortage of cannery labor, the production of canned sardines declined materially, being 11 percent less than the 5-year average. However, a thorough analysis of the situation indicates that the pack would have suffered a further decline had no production program been in operation.

The industry was consulted at the close of the season as to the desirability of continuing the production program. The consensus favored a repetition of the program with minor improvements and provision for stricter enforcement during the 1944-45 season.

FISHERIES IN SOUND CONDITION FOR POST-WAR DEVELOPMENT

In spite of the heavy demand for the products of the fisheries and the difficulties under which the industry has operated, the fundamental condition of the resource is sound. As a result of the temporary reduction in the size of the fishing fleet, the intensity of fishing has declined in many areas and, as a result, signs of a relative increase in the abundance of many important commercial species have been noted. In carrying out the war program for increased production, the responsibility of preserving the Nation's basic fishery resources for future use has not been forgotten. Conservation regulations have been amended in only a few instances, when mature consideration indicated that such action would not endanger the stability of the resource. The wisdom of this policy is now apparent.

The Office of the Coordinator of Fisheries is a war-time agency, and as such has no permanent existence and no post-war program. Plans for the future development and expansion of the fisheries belong, rather, to the Fish and Wildlife Service and the individual States. The Coordinator's Office derives satisfaction, however, from its conviction that when its task is completed and the present controls over the fisheries are relinquished, the living resources on which they depend will be found in sound condition, unimpaired by the strains and demands of war.

National Park Service

NEWTON B. DRURY, Director



AS THE Nation approaches the decisive phases of total war, it is gratifying to report that the national parks as an institution have thus far stood intact. There is now reason to believe that they will emerge with their essential qualities and the pattern of their management relatively unimpaired, for even under the stress of national emergency general recognition has been given to the importance of protecting, in war as in peace, those portions of the Federal Estate which, because of significant features of beauty and interest, have been set aside to be held unchanged as part of the American heritage.

Recent annual reports have outlined the challenge that faced the Service in meeting the emergencies and making the contributions involved in World War II, at the same time giving protection to scenic, scientific, and historic aspects of the National Park System. Those reports explained the course pursued by the National Park Service, with the firm support of the Secretary of the Interior, in cooperating with war agencies without departing from the obligation of its stewardship.

After some 3 years of participation in the war program, involving more than 1,000 authorizations for uses of park lands and facilities, an appraisal of the status of the parks produces some interesting and reassuring facts. Although it is still too early to report definitely upon the effects of all park uses by military and other war agencies, a recent survey indicates that, although such uses have been much more numerous than expected, relatively little permanent impairment of park features has resulted, largely because of the cooperative, open-minded approach of the war agencies to each problem.

THREATS TO PARK CONSERVATION AVERTED

It has been fortunate that no desperate situation demanding destruction of major park features has arisen; and developments of the past year proved the wisdom of not yielding to pressure without

a reasonable showing of critical necessity. Park timber, urgently demanded on the ground of war needs, upon investigation was found not to be essential to victory, as alternatives proved to be available; invasion of California parks by cattle and sheep proved not to be essential to the public welfare and was found to be of negligible importance to the meat industry; an initial venture in removing strategic mineral ore from a national park was abandoned as uneconomical. Thus scenic, scientific, and cultural resources of the national parks, that would have been disastrously affected or even entirely destroyed had free rein been given to all agencies and industries demanding their use in the name of winning the war, are still held as a part of the Nation's treasure.

Sitka spruce.—Pressure for the logging of Sitka spruce in Olympic National Park was intensified at the beginning of the year. Anticipation of a shortage of this species for aircraft lumber to meet war needs in the spring and early summer had led to a request from the War Production Board for the release of the park spruce.

Although some of the lumber manufacturers were insistent, the Secretary of the Interior refused to act without satisfactory proof that the necessary aircraft spruce could not be obtained from other sources. While negotiations between the Department and the War Production Board were pending, the situation changed by reason of the Alaska Spruce Log Program of the United States Forest Service, greatly increased spruce production in British Columbia, increased production of aluminum available for plane manufacture, and the Army's cancelation of orders for certain types of wooden planes. The War Production Board thereupon withdrew its request.

Thus the threat of invasion of Olympic National Park by logging was safely outridden. Nevertheless, constant vigilance is necessary, since in some measure the drive was directed to the use of park forests to sustain private industries after the war.

Spruce and hemlock in Great Smokies.—War needs for wood pulp of the long-fibered type early in the spring of 1944 loomed as a threat to the remnant of virgin red spruce and hemlock in Great Smoky Mountains National Park.

Availability of these species in the park was investigated by representatives of the Paper Division of the War Production Board, the School of Forestry of North Carolina State College, and a local lumber company having nearby an idle pulp mill equipped to process these woods.

Fortunately, it was ascertained that numerous other species are available for the manufacture of long-fibered paper products and that many other mills are manufacturing long-fibered pulp.

Strategic minerals.—The apparent necessity of relieving the critical shortage of strategic minerals resulted in an exception to national park

policy in 1943. Mining of a deposit of tungsten in Yosemite National Park by the Metals Reserve Co., a Federal agency, was permitted upon recommendations of the Geological Survey, Bureau of Mines, and War Production Board. The company ceased operations in the fall of 1943, with approximately 55 tons of hard-sorted ore obtained, and permit therefor was revoked by the Secretary of the Interior as of December 27, 1943.

The Defense Plant Corporation, whose permit to extract salt from Death Valley National Monument as an emergency measure in connection with nearby magnesium production expired December 31, 1942, completed restoration work in the Badwater salt area of the monument in December 1943.

Grazing.—Remembering the experiences of World War I, when grazing was permitted as an emergency measure, the National Park Service during the present struggle definitely excluded livestock from the wilderness national parks. Its studies had revealed that the carrying capacity of all the national parks in the one State of California, where grazing was demanded by the cattlemen, would not exceed 6,000 cattle—less than one-half of 1 percent of that State's approximately 1,400,000 beef cattle—and that this slight contribution to the meat supply would entail heavy damage to park features.

Drought conditions in the spring of 1944 caused livestock growers in the interior valleys to renew efforts to secure grazing privileges in the Sierra Nevada national parks. With greater than normal cattle inventories, range conditions were about 50 percent of normal in early April and dry feeds were exceedingly short. Therefore, after conferences with representatives of livestock associations, war food administrators, and others, the Service recommended to the Secretary that he consider limited grazing in some national park areas in California as a wartime emergency if it were shown that such steps were necessary to save purebred breeding stock from starvation. The Secretary agreed to consider each case on its merits.

To investigate the need of such action, a grazing committee was established, including representatives of the Sierra Club, California Conservation Council, Western Federation of Outdoor Clubs, and United States Forest Service. After a thorough study of the situation, and after consultation with Government agencies charged with control of the wartime food supply, this committee reached the unanimous conclusion that to June 30 opening of national park lands to grazing was "not justified by manifest war necessity—nor is the purebred breeding stock of the herds for which applications have been submitted likely to be lost if park range is not made available." Expressing sympathy and understanding of the situation in which the applicants found themselves through their efforts to produce more meat, the committee nevertheless stated that it "would feel itself

hard-pressed to recommend to the Secretary that a natural resource within a park, such as its grasslands, should be utilized for what amounts to the economical stabilizing of a private operation on the outside."

In closing its report, the grazing committee stated that "if and as applications are submitted which fall clearly within the spirit of the Secretary's intent, the committee will recommend their approval."

Meanwhile, a bill (H. R. 5058) has been introduced in Congress by Representative Clair Engle to open all national parks and national monuments to livestock grazing for the duration of the war and six months thereafter.

HISTORIC OBJECTS THREATENED

Necessity for the salvaging of metals led to the suggestion that the historic cannon, monuments, and markers in the national military parks be melted down as an aid to the scrap drive. This was a real threat for a time, but was fortunately averted. The Service gathered in its areas over 8,500,000 pounds of scrap metal, but as to trophy ordnance and memorials raised with the War Production Board the question whether rare and irreplaceable historic relics should be scrapped until the national stockpile of useless and nonhistoric and nonartistic metal objects had been utterly exhausted. The point was made that each war memorial represents the last possible debt payment of the Nation to some soldier or group of soldiers in our national past, and that it would be of little comfort to the soldiers of the present day if such evidences of the Nation's gratitude should come to be lightly regarded.

In this connection, at least one patriotically intended, but impulsive and irrevocable act of salvage serves to give point to the position taken by the Service. The U. S. S. *Oregon*, famous for its spectacularly long and speedy run to participate in the American naval victory at Santiago Harbor in 1898, was withdrawn from active service in 1925 and maintained as a historic shrine by the State of Oregon. In 1942 this battleship was dismantled for scrap metal. Representative Homer D. Angell now doubts that an appreciable amount of salvage from the *Oregon* went into the war effort and has asked for an official investigation. In any case, that which to many citizens was a precious symbol of our freedom has now become a wistful memory, and the question "Was it really necessary?" is a question asked too late.

NATIONAL PARK SERVICE LAND POLICIES CHALLENGED

Partly due to war pressures, and partly because of growing conflicts between utilitarian and conservation concepts, there arose during the past year definite challenges to the land-acquisition policies of the

National Park Service, accompanied by widespread misconception of the Service's functions and purposes. This was the case in the controversy over Jackson Hole National Monument. It was also brought out in the Partial Report of the Senate Committee on Public Lands and Surveys Pursuant to Senate Resolution 241, Seventy-sixth Congress, which contained this statement:

There are certain Government agencies that habitually and regularly include in their withdrawals far larger areas than could possibly be justified after a careful examination of the actual and proper needs. Probably the most flagrant example of this constant overreaching is to be found in the actions of the National Park Service in the setting up of national parks and monuments. There is, apparently, no limit to the demands of that agency for additional areas to administer.

It is sincerely believed that this is a misconception of the attitude of the National Park Service.

Hearings were held during the year by a subcommittee of the Senate Committee on Public Lands and Surveys in various western towns. Administrative officials of the Service were asked to attend these hearings and endeavored to answer this charge. At the hearing in Fredonia, Ariz., the Director said in part:

We are confining our attention to the areas of national caliber which are outstanding in natural beauty, wildlife values, historical and scenic interest, and we can, I agree with you, readily imperil the high standards which we have tried to maintain for the national-park system, if we take in too much territory.

Now the question as to how much land it is reasonable to include in national parks and monuments, is, of course, debatable. The fact is that, of the total land area of the United States, only about three-quarters of 1 percent, at the present time, is included in all the different types of areas administered by the National Park Service. In general, our approach is not to add to this number of areas or acreage, except where there are outstanding examples of scenery and other values such as we are supposed to preserve in parks and monuments, examples that are distinctly of interest to the Nation as a whole * * * That, too, I think we have to do without injustice either to individuals concerned or the communities where these areas are located.

While at these hearings the National Park Service took exception to the charge of "land-grabbing," it has welcomed the opportunity to explain its land policies to members of Congress, to conservationists, to those who wish to use park lands for private commercial gain, and to the public generally, which stands to gain or lose most by any change in park conservation principles and practices since the national park areas are established "for the benefit and enjoyment of the people."

It is believed that an impartial review of the history of the National Park System will verify the statement that the long-range policy guiding its growth has been one of restricting the system to areas superlative in their own fields of scenery, natural science, or history. Em-

phasis has been placed upon quality rather than quantity, and upon the national rather than the local significance of the areas acquired.

The Service would welcome an impartial reevaluation of the units of the National Park System in the light of the highest public use of the lands involved, from the standpoint of national interest.

Establishment of national parks by act of Congress began in 1872 with Yellowstone National Park. Up to 1916, when Congress created the National Park Service, 16 national parks, the Hot Springs Reservation, and 56 national monuments and related reservations had been established. Unquestionably, before 1916 a few areas had crept into the National Park System which did not measure up to national park standards. No Federal agency existed to investigate the national importance of their scenic, scientific, or historic characteristics. The Service believes that had it been in existence at the turn of the century, its stand against inclusion in the system of these substandard areas would have been heeded by Congress.

Since its organization the Service has hoped and planned to relinquish jurisdiction over some such properties. Unfortunately, in most cases this has been impossible. No units of the National Park System, whether established by act of Congress or by Presidential proclamation, may be abolished without authority of Congress. Paradoxical as it may seem in the face of the present Jackson Hole controversy, it is far easier to establish a new area with the approval of Congress than to abolish an existing one. Once a park or monument is established and accepted by the local people, its abolition usually is considered an affront to local pride.

Similarly, when the consolidation of national parks and allied areas under the National Park Service took place in 1933 by Executive order, certain areas were inherited which were not characteristic of the National Park System. Efforts to remove them from the national category and give them State or local park status have in general been met by united local opposition supported by Congressional delegations from the States concerned.

National cemeteries.—Among the areas transferred to National Park Service jurisdiction in 1933 were several national cemeteries within or near national military parks. Recently, the demand for burial space in these cemeteries has increased, giving rise to the question as to whether cemeteries in this group shall be enlarged. The National Park Service has taken the position that existing national cemeteries under its jurisdiction shall not be extended, since any such increase would encroach upon the historic area of the national military park with which the cemetery is associated. Moreover, op-

eration of such enlarged cemeteries would not be a proper function of the Service.

It has been determined that the Chattanooga National Cemetery, Tenn., one of those transferred to the National Park System in 1933, is not located on historic ground and is not adjacent to Chickamauga and Chattanooga National Military Park. It has nearly 14,000 unoccupied grave sites. With the concurrence of the Secretary of War, and approval by the Bureau of the Budget, a draft bill to transfer jurisdiction over this cemetery to the War Department has been prepared for presentation to the Congress. This is typical of the endeavor of the Service to concentrate its activities in the fields primarily covered by the basic act establishing it.

Rejections of park proposals.—From 1933 to 1940 the Service investigated 353 areas proposed for national park, monument, or related purposes. Most of the proposals were disapproved on the ground that the areas under consideration were not of national park caliber. During the same period, 420 additional park proposals were made, but were not investigated or otherwise acted upon, largely because of lack of funds and personnel. Among the areas proposed for national park status which have been adversely reported upon were the scenic and well known Pikes Peak and Mount Baker.

As to the charge that "habitually and regularly" certain Governmental agencies "include in their withdrawals far larger areas than could possibly be justified after a careful examination of the actual and proper needs," the record shows that in wilderness national parks the National Park Service in general has erred in taking too little land, resulting in inadequate range for native wildlife and creating administrative difficulties; and Congress has frequently rectified such park boundaries.

Recreational demonstration areas.—In line with Congressional authority requested by the Department, upon advice of the National Park Service, and granted in 1942, more than half of the 46 "recreational demonstration areas" have been relinquished. Fifteen and part of another have been transferred to the respective States, and 2 others have been approved by the President for such transfer. Nine, and part of 1 other, have been added to the National Park System, primarily to existing park areas. One has been transferred to the Bureau of Reclamation. It is expected that 13 additional demonstration areas will be transferred to their respective States or political subdivisions thereof when these are in a position to administer them. Five are being retained in their present status awaiting determination as to their best disposition.

The status of all 46 recreational demonstration areas is shown below :

Recreational demonstration areas, June 30, 1944

Area	State	Acreage	Disposition	Visitors
Acadia	Maine	5, 654	Added to Acadia National Park, June 6, 1942.	(1)
Alexander H. Stephens	Georgia	940		7, 300
Badlands	South Dakota	43, 414	Added to Badlands National Monument by act of June 26, 1936.	(1)
Beach Pond	Rhode Island	3, 484	Transferred to State, June 28, 1943	
Bear Brook	New Hampshire	6, 436	Transferred to State, May 12, 1943	
Blue Knob	Pennsylvania	5, 136		7, 143
Blue Ridge	North Carolina	10, 624	Added to Blue Ridge Parkway, June 30, 1936.	(1)
	Virginia			
Bull Run	do	1, 605	Designated as Manassas National Battlefield Park, June 10, 1939.	(1)
Camden Hills	Maine	4, 962		5, 495
Catoctin	Maryland	9, 919		
Cheraw	South Carolina	6, 825	6,619 acres transferred to State, June 9, 1944. 206 acres transferred to Fish and Wildlife Service, May 10, 1944.	
Chopawamsic	Virginia	15, 984	Added to National Capital Park System, Aug. 13, 1940.	
Crabtree Creek	North Carolina	4, 983	Transferred to State, April 6, 1943	
Cuivre River	Missouri	5, 759		16, 006
Custer	South Dakota	20, 405		
Fall Creek Falls	Tennessee	15, 777	Transfer to State approved by President, awaiting acceptance.	1, 547
French Creek	Pennsylvania	6, 198	214 acres established as Hopewell Village National Historic Site, August 3, 1938. Remaining 5,984 acres added to Site, June 6, 1942.	(1)
Hard Labor Creek	Georgia	5, 804		21, 346
Hickory Run	Pennsylvania	13, 386		9, 005
Kings Mountain	South Carolina	10, 147	3,972 acres added to Kings Mountain National Military Park, July 11, 1940. Remaining 6,175 acres transferred to the State, May 30, 1944.	(1)
Lake Guernsey	Wyoming	1, 753	Transferred to Bureau of Reclamation, June 8, 1943.	
Lake Murray	Oklahoma	2, 228	Transferred to State, February 20, 1943.	
Lake of the Ozarks	Missouri	16, 196		10, 522
Laurel Hill	Pennsylvania	4, 026		11, 331
Mendocino Woodlands	California	5, 425		2, 867
Montgomery Bell	Tennessee	3, 746	Transferred to State, June 9, 1943	
Montserrat	Missouri	3, 441		24, 708
Oak Mountain	Alabama	7, 805	Transferred to State, Apr. 30, 1943	
Otter Creek	Kentucky	2, 445		4, 726
Pere Marquette	Illinois	2, 522	Transferred to State, May 7, 1943	
Pine Mountain	Georgia	3, 032		3, 413
Raccoon Creek	Pennsylvania	5, 035		10, 590
Roosevelt	North Dakota	66, 376		12, 450
St. Croix	Minnesota	18, 499	Transferred to State, Sept. 27, 1943	
Shelby Forest	Tennessee	12, 258	Transfer to State approved by President, awaiting acceptance.	32, 950
Shenandoah	Virginia	10, 129	Added to Shenandoah National Park, June 6, 1942.	(1)
Silver Creek	Oregon	4, 093		3, 901
Swift Creek	Virginia	7, 605		67, 843
Versailles	Indiana	5, 371	Transferred to State, Apr. 20, 1943	
Waysides (6 units)	South Carolina	228	Transferred to State, June 9, 1944	
Do	Virginia	206	Transferred to State, Mar. 26, 1943	
Waterloo	Michigan	11, 830	Transferred to State, June 15, 1943	
Winamac	Indiana	6, 233	Transferred to State, Apr. 20, 1943	
White Sands	New Mexico	1, 719	Added to White Sands National Monument, June 6, 1942.	(1)
Yankee Springs	Michigan	4, 197	Transferred to State, June 15, 1943	

¹ Visitors counted in park or monument totals.

Jackson Hole National Monument.—Still pending at the close of the year were the Barrett bill (H. R. 2241) to abolish the Jackson Hole National Monument and the suit of the *State of Wyoming v. Paul R. Franke* (Superintendent of Grand Teton National Park and of Jackson Hole National Monument), the latter to test the legality of the

establishment of the monument by the President on March 15, 1943, under authority of the Antiquities Act of 1906.

Following the hearings on the Barrett bill held in Washington in late May and early June 1943, further hearings were held in the Jackson Hole area the following August. Involved in these hearings were many issues which brought to a focus most of the basic problems of the National Park Service.

Of the area Frederic L. Paxton, distinguished historian of the West who was awarded the Pulitzer Prize for his *History of the American Frontier*, said: "Jackson Hole at the base of the Grand Tetons is not only a great scenic treasure but also an important early center of mountain fur trade and exploration of the far West. It should be preserved as a national monument." Similar opinions by authorities on geology and wildlife support the preservation of the Jackson Hole according to the National Park Service pattern.

That many of the local people are of the same opinion was evidenced by petitions received by the House Committee on Public Lands too late for inclusion in the printed hearings of the committee on the Barrett bill, but published in the *Congressional Record* of June 7, 1944. Approximately 100 "long-time residents of Jackson Hole, Wyo., * * * actively engaged in business here," expressed the belief that "Jackson Hole is one of the finest outdoor recreational areas in the world and * * * it should be protected and developed as such," and that "it is our final conclusion that it is time for us to work constructively together and to put an end to quarreling, and we urge upon our congressional delegation that they transfer their efforts from the present Barrett bill to efforts for constructive legislation that will supplement the monument proclamation, by giving permanence and certainty to the foregoing rights [valid existing claims already recognized by the Department] which, although now guaranteed by the statements of officials of the Interior Department, should be placed beyond any possibility of doubt by legislative action." Another petition, signed by eight prominent businessmen representing commercial interests in the Jackson Hole valued at more than half a million dollars, urged the Committee "not to undo the Jackson Hole National Monument, but, if it needs bettering in any way, that you strengthen and perfect it by legislation."

During the 1944 fiscal year the National Park Service gave the monument such protection against fires and vandalism as could be provided under the limitations of the 1944 Interior Department Appropriation Act, which provided that the Service might undertake only those administrative functions that were in operation on the lands prior to monument establishment. The 1945 Appropriation Act contains the same restriction.

In March 1944 the Public Lands Committee of the House of Representatives made a favorable report on the Barrett Bill to abolish the monument, and in May the Rules Committee of the House took action providing for a vote. The bill, however, to June 30 had not been called up.

Meanwhile, the trial of the *State of Wyoming v. Paul R. Franke* was held on August 21 at Sheridan, Wyo.¹

TRAVEL CONTINUES DESPITE WAR

Despite recurring rumors to the contrary, the national parks of the United States have not been "closed." They have remained open to travel, but on a limited-service basis. The Office of Defense Transportation necessarily tightened restrictions on pleasure-travel, and the National Park Service adhered strictly to the policy enunciated by the Secretary of the Interior of not encouraging visitors to the national parks.

The travel figures are interesting more for the trends indicated than for the totals. Due to the continued trend of diminishing travel, especially through July, August, and September, 1943 (the first months of the 1944 fiscal year), the total number of visitors for the fiscal year decreased to 7,455,271 from the 1943 fiscal year total of 8,193,090, a decline of 737,819 or 9 percent. The downward trend, gradually leveling off during the next 2 months, reached bottom about December 1, 1943, and has since reversed its direction to consistent and accelerating increases. The total of 3,818,766 visitors recorded during that portion of the 1944 fiscal year from December 1, 1943, to June 30, 1944, was an increase of 615,446, or 19.2 percent over the 3,203,320 recorded during the corresponding period of the 1943 fiscal year. An increase of 49 percent was recorded in June 1944 over June 1943.

On the basis of current travel trends, it is estimated that the total number of visitors for the 1944 travel year (October 1943 through September 1944) will equal 40 percent of the peak travel year of 1941 when there were 21,050,426 visitors.

The 2,149,398 military visitors during the 1944 fiscal year made up 29 percent of the total. In all, 4,135,052 men and women in uniform have visited the national parks and allied areas since Pearl Harbor.

Facilities available to visitors.—Park concessioners, as required under their contracts, provided limited service, such as stores, meals, and overnight accommodations, in those areas where the extent of wartime travel indicated a distinct need therefor. In the face of difficult operating conditions, this service to the public was well handled. All Office of Price Administration rules and regulations

¹The case was taken under advisement and a decision is expected sometime after January 1, 1945.

with respect to meals and housing rate ceilings and the rationing of food and gasoline were strictly applied. No sightseeing trips were operated, practically all hotels were closed, and accommodations were the simplest compatible with the responsibility of providing for the public comfort.

CONCESSION POLICIES

The Department policy that concession facilities wherever possible should be installed and owned by the Government was further crystallized. This policy relates to ownership of the improvements and physical plant by the Government, and is quite distinct from the question of operation. Post-war construction programs were broadened to include plans and estimates for new Government-owned concession facilities in many areas. Concession facilities in 38 areas under National Park Service administration now are owned in whole or in part by the Federal Government.

National Park Concessions, Inc., the nonprofit distributing private corporation organized in 1941 to handle concession operations in facilities acquired through donation in Mammoth Cave National Park, extended its operations to include the concessions at Isle Royale National Park, Rosemary Inn in Olympic National Park, and Vanderbilt Inn in the Vanderbilt Mansion National Historic Site. It also acted in a managerial capacity at Lassen Volcanic National Park for the park concessioner. Its operations on the Blue Ridge Parkway were in abeyance during the year. The Secretary of the Interior designated National Park Concessions, Inc., to operate facilities in Big Bend National Park.

LOOKING INTO THE POST-WAR FUTURE

Past experience and present indications point to a speedy resumption in the early post-war period of the upsurge in national park travel that was interrupted when hostilities began late in 1941. Inherent in this anticipated increase will be diverse problems of protection, development, and use, requiring much thought and planning.

Typical of the most serious pending use-problems are: Control of concentration of visitors, fundamental to the protection of perishable features of certain western parks; possible future removal of concession facilities from areas of the greatest natural beauty; campground and forest encroachment conditions in Yosemite National Park; operation of Crater Lake National Park on a summer basis, avoiding costly snow-removal activities; and possible removal of Mount Rainier National Park headquarters to a more suitable site. Implicit in each of these situations, and many others of like nature, is the responsibility of the National Park Service, under mandate of Congress, to protect the natural features of the parks, while contributing to public enjoyment.

In the older national parks the original lay-out of visitor facilities, under then-prevailing slow modes of travel, was based on the need for overnight accommodations within the parks and near points of major interest. In general, this condition no longer prevails. The question, therefore, arises: Should future planning envision only such facilities as are necessary for daytime use, depending upon nearby communities to furnish sleeping accommodations as in the case of the Great Smoky Mountains National Park? Needless to say, there will always be certain areas where it would not be practicable to follow this procedure. But a trend away from developments of the resort type within the parks will serve the objective of holding the perishable features of many areas unimpaired.

Post-war construction.—The National Park Service is not primarily a construction agency, but it stands ready, as part of its continuing program of providing facilities, to take a small, but nonetheless substantial, part in any national post-war public works program. When the Nation went on a war basis, the construction of all physical developments in national park areas was terminated, and there is now a backlog of urgently needed construction.

Studies have been made of the Master Plans, upon which all development is based, to ascertain the maximum amount of construction that could be promptly undertaken in connection with post-war public works financing. A suggested program of planning was prepared involving the expenditure, over a 3-year period, of \$4,758,135 on investigations, surveys, and the preparation of detailed plans, specifications, and estimates. This is essential, as it takes much time and thought to program construction in such manner as to retain the natural beauty of the native landscape. Based on such studies, the Service could have ready for initiation within a reasonable time a construction program involving about \$78,000,000 for parkways, major and minor roads, trails, and physical improvements. Experience indicates that the desirable pace for such construction would be at the rate of about \$22,500,000 per year. More than this might result in hurried and ill-advised construction.

During the 10 years of work relief programs most of the work in National Park Service areas that could be done by unskilled labor and with restricted amounts of equipment and materials was accomplished. The bulk of needed future work could best be done under contract with responsible contractors possessing good equipment and experienced foremen and crews.

Studies as basis of park policy.—Post-war planning should include research projects and interpretive undertakings of prime importance in preserving basic park values. Studies of this nature are essential to intelligent administration and vital to the protection of historic and scientific resources. One such problem is to determine the extent

of permanent impairment that may result from development of tourist facilities and heavy use of park areas. There are kindred problems in forestry, wildlife, history, and other fields, regarding which investigations as to basic facts must precede the formulation of policies or the taking of action.

Airplanes.—Recognizing the tremendous impetus given to air travel by war-caused developments in aviation, the Service is looking ahead to its possible effect upon the national parks and has discussed the problem with representatives of the Civil Aeronautics Authority. Commercial and private aircraft will increasingly become a popular mode of transportation to the national parks, and will have to be reckoned with. It is felt, however, as in the case of rail and bus terminals, that airplane landing fields should be located outside park boundaries.

There will be a period of experimentation in this new and highly important field of air travel, and this phase of trial and error should not be allowed to impair the national parks. Experiments with air-transport, helicopter, or private plane should be carried on in other areas. When aircraft construction and use are stabilized, or when conditions change materially, this policy will be reviewed. Meanwhile, it is obvious that the construction of landing fields and auxiliary buildings would intrude upon park scenery; and that the noise and confusion of airplanes would disturb the native wildlife and would tend to destroy the character of these great areas as nature sanctuaries, especially affecting their atmosphere of serenity and peace, wherein lies their value for inspiration, recreation, and relaxation.

COOPERATIVE PLANNING STUDIES

By maintaining a review of the water control plans of various Federal and State agencies, the Service has been able to observe the trends in national water policy and water use developments, and their bearing upon the National Park System or on other park and recreational interests.

Potomac River recreational survey.—At the request of the War Department, the National Park Service made a study of the scenic, recreational, and historic features of that portion of the Potomac drainage basin upstream from Great Falls to the headwaters of the river, and the effect thereon of the proposals for a series of multiple use reservoirs. In putting its investigative facilities at the disposal of the United States Army Engineers the National Park Service in no way supported any plan to dam the Potomac River, which admittedly would adversely affect the environs of the National Capital.

Denison Dam and Reservoir recreational planning project.—This survey was completed and a report was prepared, including plans and recommendations. It recommends acquisition of 9,630 acres of

additional lands to permit establishment of two major recreational developments—one each in Texas and Oklahoma—and six minor developments. The estimated cost for acquisition and development is \$6,000,000.

Other recreational studies.—Recreational planning studies were continued, in cooperation with the Bureau of Reclamation, on the Grand Coulee Dam and Reservoir on the Columbia River, Wash., the Central Valley Reclamation Project in California, covering the Sacramento and San Joaquin watersheds; the Colorado River basin; and the Missouri River basin. There were further studies and research on the suggested Mississippi River parkway, of interest among Mississippi River States.

Alaska Highway study.—Field studies were made during the 1943 summer, of scenic, scientific, historical, and recreational features, and possible roadside developments, along that portion of the Alaska Highway located in the Territory of Alaska, as authorized by the President on January 8, 1943. Further studies are now in progress.

STATE RELATIONS

The Service has continued, but in a more limited way, to assist the States in their park planning and administrative problems. The principal assistance rendered has been the serving as an informal liaison between State park officials and war agencies in connection with the utilization of State parks and recreational areas for purposes relating to the prosecution of the war.

WILDLIFE OVER-POPULATION PROBLEMS

In war or peace, certain problems of protection and administration confront the National Park Service, notably in the fields of wildlife and forestry.

The basic wildlife policy has been one of permitting each species to carry on its struggle for existence without artificial aid, in the belief that this is for the ultimate good of the species, and conforms to the purpose of the parks. If conditions become such that a particular type will perish if not given especial protection, temporary resort may be made to control of natural enemies, artificial feeding, or such other measures as are necessary; directing the entire effort, however, toward placing the species as soon as possible upon a self-sustaining basis. During the past two decades over-population by grazing and browsing species in relation to the available winter range has increased, partly because of earlier artificial protective methods and partly because of growing restriction of once natural range outside these reservations. During the past year definite steps were taken to correct several of the most critical situations.

Yellowstone buffalo management.—This problem has been especially serious in Yellowstone National Park because of the complex pattern presented by the varied herbivorous forms that inhabit the area—deer, antelope, elk, moose, mountain sheep, and buffalo—and the limited winter range available. In considering the buffalo situation three salient points were taken into consideration: (1) The buffalo no longer faces extermination; numbers and distribution in the United States attest to its security as a species. (2) Continuance of the buffalo herd in Yellowstone is considered desirable and justifiable because the animals occurred there naturally, as evidenced by ancient skeletal finds. (3) Reduction of the herd is deemed imperative that Yellowstone National Park may be maintained as a natural area, and not as a zoological park or game farm. Present policy proceeds on the theory that ranch activity is no longer necessary, either for survival of the bison as a species or for the continuance of a normal number of buffaloes in the park.

To restore the buffalo to its normal place in the park fauna and to rehabilitate the range vitally needed by other wildlife species, the Lamar buffalo herd was reduced by 400 animals during the winter.

The ultimate plan for the Yellowstone buffalo herd contemplates a tapering off of feeding and placing the animals entirely upon their own resources. Hay will be kept on hand for several years to insure against potential adverse effects of unusual weather conditions before the herd reestablishes its natural feeding habits; and intensive studies will be made of its behavior under the new program. Future action will be based upon experience and investigation, but always with the ideal of maintaining the buffalo, like other species, as a wild animal in a natural environment, and not as the basis of an "animal show."

Yellowstone elk.—Because of the mild winter, most of the northern elk herd stayed in the park and the comparatively modest reduction planned through hunting north of the park could not be effected. The season closed on March 1, 1944, with a total estimated kill of 125 elk.

Zion Park deer.—Studies during the past decade revealed that mule deer in Zion National Park had increased far beyond food supply limits. Hunting outside the park boundary proved utterly ineffective in reducing the population or even in keeping it in bounds. Zion Canyon offers a sheltered wintering ground and freedom from predators, with the result that the range has been badly depleted. A few more years would have seen almost total destruction of food plants, as well as fatal deterioration of the deer. In cooperation with the Utah State Game Department, therefore, 300 deer were removed. The animals were killed by park rangers and turned over to the State game authorities.

Rocky Mountain Park elk and deer.—The east central region of Rocky Mountain National Park has been subjected to heavy overuse by elk and deer for at least 15 years. Original tendencies of the animals to migrate to lower elevations outside of the park have been inhibited by human developments blocking the original migration route. These ancestral winter ranges of the elk and deer, furthermore, have been devoted to close grazing by domestic stock. To meet this situation, plans were made in cooperation with the Colorado game authorities to reduce the herds by approximately one-third, or 200 deer and 300 elk. It was impracticable to carry out the program during the winter of 1943-44 (only 14 deer and 12 elk were eliminated) and it is planned to complete the program next winter.

WILDLIFE INVESTIGATIONS

In order to conserve, protect, and manage the important wildlife resources of the National Park System, insofar as diminished manpower and appropriations would permit, essential fact-finding programs were continued as to condition of, and changes in, important species. Assistance was furnished by the Fish and Wildlife Service for a faunal investigation on the western portion of Olympic National Park, and information supplied on the wildlife, particularly elk, in Jackson Hole National Monument. A life history study of the Yellowstone elk was resumed, to fill out many gaps in our knowledge of the famous northern herd, and to work out a successful management and range restoration program. A cooperative project is contemplated, with all Federal and State agencies concerned contributing information.

Yellowstone Park personnel initiated a life history study of the park buffalo. Studies were continued on the depleted winter range in the east central portion of Rocky Mountain National Park. The Zion National Park staff, assisted by an investigator of the Fish and Wildlife Service from the Utah Cooperative Wildlife Research Station, accumulated important data on the 300 deer that were eliminated from Zion Canyon in November and December 1943. Studies of the black bear in Yosemite Valley were made as a guide to management of that species. Bear feeding has been eliminated in all national parks. At Mesa Verde National Park, Colorado State officials continued investigations of forage on the mesa as a part of a regional program to determine carrying capacities for deer that range across national park, forest, and private lands without regard to boundaries. The Merriam turkey was restocked in Mesa Verde by the Colorado Game and Fish Commission. This species is known to have existed

there during the Indian era, but disappeared probably at the time of the great drought (A. D. 1276-99) that also forced aboriginal inhabitants to migrate.

PROTECTION OF PARK FORESTS

Protection of the remnants of the formerly widespread virgin forests of America now held as representative exhibits in the national parks continued to be a Service responsibility of first magnitude. The normal problems of protection from fire, insects, and disease and from preventable injury in areas of intensive use were further aggravated by the increasing shortage of experienced protection personnel, available fire fighters, and other workers.

During the 1943 calendar year 308 forest fires originated within or entered areas of the National Park System, a decrease of 23 percent from the previous 10-year average. A total of 10,444 acres was burned over, 70 percent of which involved a forest fire in Saguaro National Monument and a grass fire at Dinosaur National Monument.

The forest insect situation generally continued to be favorable, indicating the value of previous maintenance control measures. Three areas, however, reported threatening conditions. At Bryce Canyon National Park an epidemic of the Black Hills beetle required continued control. In Yosemite National Park, as a result of a fire in 1941, an epidemic of forest insects required control measures. A serious outbreak of the spruce budworm attacked spruce, Douglas-fir, and ponderosa pine in Rocky Mountain National Park. Experiments which indicate improved control methods are being undertaken with the cooperation of the Bureau of Entomology and Plant Quarantine.

The intensive white pine blister rust control program has resulted in initial control or reeradication work on 253,000 acres to date, leaving 190,000 acres within important pine areas of the national parks still unworked but needing attention. This threat to some of the finest forests in the parks is yearly becoming more imminent.

LAND STATUS

Since investigations have practically ceased for the duration, and acquisitions have been confined to acceptances of donations under authority of Congress or rectification of boundaries, land area changes were few during the past year. Especially noteworthy was establishment of the

NEW NATIONAL PARK AT BIG BEND, TEX.

This newest and twenty-seventh national park was established on June 12, 1944, in accordance with authority granted by Congress on June 20, 1935. Covering an area of 707,895 acres it is our sixth largest

national park. Its creation was made possible by the efforts and generosity of the State of Texas, which acquired and contributed all but 16,556.50 acres of the area to the Federal Government.

Big Bend National Park deserves the place it has been granted among the primary areas of the National Park System. It embraces a region of elusive lasting charm and arresting scenery. Perpendicular gorges cleft by the Rio Grande in the Santa Elena and Boquillas Canyons are a sharp contrast to the cool forested slopes and summits of the Chisos or "Ghost" Mountains that rise above the arid plain. Human history, rare wildlife species, mountain and desert plant life, and their combination in natural settings make it "a biological island in an expanse of desert." The paramount purpose of this national park must be the preservation of its vast wilderness as an inspiring "last frontier" on our southern border. The possibility of the establishment by Mexico of a similar park across the Rio Grande presents opportunity for a lasting memorial to international amity through linking the natural and human history of our two countries.

Developments for the benefit of visitors to the Big Bend will have to wait until the termination of the war. The necessary planning, however, is in progress.

HOME OF FRANKLIN D. ROOSEVELT NATIONAL HISTORIC SITE

By gift from President Roosevelt, title to his home at Hyde Park, N. Y., with approximately 33 acres of ground, passed to the United States on January 15, 1944, for preservation as a national historic site. Congress in 1939 authorized this step. The site adjoins the Library which the President gave to the Nation in 1939. Under the terms of the deed, actual administration of the national historic site for the benefit of the public shall begin when life interests held in the estate by the President, Mrs. Roosevelt, and the Roosevelt children shall have terminated. The property fronts on the historic New York and Albany Post Road. James Roosevelt, the President's father, acquired it in 1867, and the President was born there in 1882. The President's life has been intimately associated with this home, where since 1933 the heads of many foreign governments, including Prime Minister Churchill, have visited.

TOTAL ACREAGE ACCEPTED

The total acreage accepted by the Department of the Interior for park purposes during the year, both in established parks and approved projects, was 701,167.65 acres.

Lands acquired by the National Park Service July 1, 1943, to June 30, 1944

	Acquired by—	Funds expended		Acres	Total Federal lands in area (acres)
		Federal funds	Donated funds		
Acadia National Park, Maine.....	Donation.....			2,700.00	27,870.99
Antietam National Battlefield Site, Maryland.	Donation.....			128.59	183.32
Appomattox Court House National Historic Monument, Virginia.	Donation.....			.06	973.30
Big Bend National Park, Texas.....	Donation.....			691,338.95	691,338.95
Blue Ridge Parkway, Virginia.....	Transfer.....			105.80	38,910.00
Blue Ridge Parkway, North Carolina.	Donation.....			1,579.58	
Colonial National Historical Park, Virginia.	Purchase.....	\$14,000.00	\$31,001.00	214.83	7,057.78
Great Smoky Mountains National Park, Tennessee.	Purchase.....	36,739.77	850.00	2,278.05	461,786.82
Hickory Run Recreational Demonstration Area, Pennsylvania.	Purchase.....	3,700.00		479.44	13,386.44
Home of Franklin D. Roosevelt National Historic Site, New York.	Donation.....			33.23	33.23
Lassen Volcanic National Park, California.	Exchange.....			40.00	101,840.41
Lava Beds National Monument, California.	Donation.....			120.00	45,727.00
Mammoth Cave National Park, Kentucky.	{ Donation.....			772.31	51,244.51
	{ Purchase.....		9,441.25	291.02	
	{ Donation.....			.47	
Morristown National Historical Park, New Jersey.	Donation.....			432.62	13,648.87
Natchez Trace Parkway, Alabama.	{ Transfer.....			86.85	43,398.36
Olympic Coastal Parkway, Washington.	{ Purchase.....		2,440.00	237.15	
Saratoga National Historical Park Project, New York.	Purchase.....		16,900.00	328.70	1,864.60
Total.....		54,439.77	60,632.25	701,167.65	1,500,316.14
Lands in Federal ownership in other areas.					20,896,495.44
Total.....					22,396,811.58
Less land transferred to:					
Navy Department from Colonial National Historical Park.	Transfer.....			16.00	
State of Tennessee—Shelby Forest and Falls Creek Falls Recreational Demonstration Areas.	Transfer.....			28,174.00	
Fish and Wildlife Services—South Carolina—Cheraw Recreational Demonstration Area.	Transfer.....			206.10	
Eastern Band of Cherokee Indians, North Carolina—Great Smoky Mountains National Park.	Sale.....			905.27	
State of California—Lassen Volcanic National Park.	Exchange.....			6.25	
Less area transferred.....					29,307.62
Total Federally Owned Land.					22,367,503.96
Non-Federal land within authorized boundaries.....					895,651.46
Grand total.....					23,263,155.42

NON-FEDERAL HISTORIC SITE ESTABLISHED

St. Paul's Church, Eastchester, National Historic Site.—Historic St. Paul's Church, associated with events leading to the establishment of the Bill of Rights, became a national historic site July 5, 1943.

No transfer of property from the Episcopal Church Corporation was made; but under the terms of the Historic Sites Act of August 21, 1935, the National Park Service will cooperate in its management and preservation. St. Paul's is a noteworthy example of the Renaissance revival style of architecture in America, and the best example now standing of the eighteenth century parish church of the central colonies.

PROGRESS ON NATIONAL PARK AND MONUMENT PROJECTS

Everglades National Park project.—Interest in the possibility of substantial oil discoveries in the Everglades region is flourishing in Florida. As a consequence, the park project has become more complicated. If the park cannot be established, some provision for more protection for the wildlife of the area must be provided. The Service has agreed with Dr. Ira N. Gabrielson, Director of the Fish and Wildlife Service, and the Secretary has proposed to the State of Florida, that until the obstacles to the park are cleared up, some of the lands should be administered as a wildlife refuge. The national park project has by no means been abandoned, but if the park does not eventually materialize, the refuge should be made permanent.

Cape Hatteras National Seashore Recreational area project.—Gratifying progress was made by North Carolina in its acquisition program. The North Carolina Cape Hatteras National Seashore Commission, with assistance from this Service, in November 1943 made a reconnaissance survey to determine boundaries in relation to the numerous small communities within or bordering the most important of the three acquisition units in the project.

Richmond National Battlefield Park and Fort Frederica National Monument projects.—Progress is being made on the clearance of title to the lands being donated for these projects, and their establishment as units of the National Park System is imminent. Because of their historic interest, they will be a distinct asset to the National Park System. The Richmond Battlefield Park contains several areas over which the Union and Confederate Armies fought during the Union drives on Richmond, Va., the Confederate Capital. Fort Frederica, in Georgia, was built in 1736 by General James Edward Oglethorp, founder of Georgia, as an English outpost against Spain, which then owned Florida.

Grandfather Mountain.—A non-Federal organization, the Grandfather Mountain Park Association, was established for the purpose of acquiring, for donation to the Federal Government as part of the Blue Ridge Parkway, some 12,000 acres including Grandfather Mountain, N. C., one of the most outstanding features of the entire 484-mile parkway route.

Iowa Indian Effigy Mounds National Monument project.—The State of Iowa is pursuing land acquisition, but probably will defer donation to the Federal Government until after the war.

Olympic Parkway, Wash.—This Public Works project of some 53,000 acres, is still in the land acquisition stage. Some general studies have been made regarding the parkway location.

George Washington Carver National Monument project, Missouri.—No practical advance was made in this project to preserve the birth-place of the late Dr. Carver, noted Negro scientist, as authorized by act of Congress, because of the high valuation placed by the owner on the lands.

Cumberland Gap National Historical Park project.—This 6,000-acre project has progressed encouragingly. Land surveys, essential to negotiations for the purchase of the individual properties, were begun by the States of Kentucky, Tennessee, and Virginia. Funds for land purchases are available in the three States, and Congress, by act of May 26, 1943, gave consent to their entering into a compact under which the necessary properties may be acquired and conveyed to the Federal Government.

Manuelito National Monument project.—The legislature of New Mexico has appropriated funds with which to acquire the most important Indian allotments; and effort is being made to complete the land and development programs of this archeological project located in the States of New Mexico and Arizona.

TVA TO TRANSFER LAND TO GREAT SMOKY MOUNTAINS NATIONAL PARK

By agreement between the Tennessee Valley Authority, the State of North Carolina, Swain County in that State, and the National Park Service, 44,000 acres of land lying between the reservoir above Fontana Dam on the Little Tennessee River and Great Smoky Mountains National Park are being purchased by Tennessee Valley Authority for addition to the park in consideration of post-war road construction to be undertaken by the Service. This addition rounds out Great Smoky Mountains National Park in accordance with the original concept.

THE PROBLEM OF PRIVATE HOLDINGS

The total gross area of land within the boundaries of the 169 areas constituting the National Park System amounts to 21,076,459.41 acres. Of this total, 621,445.12 acres are privately owned and not subject to the rules and regulations governing the 20,455,014.29 net acreage of the system. From the standpoint of protecting and administering the parks, these inholdings are a serious handicap; in fact, they constitute the greatest single land problem of the Service. While no definite action is possible during the war, the Service has done what it can to

formulate a comprehensive program for the acquisition of these privately-owned lands. Legislation providing funds for a continuous land acquisition program directed to the acquisition of inholdings is sorely needed.

ADVISORY BOARD

The Interim Committee of the Advisory Board on National Parks, Historic Sites, Buildings, and Monuments met once during the year to advise on war and postwar problems. Attending were Edmund H. Abrahams (chairman), Dr. Waldo G. Leland, Col. Richard Lieber, Charles G. Sauers, Dr. Frank Setzler (secretary), and Dr. Ralph W. Chaney. Other members of the Board are Dr. Clark Wissler (vice chairman), Dr. Thomas Barbour, Dr. Herbert E. Bolton, Mrs. Reau Polk, and Dr. Fiske Kimball.

The death early in July 1943 of George De Benneville Keim, Board member, was reported last year. The Service now records with deep regret the death of another member, Col. Richard Lieber, noted authority on conservation. Colonel Lieber's contribution in the fields of conservation and the humanities, both to the Nation and to his own State of Indiana, cannot be overestimated. Service officials benefited greatly from his wisdom and experience.

Dr. Ralph W. Chaney, paleontologist of the University of California, was appointed a member of the board vice Mr. Keim. The vacancy created by Colonel Lieber's death has not yet been filled.

COOPERATING FEDERAL AGENCIES

Public Roads Administration.—New regulations implemented the working agreement that had been in effect since 1926 between the National Park Service and the Public Roads Administration. Included are new cooperative features applicable to the planning and construction of major roads and to planning for the maintenance of roads constructed by the Public Roads Administration. The regulations were approved by the Secretary of the Interior and the Federal Works Administrator pursuant to a requirement contained in the 1940 Federal Aid Highway Act.

Public Health Service.—A new agreement has been made with the United States Public Health Service providing that its eight district sanitary engineers shall furnish advice and service on sanitation matters in the National Park System. The high plane upon which this cooperative work has been conducted was largely due to the pioneering by Sanitary Engineer Harry B. Hommon, who retired in 1943.

Fish and Wildlife Service.—An agreement was reached between the Fish and Wildlife Service and the National Park Service as to the detailing of biologists for wildlife investigations in national park areas. This cooperation is especially helpful at a time when park protective and research staffs have been cut to a bare minimum.

Civilian Public Service Program.—Five Civilian Public Service Camps—conscientious objectors—again were allocated to the National Park Service and assigned to the Blue Ridge Parkway and Shenandoah, Great Smoky Mountains, Glacier, and Sequoia-Kings Canyon National Parks. These men were trained for and placed primarily on jobs involving forest protection, but also assisted in maintenance work, tree-disease control, and soil and moisture conservation in much the same manner as did the Civilian Conservation Corps on a much larger scale before the war. Their presence helped to meet the manpower shortage in the five areas concerned.

ADMINISTRATIVE ORGANIZATION

In general, the administrative organization remains unchanged as it concerned the responsibilities and activities of the Director's Office, located in Chicago as a wartime measure since August 1942. Organization of the four regional offices was improved, despite drastic personnel cuts. The units of the National Park System, particularly the smaller areas, have been hard put to it to carry their administrative responsibilities because of the loss of experienced members of their staffs, but have met these responsibilities well. Kings Canyon National Park and the adjoining Sequoia National Park were placed under a single superintendent for reasons of economy and effective administration.

The Service suffered a serious loss in the death of George A. Moskey, Chief Counsel, in February 1944. Mr. Moskey contributed much to Service policy and procedure during the formative years of the bureau and in the period of emergency expansion. Of him it has been said: "He was an attorney who knew how to apply the science of democratic government." The vacancy created by Mr. Moskey's death was filled by the transfer of Jackson E. Price from the position of Assistant Solicitor of the Department of the Interior.

The position of Biologist was established in the Director's Office and filled by the transfer back to the Service of Victor H. Cahalane, formerly Chief of the Wildlife Division, who, in a departmental reorganization in 1939, was transferred to the Fish and Wildlife Service. As chief of that agency's section on National Park Wildlife he handled park wildlife problems until his retransfer to the National Park Service.

Following the trends of previous years, the number of permanent full-time positions in the Service was reduced from the 1,974 reported on June 30, 1943, to 1,573 on June 30, 1944, resulting in severe handicaps in the basic fields of administration, protection, and maintenance. The number of employees of the Service just before Pearl Harbor was 5,963.

Increased use was made of women as park rangers and fire lookouts during the summer months; and as more veterans return to civil life attention is being given to placing them in vacant positions. By such means and the use of older men, with some relaxation of physical and qualifications standards, it has been possible to maintain reasonably adequate staffs despite the critical manpower shortage. The Service gained by the return of several of its supervisory officials released by the Army. On June 30, 651 National Park Service employees were on furlough with the armed forces and 617 had transferred to civilian war agencies with reemployment rights.

The highly trained, competent, and vigorous personnel who have left the Service to enter the armed forces constitute one of its most important contributions to the prosecution of the war. The Service recognizes an obligation to perpetuate for them the integrity of the National Park System. This obligation is being met by those who have remained, and who have shown themselves constant to their tasks. Their loyalty and devotion deserve clear recognition.

INFORMATION TABLE

There follows a table showing the units of the National Park System, including several projects now being administered by the Service pending transfer of lands, the acreage of these areas, and the number of visitors:

National Park System, acreage, and number of visitors

Areas (classification)	Location (State)	Net acreage	Approximate visitors, fiscal year July 1, 1943-June 30, 1944	Approximate visitors, 5-year average, 1940-44	Visitors, peak year (1941 unless otherwise stated)
<i>National Parks</i>					
Acadia.....	Maine.....	27, 870. 99	9, 966	210, 248	423, 088
Big Bend.....	Texas.....	691, 338. 95	(1)	(1)	(1)
Bryce Canyon.....	Utah.....	35, 980. 08	8, 014	65, 270	124, 098
Carlsbad Caverns.....	New Mexico.....	43, 087. 12	104, 476	185, 937	284, 024
Crater Lake.....	Oregon.....	160, 213. 54	30, 641	154, 721	273, 564
Glacier.....	Montana.....	997, 400. 36	25, 542	106, 795	210, 072 (1936)
Grand Canyon.....	Arizona.....	645, 084. 31	63, 350	255, 851	431, 816
Grand Teton.....	Wyoming.....	94, 852. 84	10, 854	63, 972	153, 353 (1938)
Great Smoky Mountains.....	North Carolina-Tennessee.....	460, 881. 55	462, 125	802, 424	1, 247, 019
Hawaii.....	Hawaii.....	173, 384. 00	424, 272	348, 800	414, 274 (1943)
Hot Springs.....	Arkansas.....	1, 015. 27	223, 392	199, 288	273, 083 (1936)
Isle Royale.....	Michigan.....	133, 838. 51	5, 026	2 4, 433	7, 257
Kings Canyon.....	California.....	453, 048. 02	51, 151	126, 993	201, 545 (1940)
Lassen Volcanic.....	do.....	101, 880. 41	19, 991	68, 198	108, 663
Mammoth Cave.....	Kentucky.....	51, 244. 51	46, 031	102, 023	158, 772
Mesa Verde.....	Colorado.....	51, 149. 12	4, 584	23, 190	42, 079
Mount McKinley.....	Alaska.....	1, 939, 199. 04	(1)	(1)	(1)
Mount Rainier.....	Washington.....	239, 899. 92	127, 944	330, 025	456, 637 (1940)
Olympic.....	do.....	845, 759. 47	62, 168	71, 241	92, 968
Platt.....	Oklahoma.....	911. 97	99, 747	220, 002	358, 240 (1939)
Rocky Mountain.....	Colorado.....	252, 625. 87	127, 450	438, 160	685, 393
Sequoia.....	California.....	385, 100. 13	63, 599	196, 354	300, 012
Shenandoah.....	Virginia.....	193, 472. 98	66, 165	574, 692	1, 054, 479
Wind Cave.....	South Dakota.....	11, 818. 34	3, 359	12, 405	108, 943 (1929)
Yellowstone.....	Wyoming, Montana, and Idaho.....	2, 213, 206. 55	68, 942	325, 910	581, 761
Yosemite.....	California.....	756, 294. 65	122, 618	370, 329	594, 062
Zion.....	Utah.....	94, 201. 06	43, 710	116, 587	190, 016

See footnotes at end of table.

National Park System, acreage, and number of visitors—Continued

Areas (classification)	Location (State)	Net acreage	Approximate visitors, fiscal year July 1, 1943-June 30, 1944	Approximate visitors, 5-year average, 1940-44	Visitors, peak year (1941 unless otherwise stated)
<i>National Historical Parks</i>					
Abraham Lincoln	Kentucky	110.50	12,440	80,241	175,000(1934)
Chalmette	Louisiana	29.52	56,398	38,642	48,216(1943)
Colonial	Virginia	7,057.78	247,322	428,298	663,971(1937)
Morristown	New Jersey	1,051.56	96,596	156,060	221,779
<i>National Monuments</i>					
Ackia Battleground	Mississippi	49.15	(1)	(1)	(1)
Andrew Johnson	Tennessee	17.08	14,094	² 4,220	6,898(1943)
Appomattox Courthouse	Virginia	973.30	5,500	² 15,185	50,000
Arches	Utah	34,139.70	744	2,006	3,786
Aztec Ruins	New Mexico	25.88	4,949	9,053	20,214(1938)
Badlands	South Dakota	122,812.46	9,234	129,159	251,498
Bandelier	New Mexico	25,971.89	7,065	8,921	14,619(1938)
Big Hole Battlefield	Montana	200.00	(1)	² 1,962	4,000
Black Canyon of the Gunnison	Colorado	12,040.55	3,141	11,247	19,307(1940)
Cabrillo ³	California	.50	(1)	² 88,810	234,465(1937)
Canyon de Chelly	Arizona	83,840.00	456	1,596	2,733(1940)
Capitol Reef	Utah	33,068.74	(1)	² 970	2,100
Capulin Mountain	New Mexico	680.37	10,798	25,199	35,550
Casa Grande	Arizona	472.50	8,660	14,435	37,244(1929)
Castillo de San Marcos	Florida	18.51	142,139	215,552	297,620
Castle Pinckney	South Carolina	3.50	(1)	(1)	(1)
Cedar Breaks	Utah	6,066.60	4,479	10,553	22,500(1938)
Chaco Canyon	New Mexico	18,039.99	2,995	2,117	8,014(1937)
Channel Islands	California	1,119.98	(1)	(1)	(1)
Chiricahua	Arizona	10,529.80	3,877	7,979	15,331(1934)
Colorado	Colorado	18,060.45	5,737	22,018	64,715(1938)
Craters of the Moon	Idaho	47,540.70	1,909	12,006	21,796
Death Valley	California-Nevada	1,850,565.20	12,098	59,734	96,529
Devil Postpile	California	798.46	(1)	² 4,443	10,251
Devils Tower	Wyoming	1,193.91	5,412	21,433	53,889(1938)
Dinosaur	Utah-Colorado	183,221.56	1,477	6,006	10,928(1940)
El Morro	New Mexico	240.00	421	1,086	5,794(1926)
Father Millet Cross	New York	.01	(1)	(1)	(1)
Fort Jefferson	Florida	86.82	(1)	(1)	(1)
Fort Laramie	Wyoming	214.41	1,252	4,688	10,102(1940)
Fort Matanzas	Florida	18.34	2,163	11,425	21,370(1939)
Fort McHenry	Maryland	47.64	281,251	432,154	660,403
Fort Pulaski ³	Georgia	5,427.39	(1)	² 22,410	55,536
Fossil Cycad	South Dakota	320.00	(1)	(1)	100(1935)
George Washington Birthplace	Virginia	395.44	9,193	31,255	65,154(1932)
Gila Cliff Dwellings	New Mexico	160.00	(1)	² 91	330
Glacier Bay	Alaska	2,299,520.00	(1)	(1)	(1)
Grand Canyon	Arizona	195,231.00	(1)	² 64	324
Gran Quivira	New Mexico	370.94	321	1,745	4,812(1930)
Great Sand Dunes	Colorado	36,849.19	2,788	6,678	11,700(1939)
Holy Cross	do	1,392.00	(1)	² 24	600(1935)
Homestead National Monument of America	Nebraska	160.82	(1)	² 280	1,400
Hovenweep	Utah-Colorado	285.80	41	178	500(1937)
Jackson Hole ⁴	Wyoming	173,064.62	(1)	(1)	(1)
Jewel Cave	South Dakota	1,274.56	31	² 2,509	5,203(1939)
Joshua Tree	California	653,123.70	14,487	² 16,058	27,747(1942)
Katmai	Alaska	2,697,590.00	(1)	(1)	17(1924)
Lava Beds	California	45,727.00	8,286	24,283	36,619(1940)
Lehman Caves	Nevada	639.31	830	3,021	5,000
Meriwether Lewis	Tennessee	300.00	3,567	12,707	21,281
Montezuma Castle	Arizona	520.00	3,036	6,457	19,298(1930)
Mound City Group	Ohio	57.00	(1)	(1)	35,260(1935)
Muir Woods	California	424.56	105,397	123,136	179,365(1939)
Natural Bridges	Utah	2,740.00	110	483	1,044(1939)
Navajo	Arizona	360.00	45	303	965(1929)
Ocmulgee	Georgia	683.48	27,463	41,511	63,330
Old Kasaan	Alaska	38.00	(1)	(1)	(1)
Oregon Caves	Oregon	480.00	(1)	² 28,601	57,704
Organ Pipe Cactus	Arizona	328,161.73	65,492	27,042	50,842(1943)
Perry's Victory and International Peace Memorial	Ohio	14.25	14,794	² 25,996	75,000(1938)
Petrified Forest	Arizona	84,597.10	37,963	138,707	240,967
Pinnacles	California	12,817.77	4,779	16,996	28,036
Pipe Spring	Arizona	40.00	425	1,105	24,883(1929)

See footnotes at end of table.

National Park System, acreage, and number of visitors—Continued

Areas (classification)	Location (State)	Net acreage	Approximate visitors, fiscal year July 1, 1943-June 30, 1944	Approximate visitors, 5-year average, 1940-44	Visitors, peak year (1941 unless otherwise stated)
<i>National Monuments—Continued</i>					
Pipestone	Minnesota	115.08	2,372	² 1,470	2,785
Rainbow Bridge	Utah	160.00	(1)	² 134	550(1936)
Saguaro	Arizona	53,669.24	4,653	12,034	20,422(1938)
Santa Rosa Island	Florida	9,500.00	451,246	² 273,182	405,968
Scotts Bluff	Nebraska	2,292.15	29,665	65,513	108,536(1940)
Shoshone Cavern	Wyoming	212.37	(1)	(1)	(1)
Sitka	Alaska	57.00	4,484	6,500	9,195(1942)
Statue of Liberty	New York	10.38	345,299	375,963	446,364
Sunset Crater	Arizona	3,040.00	2,392	7,934	12,944
Timpanogos Cave	Utah	250.00	18,715	11,867	16,673(1943)
Tonto	Arizona	1,120.00	3,008	5,517	9,423
Tumacacori	do	10.00	5,016	8,164	18,472(1937)
Tuzigoot	do	42.67	3,271	5,461	9,350
Verendrye	North Dakota	253.04	(1)	² 3,250	15,000(1928)
Walnut Canyon	Arizona	1,635.32	4,036	9,222	13,526(1938)
Wheeler	Colorado	300.00	(1)	² 285	511(1940)
White Sands	New Mexico	137,885.91	34,69	54,779	110,805(1938)
Whitman	Washington	45.93	(1)	² 1,640	8,204
Wupatki	Arizona	34,693.03	438	2,309	4,153
Yucca House	Colorado	9.47	26	75	400(1937)
Zion	Utah	33,533.01	(1)	² 100	500
<i>National Military Parks</i>					
Chickamauga and Chattanooga	Georgia-Tennessee	8,146.33	100,755	279,387	481,381(1940)
Fort Donelson	Tennessee	102.54	7,078	28,206	41,908
Fredericksburg and Spotsylvania County Battlefields Memorial	Virginia	2,420.15	37,739	91,133	156,038
Gettysburg	Pennsylvania	2,425.25	87,312	382,286	1,554,234(1938)
Guilford Courthouse	North Carolina	143.83	11,742	29,610	53,203
Kings Mountain	South Carolina	4,012.29	7,821	17,450	29,487(1939)
Moores Creek	North Carolina	30.00	5,610	4,389	6,218(1938)
Petersburg	Virginia	1,328.25	87,336	185,707	263,169
Shiloh	Tennessee	3,716.66	48,883	158,092	346,069(1938)
Stones River	do	323.86	10,649	5,277	6,542
Vicksburg	Mississippi	1,323.56	9,031	130,747	317,120(1938)
<i>National Historic Sites</i>					
Atlanta Campaign Markers	Georgia	20.96	(1)	(1)	(1)
Federal Hall Memorial	New York	.49	110,255	² 63,139	126,737(1942)
Fort Raleigh	North Carolina	16.45	9,104	² 19,881	76,016
Home of Franklin D. Roosevelt	New York	33.23	(1)	(1)	(1)
Hopewell Village	Pennsylvania	6,197.00	32,246	² 31,557	85,562
Jefferson National Expansion Memorial	Missouri	82.58	32,252	² 12,027	34,914(1943)
Manassas National Battlefield Park	Virginia	1,604.57	5,250	² 6,504	11,494(1943)
Old Philadelphia Customhouse	Pennsylvania	.79	23,838	² 8,847	15,489(1943)
Salem Maritime	Massachusetts	8.61	4,875	5,453	7,258(1942)
Vanderbilt Mansion	New York	211.65	20,950	² 11,282	17,669
<i>National Battlefield Sites</i>					
Antietam	Maryland	183.32	12,951	20,697	88,949(1937)
Brices Cross Roads	Mississippi	1.00	(1)	² 1,290	3,200(1940)
Cowpens	South Carolina	1.00	(1)	² 1,250	5,150(1942)
Fort Necessity	Pennsylvania	2.00	13,350	52,321	107,533(1938)
Kennesaw Mountain	Georgia	60.00	15,177	13,044	18,430(1942)
Tupelo	Mississippi	1.00	(1)	² 3,660	7,500(1940)
White Plains	New York	.00	(1)	(1)	(1)
<i>National Memorials</i>					
Camp Blount Tablets	Tennessee	(1)	(1)	(1)	(1)
House Where Lincoln died	District of Columbia	.05	52,085	36,638	91,724(1937)
Kill Devil Hill	North Carolina	314.40	10,427	41,245	84,194
Lee Mansion	Virginia	.50	170,380	274,510	729,652(1937)

See footnotes at end of table.

National Park System, acreage, and number of visitors—Continued

Areas (classification)	Location (State)	Net acreage	Approximate visitors, fiscal year July 1, 1943-June 30, 1944	Approximate visitors, 5-year average, 1940-44	Visitors, peak year (1941 unless otherwise stated)
<i>National Memorials—Con.</i>					
Lincoln Memorial.....	District of Columbia.....	(1)	613, 887	1, 130, 043	1, 796, 752
Lincoln Museum.....	do.....	. 18	85, 783	62, 123	132, 787(1937)
Mount Rushmore.....	South Dakota.....	1, 710. 00	30, 355	² 118, 997	400, 000
New Echota Marker.....	Georgia.....	1. 00	(1)	² 3, 027	6, 090(1940)
Thomas Jefferson Memorial.....	District of Columbia.....	(1)	408, 323	² 154, 251	463, 555(1943)
Washington Monument.....	do.....	(1)	514, 474	752, 071	998, 686(1937)
<i>National Cemeteries</i>					
Antietam.....	Maryland.....	11. 36	(1)	(1)	(1)
Battleground.....	District of Columbia.....	1. 03	2, 700	3, 400	5, 000
Chattanooga.....	Tennessee.....	136. 15	(1)	(1)	(1)
Custer Battlefield.....	Montana.....	757. 84	15, 312	² 23, 684	65, 132
Fort Donelson ¹	Tennessee.....	15. 34	(1)	(1)	(1)
Fredericksburg ⁵	Virginia.....	12. 00	(1)	(1)	(1)
Gettysburg ¹	Pennsylvania.....	15. 55	(1)	(1)	(1)
Poplar Grove ¹	Virginia.....	9. 02	(1)	(1)	(1)
Shiloh ¹	Tennessee.....	10. 25	(1)	(1)	(1)
Stones River ¹	do.....	20. 09	(1)	(1)	(1)
Vicksburg ¹	Mississippi.....	119. 76	(1)	(1)	(1)
Yorktown ¹	Virginia.....	2. 91	(1)	(1)	(1)
<i>National Capital Parks ⁶</i>					
The park system of the District of Columbia.....	-----	7 27, 790. 36	(1)	(1)	(1)
<i>Parkways</i>					
Blue Ridge.....	Virginia - North Carolina.....	38, 910. 00	194, 107	² 315, 141	965, 507
George Washington Memorial.....	Virginia-District of Columbia.....	2, 458. 68	(1)	(1)	(1)
Natchez Trace.....	Mississippi, Alabama, and Tennessee.....	13, 648. 87	(1)	(1)	(1)
Total National Park System.....	-----	20, 455, 014. 29	7, 218, 122	13, 056, 451	-----
<i>National Recreational Area</i>					
Boulder Dam.....	Arizona-Nevada.....	1, 680, 133. 33	236, 101	526, 219	838, 246
<i>Projects</i>					
Saratoga National Historical Park. ⁸	New York.....	1, 864. 60	5, 962	² 18, 866	72, 591
Kennesaw Mountain National Battlefield Park.	Georgia.....	3, 034. 21	(1)	(1)	(1)
Richmond National Battlefield Park.	Virginia.....	. 00	(1)	(1)	(1)
<i>National Historic Sites in Non-Federal Ownership</i>					
Gloria Dei (Old Swedes' Church).....	Pennsylvania.....	1. 53	(1)	(1)	(1)
Independence Hall.....	do.....	4. 55	(1)	(1)	(1)
Jamestown Island.....	Virginia.....	22. 00	(1)	(1)	(1)
McLoughlin Home.....	Oregon.....	. 63	(1)	(1)	(1)
Saint Paul's Church.....	New York.....	6. 09	(1)	(1)	(1)
San Jose Mission.....	Texas.....	4. 13	(1)	(1)	(1)
Grand total.....	-----	22, 140, 085. 36	⁹ 7, 460, 185	13, 601, 536	-----

¹ Travel figures not available or maintained.² Travel figures available for less than five years.³ Closed to visitors.⁴ Established by Presidential Proclamation, March 15, 1943.⁵ Included in travel figures for adjacent battlefield site, military park, or historical park.⁶ Travel included under "Memorials."⁷ Includes Chopawamsic area, Virginia, and C. & O. Canal, Maryland.⁸ Administered by Service pending final establishment.⁹ Includes 2,149,398 military visitors.

Office of Indian Affairs

JOHN COLLIER, Commissioner



THE truly epic story of Indian heroism on all the battle fronts of the planet, unstintingly backed by the toil of Indian men, women, and children on farm and range and in the war industries, has broadened and deepened during the past year.

On the first of April, 21,756 Indians, exclusive of officers, had joined the fighting forces, of which number 19,284 were in the Army, 1,555 in the Navy, 574 in the Marine Corps, 127 in the Coast Guard, and 216 in the Wacs and Waves.

NUMEROUS DECORATIONS

Throughout the Pacific area, in China, North Africa, Sicily, Italy, and Normandy, Indians have served with conspicuous gallantry, winning all decorations, in addition to numerous citations and commendations. By the end of June, 16 had received the Distinguished Flying Cross; 29, the Air Medal; 20, the Silver Star; 4, the Distinguished Service Cross; 1, the Soldier's Medal; 1, the Distinguished Service Medal; 1, the Navy Cross; 1, the Medal of Honor; and 1, the Croix de Guerre. Seventy-five had been awarded the Purple Heart. Some had received more than 1 decoration, and numerous Oak Leaf Clusters had been distributed in lieu of further awards of a given medal or in recognition of flying missions achieved. Several had received from 6 to 14 Clusters each.

THE CONGRESSIONAL MEDAL OF HONOR

Until April last, no Indian had received the Congressional Medal of Honor. Now, thanks to Second Lieutenant Childers, a three-quarters Creek of Broken Arrow, Okla., this honor also may be claimed by the first Americans. Lieutenant Childers, who had won his commission on the battlefield during the invasion of Sicily, was awarded the nation's highest military honor as the result of an all but incredible

exploit performed near Oliveto, Italy, in September 1943. Hobbling with a broken instep, he advanced alone against three German machine-gun nests, rubbed them out, and opened the way for the advance of his battalion which had been in danger of annihilation. Only 14 Medals of Honor have been awarded thus far in the war, 3 in the Mediterranean theater.

A GLOBE-EMBRACING STORY

Decorations serve only to highlight the globe-embracing story of the Indian fighting man's gallantry and efficiency, as indicated by reports from all fronts. A group of 13 Indians from nearly as many tribes was in the first wave of paratroopers dropped with demolition equipment upon German defenses in France at the beginning of the Normandy drive. Harlyn Vidovich, "The Sky Chief," a Shoshone-Paiute of Sacaton, Ariz., won fame as one of General Chennault's "Flying Tigers," was commended by General Chiang-Kai-shek, and was promoted to the grade of captain shortly before his death in China last January. A noted Cherokee woodcarver, Going Back Chiltoskey, was employed by the Engineer Board in making scale models of terrain and buildings for the plans of the African invasion. It was an Omaha Indian boy, Pvt. Robert Stabler, who, in July last year, landed alone under heavy fire in advance of the assault waves at Licata, Sicily, to mark the beaches for the infantry craft—an exploit for which he received the commendation of his general. He had volunteered for service at the age of 20, and he wore no medal when he died of wounds in Italy last January.

The story of Indian heroism cannot be told in terms of medals and commendations. It is woven closely into the untold all-American tale of high heroism everywhere, regardless of race and color and creed.

FAITH AND WORKS

The profound seriousness with which Indians generally are devoting their energies to the prosecution of the war has been conspicuously evidenced by the religious observances of the homefolk. Indians in the old days, interwove religion into everyday living to an extent unknown in white society; and out of the deeps of racial memory, sacred ceremonies have been revived by many tribes as an expression of their dedication to a great common cause and their dependence upon divine aid for its achievement. In various instances, Christian Indians have joined their prayers with the ancient supplications of their people, in the true American spirit of religious liberty. These expressions of profound faith and dedication, notably increased during the past year, have accompanied heroic works at home, as well as abroad, even as in the old days.

THE GREATEST EXODUS OF INDIANS

The war has brought about the greatest exodus of Indians from reservations that has ever taken place. Out of a total of approximately 65,000 able-bodied men from 18 to 50 years of age, 30 percent have joined the armed forces and about 25 percent are engaged in war industries and other essential war services. In addition, more than 10,000 men, women, and children have left the reservations for varying periods to work on farms and ranches. Thus, at least half of the able-bodied men and about one-fifth of other employable persons have been drained from the reservations. Reports show that there were 8,683 fewer Indian families residing at home in 1943 than in 1941.

WOMEN, CHILDREN, AND OLD MEN CARRY ON

Notwithstanding this great loss of manpower at home, the total production of agricultural commodities by Indians on all reservations was greater in 1943 than in 1942. Approximately 1,000 more families engaged in farming and stockraising. Although a greater acreage of land was planted to all crops, less grain and feed were sold, owing to the increased feed requirements of the great number of livestock on hand. At the end of 1943, Indians on all reservations owned a total of 1,531,000 head of livestock—90,000 more than at the end of the previous year, and, incidentally, double the number owned by them in 1933. The total receipts from livestock sales in 1943 amounted to \$10,533,079, which was \$667,000 greater than in 1942, and five times more than in 1933. The total value of all sales of Indian agricultural products was \$19,077,333, compared with \$17,457,241 in 1942; and the total value of all food produced and used in the home was \$8,364,792, compared with \$7,985,584 in the preceding year.

This remarkable achievement may be credited largely to the eagerness and ability of Indian women, children, and older men to carry on while the young men are away. The bond between the Indian and his homeland is very strong, and most Indians in the far-flung battle areas write home, giving instructions for the management of livestock and farming operations, and dwelling on the plans they have in mind for the post-war years.

REMARKABLE ACHIEVEMENT OF SCHOOL CHILDREN

The same enthusiastic response to the needs of the time was to be noted in the schools of the Indian Service, whose production of fruits, vegetables, meat, milk, and eggs was almost 50 percent greater in 1943 than in the previous year, although many high school students were serving in the armed forces or in war industries. Nearly 3 million pounds of fruits and vegetables were stored and used. A large number of the schools were on a self-sustaining basis, so far as agricultural

produce was concerned, and large quantities of vegetables, meat, milk, and eggs were marketed for the general need. Fifty-eight thousand gallons of fruit and vegetables were canned.

Dehydrators, on the model developed at the Phoenix Indian School, in collaboration with the United States Department of Agriculture, were erected at half a dozen other schools in the Indian Service. As a result, more than ten tons of fruits and vegetables were dehydrated in the schools of the Indian Service, from which supply the boarding schools and hospitals in Alaska were furnished most of their vegetables for the year at a great saving in freight cost. In addition to the foregoing, the Indian schools produced more than 9,000 tons of hay, nearly 3,000 tons of grain, and more than 5,000 tons of silage.

A great share of the labor involved in producing such quantities of foodstuff was furnished by the Indian boys and girls themselves, and many employees of the Indian Service sacrificed their vacation time that they might help in the fields.

INVESTING IN DEMOCRACY

The Indian people's faith in their country and their devotion to the cause of Democracy have been further attested by their war bond purchases.

It is estimated that bond sales to Indians had reached a grand total of \$50,000,000 on June 30. During the fiscal year 1944, group investments amounted to \$2,517,000, and sales to restricted Indians totaled \$1,525,664. In addition, during the year the Office of Indian Affairs had received for safekeeping bonds purchased by individuals with their unrestricted funds in the amount of \$92,438. The latter item represents only a portion of such purchases.

On many reservations war bond auction sales and bond pow-wows have been patronized with remarkable enthusiasm. In January, the Lower Brule Sioux sponsored an auction at Reliance, S. Dak., in which donations, ranging from a sack of peanuts to poultry and horses, garments and fancy quilts, were disposed of to the highest bidder in bonds. Sales totaled \$22,000, half of which was realized through the donations of the Indians. A Sioux boy sacrificed his pet colt, which brought \$925 in securities. An old longhair wept when told that he could not donate 320 acres of land to the cause.

The Phoenix Indian School was awarded the Treasury-Department's certificate of merit for its success in organizing a bond pow-wow that resulted in sales amounting to \$58,177. In the Fourth War Loan Drive, the Papago Reservation exceeded its quota by-almost 600 per cent, although the State of Arizona as a whole fell behind. In Alaska, many isolated villages have sacrificed the white man's food and clothing in order to buy bonds.

Although the amount donated by Indians to the Red Cross and to the National War Fund cannot be stated with accuracy, it is known to be very large and in proportion to the general whole-hearted response of Indians to the needs of the time.

LAND ACQUISITION

Although no additional public funds for land purchases were appropriated for the fiscal years 1944 and 1945, funds appropriated in past years permitted purchases involving 17,337.29 acres at a cost of \$105,860.70. Also, 631,887.51 acres were restored to tribal ownership on the Wind River Reservation in Wyoming, under authority of the act of July 27, 1939.

The desire of the Indians to increase their land holdings is evidenced by the fact that tribal funds amounting to \$183,450.68 were used during the past year in purchasing 37,720.18 acres on 12 reservations. Many tribes possessing funds have demonstrated their determination to invest a substantial portion of their money in this way. In addition to the above, 2,680 acres were withdrawn from the public domain for reservation purposes and for the benefit of certain individual Indians.

NEW RESERVATIONS IN ALASKA

The large influx of population into Alaska as a result of war activities, and the growing encroachment of the whites upon the land and resources of the Indians and Eskimos have served to emphasize the most serious problem confronting the natives—the protection of their ancestral hunting, trapping, and fishing bases. Recognizing the fundamental importance of the problem, the Office of Indian Affairs, early in the year, detailed a special representative to the Territory to supervise the work of establishing reservations.

Under authority of the act of May 1, 1936, six reservations were formally established in Alaska during the fiscal year 1944, as follows: Akutan, in the Aleutian Islands, area 72,000 acres; Karluk on Kodiak Island, 32,000 acres; Venetie, on the Upper Yukon, 1,408,000 acres; Shishmaref, 3,000 acres, and Wales 21,000 acres, both on Seward Peninsula.

Proposals for the creation of 16 additional reserves totaling 3,729,420 acres, have been received and are now under consideration. Two of the proposed reservations are located on the upper, and 1 on the lower, Tanana River; 2 are in southeastern, and 5 in central Alaska; 5 are along the Arctic coast; and 1 on the Noatak River.

LAND CONSOLIDATION

The absurd fragmentation of Indian estates under the allotment and inheritance system, resulting in great economic loss to the Indians and much unproductive administrative expense to the Government, has received further attention by the Sioux of South Dakota during the past year. The organization of the Tribal Land Enterprise by the Rosebud Sioux marks an encouraging advance toward the solution of this serious and complicated problem. The new organization's bylaws were approved by the Secretary of the Interior in December last, and its first "certificate of interest" was issued in January.

The purpose of the new enterprise, in keeping with the general Sioux land consolidation program, is to acquire individually owned allotments and fractional inherited interests in exchange for use rights in compact tribally owned areas thus established; also to purchase scattered interests and key tracts with tribal funds. Indians are coming to realize that only by such a method can the progressive, and otherwise ultimately ruinous, evil of fractional land ownership be ended. Already the Rosebud Tribal Land Enterprise has approximately 30,000 acres under its management, and there is a growing interest in the plan. The South Dakota projects are being watched by Indians elsewhere, and this movement to establish land ownership on a sound basis may well spread to many other allotted reservations of the western States.

LAND CONSERVATION

In the long view, the control of erosion on the home front must be regarded as secondary only to the successful conclusion of the war. Now that soil is being used more intensively than ever before, its fertility is being taxed to the limit. Accelerated erosion is destroying millions of acres of Indian land, in common with other lands throughout the nation.

The Indian Service has given increasing attention to aiding Indians in following conservation practices which will yield maximum production with a minimum of soil losses. During the war, with curtailed appropriations, such practices can be applied only in emergencies, to critical areas and to those which will most readily respond to treatment under the load of maximum production.

It has been fully demonstrated that the practice of scientific conservation on farm lands will increase yields by 20 percent, and in many instances by as much as 100 percent. The possibility of such increase has been demonstrated on the Florine Little Bear farm of 80 acres in Oklahoma. On this land the corn yield was increased from 100 to 360 bushels, hay from 20.5 to 38 tons, cotton from two to four bales, pasture carrying capacity from 48 to 63 animal-months.

THE RUINOUS COST OF SILTATION

The Salt River watershed in Arizona serves to reveal the values involved in the erosion and siltation problem of the West. At the present rate of siltation, the reservoirs of the Salt River Valley System will be completely silted full in 175 years. With this life expectancy it can be shown that the total annual loss resulting from reservoir sedimentation in this area is approximately a million dollars, or \$150 for each square mile of watershed.

The losses from siltation to downstream development in this area are greater each year than returns from the range and forest lands of the watershed. To these losses may be added large yearly damages from flood water. An amount equal to the losses to downstream developments, if applied for a 10-year period to the watershed, will reduce erosion and siltation to the minimum. Conclusive evidence on Navajo demonstration areas show that this can be done, with increasing returns to watershed users at the same time.

The Indian lands in the South and Southwest, comprising approximately one-half of all Indian lands, will require 111,400 man-years of unskilled labor, 31,650 man-years of skilled labor, 8,040 man-years of technical assistance, and 21,000 tractor-years to build the dams, terrace the fields, reseed the ranges, improve pastures, reconstitute cropping and cultural practices, stabilize stream banks, spread water, and do the other things necessary to preserve the soil and productivity of the upland farms and ranches, and to protect the downstream irrigation and public utility developments.

ACCOMPLISHMENTS IN 1944

The outstanding response of Indians to a program of conservation is attested by the fact that they spent in the past year for this purpose \$421,206 in terms of cash and contributed labor to supplement \$437,839 of Indian Office funds. The demand for assistance in preparing and carrying out conservation plans has been greater than the office could supply. Plans were requested on 544 land unit areas comprising 920,899 acres. Assistance in planning and establishing conservation practices was rendered on 330 units embracing 813,265 acres of Indian farm and range land, and erosion was checked in varying degrees on 536 farm units, comprising 206,266 acres.

Improved cropping practices were inaugurated on 53,047 acres, and drainage of 5,539 acres required 13 miles of ditching. Permanent farm pastures, totaling 10,000 acres, were established or improved. Worn out and badly gullied land, totaling 31,649 acres, was seeded to provide better soil cover and increased financial returns.

On the range land, improved management was instituted on 2,958,775 acres. The various activities undertaken to accomplish this in-

cluded the seeding of 17,518 acres, the contouring of 3,203 acres, the digging of 4,080 feet of drain canals, water spreading on 10,950 acres, the building of stock water tanks, and the development of wells and springs. Utilization checks, to learn the amount of forage being consumed and to determine the safe use of range, were made on 8,802,500 acres.

IRRIGATED LANDS AND POWER PROJECTS

Irrigation construction on Indian reservations was reduced to a minimum during the year in order to conserve materials for vital war projects, and only facilities for irrigating garden tracts were installed, noncritical materials being used. On lands already under irrigation, 37 internal distribution systems, comprising 10,000 acres, were revised to prevent waste and effect a more nearly uniform use of water.

During the year the irrigation projects of the Indian Service supplied water to 570,000 acres of farm lands on Indian reservations west of the Mississippi River. These lands, used by Indian and non-Indian farmers, have been devoted to increased production in keeping with the policy of the War Food Administration to emphasize maximum production in the area adjacent to shipping lanes for the Pacific war theater. Thus cross-country shipping facilities were conserved for other vital war materials. It is estimated that the combined farm crops raised on Indian irrigation projects during 1943 were sufficient to feed 10 Army divisions for a year. Forage crops were harvested for 300,000 head of beef cattle and 50,000 dairy cows.

Power systems, operated by the Indian Service along with irrigation projects, furnished 60 million kilowatt-hours of energy, directly and by inter-connection, to copper and molybdenum mines, manufacturing plants, city utilities, and other industrial and commercial consumers in the rural West. The San Carlos and Colorado River projects furnished irrigation water and power to relocation centers settled by 20,000 people of Japanese ancestry removed from the west coast and strategic defense areas. Power was furnished also to an army camp near Florence, Ariz., where prisoners of war are interned.

During the year, plans were developed for an impressive list of proposed irrigation projects on Indian reservations, to contribute to increased food production, to create post-war employment, and to make farms available for Indians returning from the armed services and industrial areas. On the San Carlos project, studies were made to prepare for post-war changes in commercial power loads.

MINERALS FOR WAR AND THE FUTURE

Will the petroleum and other mineral reserves on Indian lands be so depleted when peace comes as to render them insignificant in the post-war period? Not if the present exploratory activities, growing out of the Nation's war needs, meet with even a fair degree of success.

Already wartime discoveries of oil have been made on the Wind River Reservation in Wyoming, and on the Otoe and Pawnee lands of Oklahoma. Prospecting permits have been issued, with approval of tribal authorities, covering several hundred thousand acres in the Rocky Mountain region; and wildcat leasing blocks have been assembled on Indian lands in Montana, western Oklahoma, Mississippi, Wyoming, South Dakota, and New Mexico. Over a thousand oil and gas leases covering Indian lands have been approved during the past fiscal year.

QUAPAW RESERVATION MINES

Most gloomy of the predictions relating to post-war production of minerals from Indian lands have been concerned with the once-rich lead and zinc mines on the Quapaw reservation in the Tri-State mining district. But in spite of depletion of the richer ores, production from Indian lands within that district has borne up well. In the period from July 1, 1941, to June 30, 1943, the mines and tailing mills on restricted Indian lands of the Quapaw reservation sold 304,577 tons of lead and zinc, and the royalty received by restricted landowners from these sales amounted to nearly 2 million dollars. At the close of the fiscal year it was estimated that production for 1944 would equal that of the previous year.

Indian owners, the mining industry, the Geological Survey, and the Indian Service, are cooperating in arrangements to permit economical, unitized operations for the mining of lower grade ores and isolated high-cost ores. These arrangements and the industry's efforts to perfect improved methods for re-treating the ores and tailing piles may prove sufficient to prolong the productivity of the Quapaw mineral lands. Elsewhere in Oklahoma, prospecting permits, covering several thousand acres of Indian lands, have been approved in support of efforts to locate additional reserves of lead and zinc ores. In view of these activities, it seems probable that production of minerals from Indian lands will not decline in volume or importance during the war and for some time into the post-war period.

At present, leased Indian properties are producing minerals having an annual value in excess of 39 million dollars, yielding an annual income of nearly 6 million dollars in royalties to the Indian owners.

This estimate includes the total output of petroleum and its products, lead, zinc, copper, vanadium, helium, coal, tungsten, asbestos, manganese, gypsum, limestone, and marble.

COAL AND ASPHALT LANDS

The Choctaw and Chickasaw Nations once possessed lands encompassing many hundreds of square miles in the Southern States. Their last remaining communally held property, other than a few scattered tracts, consists of some 370,000 acres of coal deposits and about 3,000 acres of asphalt deposits that were segregated and reserved from allotment under the Atoka Agreement of 1898 and the supplemental agreement of 1902. A provision in the Interior Department Appropriation Act, approved June 28, 1944, paves the way for disposal of this last remaining property to the United States. The provision authorizes and directs the Secretary of the Interior to enter into a contract on behalf of the United States for the purchase of the lands and deposits. The contract is not to become effective unless ratified by the Indians in a referendum election, and then finally ratified by the Congress. The Principal Chief of the Choctaw Nation and the Governor of the Chickasaw Nation have indicated their desire to enter into the negotiations contemplated by the legislation, and plans for the negotiations are now receiving consideration.

INDIAN FORESTS

Based on a conservative estimate, there are approximately 35 billion feet of timber on about 16,700,000 acres of Indian lands in 19 states, 17 of which are located west of the Mississippi River. Of this volume approximately 80 percent is considered suitable for the production of lumber.

There have been active logging operations on many Indian reservations during the past year. The volume of timber cut for the production of lumber and other forest products was 502,867,000 feet. Since a very high percentage of the timber cut under contract went directly into military activities, the Indians and the Indian Service made every reasonable effort to furnish timber for cutting, consistent with sustained-yield management and available personnel. It is anticipated that the forests on Indian lands will continue to provide their full share of timber needed by the Nation during the war and post-war periods.

LUMBER ENTERPRISES OF INDIANS

During the past year the four Indian sawmill enterprises were operated with a reasonable degree of success. The volume of logs cut by each of these enterprises is as follows: Menominee Indian Mills, Neo-

pit, Wis., 18,337,000 feet; Red Lake Indian Mills, Redby, Minn., 5,360,000 feet; Navajo Indian Mills, Window Rock, Ariz., 7,718,000 feet; Fort Apache Sawmill, Whiteriver, Ariz., 1,008,000 feet. Limited available labor and equipment curtailed production to some extent. In addition to these sawmill enterprises, the Indians have carried on logging operations on their respective reservations.

FOREST DISEASE AND FIRE PROTECTION

The white pine blister rust continues to be a problem on Indian lands in the Lake States area. During the past year control work was done on 7,580 acres, in cooperation with the Bureau of Entomology and Plant Quarantine, Department of Agriculture. Indian women did much of the work.

The pine bark beetle caused some loss of ponderosa pine timber on Indian lands in the Western States last year. No control work was done because of the war. It is planned, however, as a post-war project, to do as much control work as conditions may warrant.

Fire protection on Indian forest and range lands continues to be a serious problem on account of limited funds and personnel. During the year, 976 fires burned over 166,058 acres of these lands, but none was excessively destructive, owing to favorable weather conditions. The average cost for fire presuppression was one-half cent an acre for the 36,425,700 acres under protection.

GRAZING

Approximately 38,956,000 acres of Indian forest and range lands were used last calendar year for grazing approximately 355,770 cattle, 79,140 horses, and 1,299,720 sheep and goats. Of this total area, about 30,365,000 acres are being used by Indians to graze their livestock, and the remainder is being used by non-Indian stockmen under approved grazing permits.

Estimates of the grazing capacity of the Indian range lands have been made, and on most reservations the stocking has been limited in keeping with such estimates. Some districts of the Navajo, Hopi, Papago, and a few of the smaller reservations in the Southwest, continue to present a difficult problem with regard to overstocking. In all instances the problem is complicated by the fact that the Indians concerned depend largely upon a livestock economy, and do not own sufficient range lands on which to graze the number of livestock needed to maintain themselves on a reasonable economic level. Efforts are being made to correct this situation, and some progress was achieved during the past year.

FISH AND WILDLIFE MANAGEMENT

The management of fish and wildlife resources on Indian lands was given considerable attention. The Fish and Wildlife Service has conducted special investigations on several reservations and has assisted in encouraging the Indians to adopt ordinances for the regulation of hunting, fishing, and trapping. The fish hatchery on the Fort Apache Reservation, Ariz., was successfully operated, and supplied fish for planting streams in that area. Fish from other sources were planted in waters on other Indian reservations.

ROAD BUILDING AND MAINTENANCE

Modern society cannot exist without adequate transportation. The roads constructed on Indian reservations during the last decade have contributed greatly to the ability of the Indians to expand their food production for war use. During the present emergency period, ordinary road activities are restricted to maintenance. The fact that construction organizations were equipped and available at the various reservations made it possible for the Indian Service to undertake the building of access roads to sources of raw materials, a program involving a cost of approximately 1 million dollars. This work is continuing. These access roads will be useful in the marketing of mineral and forest materials after the war.

Plans are being formulated for post-war construction to continue the development of reservation road systems, but a lack of funds has thus far prevented the making of field surveys and the preparations of blue prints and specifications. This is an essential step in meeting post-war responsibilities.

EDUCATION CONTRIBUTES TO WAR NEEDS

The mobilization of Indian resources, energy, and skills for the needs of the world conflict, has carried over into the educational realm with gratifying results. The effectiveness of the training offered in the Indian vocational schools, throughout the decade just ended, has been demonstrated by the rapid advancement of vocational school graduates to noncommissioned and technical grades in the armed forces, and by the large number of young men and women who have been employed in war work demanding high manual skill.

The great exodus of Indian families has reduced the number of students in both the elementary day schools and high schools by 2,200 from a total of 29,621 in the previous year. Although the total enrollment in Indian Service high schools has been reduced about 20 percent, as a result of the drafting and employment of older students, specialized training of a wide variety, which contributes to the success of the war, is being continued. Many high schools have given

courses in welding and metal work, suitable to the needs of the aircraft and shipbuilding industries.

The Navajo vocational schools have operated preinduction classes for illiterate and semiliterate Navajos, of whom there are a great many. Haskell Institute has offered special training for mature men in plant maintenance and engineering to replace younger employees of Indian schools, agencies, and hospitals, who have joined the armed forces. The commercial department at Haskell has found so great a demand for trained office workers in other branches of the Government that most of its students are now finding placement outside the Indian Service. Other schools have given special training for nursing and other especially needed skills.

Schools of the Indian Service are now planning the part they expect to play in the continued education and retraining of returning veterans under the provisions of the Servicemen's Readjustment Act; and Indian communities throughout the country have requested that we be equipped to undertake such training.

It is noteworthy that a considerable number of Indian students, granted Government loans for higher education, have continued or increased the payments on these loans since entering the armed forces, despite the legal moratorium they enjoy. The number of loan students, however, has been reduced from a previous maximum of 600 per year to 155.

INCREASING INTEREST IN EDUCATION

Increasing interest in education upon the part of Indians themselves has been evidenced by the fact that a number of tribal councils have passed compulsory education ordinances, and enforced such ordinances previously enacted but neglected.

The Navajo Tribal Council has called upon the Indian Service to provide additional schools, asserting that the Government is not carrying out its treaty agreement to supply a classroom and a teacher for each 30 Navajo children presented for enrollment. Also the Council has asked that a high priority be given in post-war planning to the additional boarding and day schools needed for 10,000 Navajo children not now enrolled in any school.

Indian communities have been encouraged to take an increasingly active part in planning for their school children and in outlining a program of post-war development for serving different age groups. The discussions which occurred during the year revealed an almost unanimous enthusiasm for the Federal school program in the closed reservations, to which it is now largely limited.

Research in Indian education has been supplemented by initiating a study of achievement in elementary and high schools, and it is hoped

that an initial report on the effectiveness of Indian schools in achieving their objectives may be presented within the coming year.

The annual Indian Service summer school, primarily for the in-service training of employees of the Education Division, has for the last 2 years been oriented towards war and post-war problems, encouraging a consideration of revised vocational curricula in the light of post-war needs. New teachers have found the summer school most effective as an introduction to the program of Indian education.

EXTENSION WORK

The diminution of Extension funds resulted during the year in the withdrawal of Extension positions on several reservations, such as Eastern Cherokee and Mississippi Choctaw. In such areas the day school teachers and vocational instructors attached to the schools undertook to carry on a program of advice and guidance in agriculture, stockraising, and home extension with the adult Indians. At the day schools on these and other reservations, the Education Division has assigned purebred sires to assist in improving the beef cattle, horses, and other livestock of the reservations. Several years ago, a decision to undertake the up-grading of dual purpose beef and dairy cattle at Eastern Cherokee led to the purchase for the day schools of registered brown Swiss bulls, whose offsprings are now affording better milk and more meat. At the day schools of the Pine Ridge and other Dakota reservations, purebred Morgan stallions are improving Indian cattle horses.

All Home Extension work on reservations with Federal schools is being handled by the day school teachers and housekeepers under the direction of the home economics teachers of the central vocational schools. Home economics equipment is made available for use by adults, and instruction is offered them in sewing, also in cooking by way of increasing their concern over the use of an adequate variety of nutritious foods within the home.

INDIAN ARTS AND CRAFTS

During the past year Indian craft centers have enjoyed a greater demand for craft products than at any previous time. While a great many of the younger craft workers have been away from the reservations, the earnest efforts of craft teachers and the sponsorship of cooperative producing and distributing centers have led, in many cases, to an actual increase in crafts produced and sold. For example, the Northern Plains Indians Crafts Association, which is the outlet for producer cooperatives among the Indian craft workers of the Montana and Wyoming reservations, increased its business from \$6,906.87 in the calendar year 1942, to \$11,135.30 in 1943.

During the same period of time, the sales of Alaskan native crafts increased from \$242,100.67 to \$420,201.18. The latter increase, however, was more a matter of higher prices than of quantity sold, owing to the patronage of American troops stationed in the Territory.

The foundation has been laid for a considerable expansion of craft production in all the major Indian areas after the war. Recently, the Indian Arts and Crafts Board has copyrighted trade-marks for the Navajo Crafts Guild, the Seminole Crafts, and Northern Plains Indians Crafts Association. Copyrights of trade-marks for other producing and marketing groups are pending.

INDIANS ORGANIZE FOR HEALTH

One of the more encouraging developments of the year has been the increasing participation of Indian communities in the health activities of the Indian Service. Health councils were organized by the Indians on a number of reservations, and these are now functioning with marked enthusiasm for the task confronting them. In one instance a salaried board of health, the membership of which is entirely Indian, has been established. Such councils, in collaboration with health personnel and the superintendent of the agency, formulate modern health programs, recommend health legislation to their communities, and assist in presenting approved health policies and practices to their people in such a way as to stimulate interest and win acceptance.

Numerous ordinances, providing for the control of communicable diseases, have been passed by the health councils and approved by the tribes. This democratic approach to Indian health problems is highly significant, and there are indications that the movement will spread to other reservations during the coming year.

SHORTAGE OF HEALTH PERSONNEL

The growing determination of Indians to do something about their own health problems is especially desirable in view of the critical shortage of health personnel. On January 1 of this year, there were 73 vacancies for full-time physicians, 27 for part-time physicians, and 188 for nurses. Some of these vacancies are filled by local temporary employment, so that, in most instances, the essential emergency services are still available.

Cadet Nurses are being assigned to Indian hospitals, with benefit to all concerned; and the facilities thus given to their training is a direct contribution to the war program. Arrangements have been completed for the affiliation of the new Tacoma Hospital with the School of Nursing at the University of Washington.

Indian technicians and orderlies are being trained by Indian Service physicians and nurses to take the places of those now serving in the armed forces and to relieve medical personnel for more important duties.

HEALTH SERVICES OF THE YEAR

Exact tabulation of health service statistics for the fiscal year has not been completed, but the trend has not varied greatly from that of the preceding year. At that time the 94 hospitals operated by the Indian Service in the States and Alaska had 3,255 beds available for general cases and 1,214 for tuberculosis; 40,184 patients were admitted to the general hospitals for a total of 968,993 hospital days, and in addition, there were 4,739 tuberculosis patients given 393,859 days care.

Considerable hospital care has been furnished to families of soldiers and sailors, in cooperation with the Maternal and Child Care Program of the Children's Bureau. The intensive campaign to control and eradicate trachoma has continued, and during the year 2,232 cases were reported by the hospitals. The Bacillus Calmette Guerin or B. C. G. vaccination research project for the control of tuberculosis was carried on under extreme difficulties; but progress continued, and several reservations have reported 100 percent of known cases hospitalized.

Health conditions in Alaska, emphasized by the presence of war workers and the military, have been of great concern. At the close of the fiscal year, the Congress approved the transfer of a 150-bed hospital at Skagway from the Army to the Indian Service. If the necessary personnel can be obtained, the operation of this facility will contribute in large measure to the control of tuberculosis among a highly susceptible people.

The most notable innovation by the Indian health service during the year was the beginning of a complete analysis of vital statistics to determine accurately the Indian population served, birth and death rates, age distribution, causes of death and of morbidity, hospital utilization, economic status with its many implications, and other matters necessary for efficient employment of funds and efforts. When the analysis is completed it should prove of great practical value to the various branches of the Indian Service.

WELFARE ACTIVITIES

Especial emphasis was placed upon a more constructive welfare program, beginning with aid to adult Indians in taking advantage of opportunities offered by the defense industries, and featuring preventive and protective care for children, adolescents, the aged, and the incapacitated. Perhaps the greatest advancement in relief work

during the past year has been in the substitution of cash assistance for rations.

There has been a continuing effort to gain full recognition of the Indians as citizens of their home counties and States, with the responsibilities as well as the privileges of other citizens. It is good to note that the State of Colorado, on January 1 last, began issuing assistance under the Social Security Act to needy Indians of the Consolidated Ute Reservation. Efforts are being made to have the Sac and Fox Indians of Iowa included in the State aid to dependent children program.

As throughout the Nation, there has been a considerable increase in juvenile delinquency, and in other problems traceable to faulty adjustments away from home, as well as in families disrupted by the absence of the father. Our program is planned to meet such situations, continuing to stress adequate aid for the needy, wholesome recreation for the whole family, and particularly for adolescents. Careful attention is being given to the needs of returning servicemen and defense workers.

AWARDS OF EXCELLENCE

Four Indian Service employees, Mr. and Mrs. C. Foster Jones and Mr. and Mrs. Charles Ralph Magee, received awards of excellence and meritorious promotions voted by the Interior Department's Board of Suggestions. Mr. and Mrs. Jones, radio operator and teacher, respectively, on the island of Attu in the Aleutians, remained courageously at their posts after war was declared; and when Attu was taken by the Japanese in June 1942 they either became prisoners of war or lost their lives resisting the enemy. When Attu was retaken no trace of them was found and no word has been received from them, but it is hoped that they are alive and will return to their work after the war is over. Mr. and Mrs. Magee, holding similar positions on Atka, managed by heroic measures to evacuate the population of the island without loss just before the arrival of the Japanese, and they accompanied the Aleuts to temporary homes on the mainland.

HOONAH VILLAGE BURNED

Fire broke out in Hoonah Village, Alaska, on the evening of June 14, when, according to reports, an Indian woman who was drying fish in a little stilt-supported house threw gasoline on the embers of her fire. A high wind spread the flames rapidly and about 70 percent of the village was destroyed, leaving 350 persons homeless. One man lost his life. Coast Guard officers flew to the scene, and the Army, at the request of Indian Service officials, evacuated many of the homeless to Excursion Inlet, where barracks were available for

temporary shelter. The Red Cross, through the Sitka, Juneau, and Kechikan chapters, sent food and blankets. Planning was begun at once by the Indian Service, in cooperation with other Government agencies and the Army, for rebuilding and resettling the village.

TRIBAL CLAIMS

One of the important objectives to be obtained in the post-war period is the early settlement of Indian tribal claims against the United States, which, for patriotic reasons, have not been pressed during the war.

The Indians look forward to the settlement of their claims as a means for their economic advancement in the post-war period. The proceeds from favorable judgments will be used largely to acquire additional needed land, to build homes, and to develop land enterprises. Consonant with this plan, legislation has been enacted to enable the Menominee Indians to acquire reservation lands in Wisconsin from the proceeds of the judgment rendered by the United States Court of Claims last February. Negotiations are being made for settlement of the claims of the California Indians by an appropriation to be used during the post-war period for the economic advancement of these Indians.

The establishment of an Indian Claims Commission would relieve the Congress of the burden of considering each claim at a time when other matters of great moment will require attention. Also, such a commission would relieve the Court of Claims at a time when doubtless it will be overburdened with litigation. The Indian office has urged the creation of such a commission, and will continue to do so.

INTER-AMERICAN ACTIVITIES

In Mexico City, on April 18, 1944, the governing board of the Inter-American Institute of the Indian held its annual meeting, exactly 4 years after the first great Congress of the Indians at Patzcuaro, Mexico. Twelve republics have now united themselves with the Institute through treaty. They are: Mexico, El Salvador, Panama, Honduras, Nicaragua, Ecuador, Colombia, Peru, Costa Rica, Paraguay, the Dominican Republic, and the United States. Others are preparing to join in the movement. At the annual meeting, particular attention was given to the project of the National Indian Institutes of Panama, Nicaragua, and Ecuador, cooperating through the Inter-American Institute with the National Indian Institute of the United States, for the establishment of health work at the subprofessional level. This project includes a study of the feasibility of uniting modern health work with the work of native medicine men, and the organization of subprofessional health services in the necessary absence of a sufficient supply of doctors and nurses.

Attention was given, also, to the Indian personality project, carried out under the Inter-American Institute in Mexico. This project has been successful in using the services of many types of professional and lay workers, including Indians, and promises to be deeply revealing on both the administrative and psychological levels. It is an integrative study, paralleling that now going forward in our own Indian Service.

On Indian Day, the purposes and hopes of the Institute were broadcast throughout Mexico, Central America, and northern South America, through speeches by Dr. Manuel Gamio, Director of the Institute, Senor Isidro Candia, the Director of the Indian Service of Mexico, and Commissioner Collier, who had been reelected as chairman of the governing board.

MISSION TO EL SALVADOR

During his visit to El Salvador last summer, Mr. Ernest E. Maes, Secretary of the National Indian Institute, was much impressed with the program set up there by the Confederation of Rural Credit Funds. As our Indian Service has been greatly interested in developing a self-liquidating agricultural system for Indian farmers, Mr. Maes felt that someone should be sent to El Salvador for the purpose of studying the program there in operation.

Mr. David C. Dozier, a young Santa Clara Pueblo Indian employed at the United Pueblos Agency in Albuquerque, was chosen for the mission, which he performed during February with profit to all concerned. In sending Mr. Dozier on this mission, the National Indian Institute was fulfilling its function of developing collaboration among Latin-American countries and our own country in the solution of Indian problems.

LOOKING TO THE FUTURE

The fiscal year 1943 marked the end of 11 years during which there had been a tremendous release of long-dormant Indian energy, a vigorous functioning of inherent Indian democracy, and a rebuilding of the shrunken Indian landed estate. It was necessary to know how much progress Indians had made during those 10 years in the direction of democratic self-control and economic self-sufficiency, and what might best be done to safeguard and improve Indian organization and economy for the trying test of the post-war period.

For 2 years research, designed in its end result to criticize and implement policy and administration in Indian Service, has gone forward in 11 contrasting communities in 5 contrasting tribes. The Committee on Human Development, of the University of Chicago, and specialists from a number of other institutions, have contributed indispensably. These studies have used integratively the instruments

of discovery of anthropology, psychology, ecology, and medicine. The initial results are now in process of publication or ready for the press. Information acquired by these studies and the practical experience of Indian Service administrators, augmented by consultation with experts in personnel and public administration, will be used in the coming months to produce critiques of Indian administration which well may prove far reaching and practicable for the administration of native groups.

These intensive researches and their practical utilization are confluent with the production, service-wide but less intensive, of detailed, factually based post-war plans by the Service personnel and the Indians in all jurisdictions of the Service. Early in the fiscal year Indians and field employees were requested to review past accomplishments and present conditions; to analyze the social, economic, political, and administrative problems of each tribe or group; and on the basis of such an analysis to consider the future relations of each tribe or group to the Federal Government, to the States and counties, and to the non-Indian population.

It was realized that the basic resources of nearly all tribes were inadequate; that the enlargement of resources and their effective use by Indians presented many difficult problems; and that the functioning of the reorganized tribes as civic or corporate bodies was in need of much improvement.

In response to this call of a year ago for the gathering and interpretation of facts, opinions, and suggestions, 64 detailed proposals for post-war programs, dealing with the problems of 120 tribes and groups, have been submitted. These proposed programs are now being carefully analyzed and revised. Upon approval in their final forms, they will serve as maps whereby the Indian tribes and bands concerned, in cooperation with the Department and with the support of the Congress, can determine definite courses which will lead them to the common goal of self-sufficiency and harmonious integration with the national life.

Division of Territories And Island Possessions

BENJAMIN W. THORON, Director



THE magnificent accomplishments of the armed forces in freeing Alaska of the Japanese invaders, relieving Hawaii of the probability of attack, and virtually clearing the Caribbean area of the submarine menace, point to the necessity for developing a post-war program by the Division of Territories and Island Possessions. It has, however, been unable to make much progress because of the reduction of its appropriation necessitating reduction in staff at a time when many new problems must be met. The action of Congress in still further reducing the 1945 budget leaves the Division in a desperate situation.

The Division of Territories has been keenly aware that the position of Alaska is one of national strategic importance. Public interest has been greatly stimulated as a result of war activities, the building of the Alaska Highway, and various articles in the press and magazines. As a consequence, inquiries from servicemen and civilians relative to post-war opportunities have flooded the Division. In cooperation with the General Land Office and other bureaus an effort has been made to supply information that is factual and will be helpful to settlers desiring to build their future on the new frontier. The development of an Alaskan program by coordinating the work of the various bureaus within the Department is essential and the Division has tried to make a start on this. Hospitals for the treatment of tuberculosis among both white and native populations are urgently needed. Negotiations are now under way to have the military facilities which are no longer considered necessary for the treatment of war casualties, transferred for the use of the civilian population. The disposition of other surplus military property and equipment to Federal and territorial civilian agencies can be of great permanent value, where its sale

to dealers and speculators for cash as salvage will lead to much greater Federal expenditure in the future.

The Alaska Railroad continues to do heavy duty for military and civilian needs. In spite of manpower shortages and difficulty in securing equipment, every effort has been made to improve the roadbed, bridges, and rolling stock. The Division has worked in close cooperation with the War Manpower Commission and the War Department to recruit help, and with the Office of Defense Transportation and the War Production Board to secure priorities for materials and equipment.

Since the changed military situation in Alaska during the summer of 1943, the need for governmental stockpiles of food for civilians no longer exists. Liquidation of these stocks has been proceeding in an orderly and businesslike manner, through sales to the trade, other agencies, and to the Army and Navy, and is rapidly nearing completion.

The Morningside Hospital at Portland, Oreg., where insane residents of Alaska are cared for, was inspected, and conditions were found to be satisfactory.

The position of Hawaii has changed from a defense outpost to a base for offense. As a springboard for the South Pacific, it still has all of the problems of a war theater. Civilians feel the pinch of housing and shipping shortages. Although martial law remained in force, conferences were held between this Department and the War, Navy, and Justice Departments, looking to the complete restoration of civil affairs to civil authorities and some relaxations of military controls were obtained. The validity of the trial of civilians by provost courts was challenged in the Federal District Court. Both Federal judges ruled against the military, and appeals were taken to the Circuit Court of Appeals at San Francisco, but had not been argued by the end of the year.¹

The Division, working in cooperation with the Hawaiian Housing Authority, was successful in securing an interim housing program providing for 250 publicly financed dwelling units and 500 privately financed dwelling units. This allotment was predicated largely on the availability of manpower and matériel. While it does not begin to meet the need, we hope that a more extensive program may be undertaken in the coming year. The Territorial Office of Civilian Defense, which has done an outstanding job in instructing civilians in all phases of defense activities, has discontinued many of its branches. However, it maintains a skeleton force and its employees, both paid and voluntary, demonstrated their training in a recent serious explosion and plane crash. By rigid control of expenditures it still

¹ By proclamation of the President dated October 19, 1944, martial law was terminated and the privilege of the writ of habeas corpus was restored, effective October 24, 1944.

retained a sufficient balance of the appropriation made in January 1942 to carry through the 1945 fiscal year.

Of outstanding interest and importance to the possible future relationship between Puerto Rico and the continental United States was the meeting of the President's Advisory Committee to draft recommendations for revising the Island's Organic Act with a view to granting to the people an increased measure of control over their local affairs, including the popular election of their Governor. The committee consisting of four Puerto Ricans and four continentals under the chairmanship of the Secretary of the Interior met in Washington for 3 weeks in July and August and drafted a bill providing for election of the Governor by the people, appointment of the justices of the Supreme Court and of all department heads by the Governor, together with other amendments to the Organic Act consistent with these provisions and increasing local self-government. The bill was transmitted by the President to Congress. It passed the Senate with numerous amendments, but has not yet been taken up by the Insular Affairs Committee of the House of Representatives.

The Civilian Food Reserve unit of the Division of Territories, working with the Office of Distribution of the War Food Administration, during the year procured and shipped to Puerto Rico and to the Virgin Islands a total of 479,715 tons of foodstuffs, feeds, and fertilizers. There were ample supplies of basic commodities and the prices during the year were stabilized in a very satisfactory manner.

In line with our expressed policy after discussion with our Trade Advisory Committee, 41 food and feed commodities, involving approximately 8,000 tons monthly, were returned from governmental procurement to the regular trade channels. The return of additional commodities is being made as rapidly as there is assurance that adequate supplies can be maintained at reasonable prices.

While shipping to Puerto Rico was still severely restricted, the supply situation was met satisfactorily, considering the prevailing wartime conditions, through the continuance of governmental control of shipping space as described in last year's report.

The complete lack of war industries in Puerto Rico, the cessation of military construction, a severe drought that reduced sugar production materially, and the discontinuance of the work relief program of the Federal Works Agency all aggravated the Island's unemployment problem. The Insular Government immediately appropriated funds for direct and work relief. Induction into the armed services of more than 25,000 men also helped to relieve conditions. The Division assisted in working out plans in conjunction with the War Manpower Commission and the Governor's office to bring several thousand Puerto Ricans to the mainland to relieve the manpower shortage in war industries. The War Manpower Commission did not obtain the neces-

sary appropriation to finance their transportation, but over 2,500 Puerto Ricans have come, some paying their own way and seeking employment individually, others transported at the expense of employers who contracted for their services through the War Manpower Commission.

Steady progress is being made by the Puerto Rico Development Co. in the introduction of new industries to supplement the Island's agricultural economy. Private interests are constructing a coconut fiber bag plant, and a leather goods manufacturer has begun operations in the west end of the Island. Continental industrialists are showing increased interest in the Island. The Division and the Development Co. have not only aided those firms which have begun operations in the past year but have encouraged those who are looking to the Island as a possible post-war base for branch plants in which to manufacture goods for South and Central American trade.

During the year the President issued an Executive order which places on the Secretary of the Interior responsibility for coordinating the policies and activities of all Federal civil agencies in Puerto Rico and the Virgin Islands. Most of the agencies have cooperated effectively with the Division of Territories with a resultant improvement in the services provided in the Islands. The reduced appropriation for personnel in the Division has made it impossible to make this coordination fully effective.

In the fiscal year full or partial settlements have been received or agreements reached in 530 cases of hurricane relief loans, with collections totaling \$135,835.05, as compared with a total of 852 adjusted in the preceding 4 years. New procedures have been instituted to expedite the settlement of these loans. Small debts of farmers living in isolated mountain areas have been handled expeditiously through the Agricultural Extension Service of the University of Puerto Rico.

The need for molasses for munitions production made it necessary for the War Production Board to establish quotas for the importation of beverage cane spirits from foreign countries and for the production of the same product in American Caribbean possessions. The Division energetically presented the case for Puerto Rico and the Virgin Islands at conferences of the interested agencies. The resulting quotas, while not fully satisfactory, have permitted the operation of the distilling industry in these islands at something less than 50 percent of capacity. The effect on the revenues and employment will be very noticeable in the coming fiscal year unless the restrictions are removed.

The failure of Congress to appropriate the salary of a Government Secretary for the Virgin Islands, upon which office the Governor's duties devolve in his absence, resulted in that position remaining vacant from the time of the resignation of Robert Morss Lovett. This has resulted in an enormous burden on the small administrative staff

of the Virgin Islands Government and the restoration of this position is essential. After the Federal Works Agency work program was liquidated at the end of November 1943, a bill was introduced in Congress containing a program of specified public works. Hearings have been held by the House Committee on Insular Affairs but no further action has been taken.

The Virgin Islands Co. enjoyed a prosperous year. The Bethlehem sugar factory, which had been rehabilitated with Public Works Administration funds, was put in full operation for the first time in 14 years and 33,200 tons of sugarcane were ground. It is expected that the operation of this mill will bring about increased cane planting and so add to the income of the small farmers of the islands.

As a result of the responsibility of the Department for matters affecting Puerto Rico and the Virgin Islands, the Division has participated actively in the work of the Anglo-American Caribbean Commission. Puerto Rico and the Virgin Islands were represented by their own delegates at the first West Indian Conference held at Barbados, March 21-30. The Director also attended as an adviser to the American Commissioners. The interchange of information and ideas among the people and officials of the various islands may well lead to a better understanding of the community of their problems and to trade relationships that will be extremely beneficial to the whole area.

Although the Philippines are still under enemy control, concern for their future is evidenced by the approval in November 1943 of a bill relating to their rehabilitation, a joint resolution of Congress relative to the establishment of an independent government after the enemy has been driven out and the approval of a joint rehabilitation commission to study and make recommendations on post-war problems. Certain fiscal responsibilities continued to be exercised by the Division, but because of the failure of Congress to appropriate funds it was not possible to make any constructive preparation for the time when the Commonwealth Government returns to the islands.

A more detailed report of activities in each area follows:

TERRITORY OF ALASKA

Although the last Japanese on Alaskan soil was exterminated or had fled in the summer of 1943, Alaska still retained on June 30, 1944, its status as a combat area. What military activity there was, however, had been transferred to the Aleutian chain. Civilian travel control, censorship, and other military restrictions still remained.

Recognition of the present and future military importance of Alaska has come with the establishment by the Army of the Alaskan Department to supersede the former Alaska Defense Command, commanded from San Francisco, and establishment by the Navy of the Seventeenth

Naval District to supersede the Alaska Sector of the Thirteenth Naval District, commanded from Seattle. Both of these new commands have their headquarters in Alaska.

A similar recognition of Alaska's importance and of its special character in a different field—and one of the greatest economic importance—came with the establishment of the Territory as region 6 of the Fish and Wildlife Service under its own Regional Director with headquarters at Juneau. Under the Regional Director, a fishery management supervisor and a game management supervisor superintend the vast natural resources in their respective fields.

The establishment of an Alaska regional office in Anchorage of the Civil Aeronautics Board is likewise a recognition of the great importance and potential growth of civil aviation in the Territory.

In the War-bond drive Alaska maintained its record of surpassing its quotas and of leading the Nation. In the Fourth War Loan, Alaska raised 202 percent of its quota. In second place was the other Pacific Territory, Hawaii, with 175 percent. This record is all the more striking since, while Alaska was the only political entity to subscribe more than double its quota, only two States exceeded their quotas by as much as 50 percent.

Although the Territory had made no provision up to the end of the fiscal year for a planning or development commission to formulate a post-war construction program, both to meet the Territory's needs and to provide for the returning veterans, a start has been made by the Governor's office which has requested individual communities to study their needs and to submit desired projects with approximate cost estimates. To date requests for projects totaling \$23,050,500 have been received from the following Alaska towns: Anchorage, Craig, Cordova, Douglas, Fairbanks, Haines, Juneau, Kodiak, Ketchikan, Nome, Petersburg, Sitka, Skagway, Seward, Unalaska, Valdez, Wrangell, and Whittier. Estimated costs for post-war projects submitted thus far by Territorial and Federal agencies total \$36,434,625. These estimates have been submitted by The Alaska Railroad, the Alaska Road Commission, the Forest Service, the Fish and Wildlife Service, the Office of Indian Affairs, the Public Roads Administration, the Territorial Department of Education, the Territorial Department of Health, the University of Alaska, the Department of Justice and the Post Office Department. Post-war planning for Alaska is, however, far behind what it should be, especially in comparison with other political units—virtually every State in the Union having long since established its planning and development commissions.

While war continues to be, in Alaska, as elsewhere under the flag, the overshadowing fact, Alaskans have in the last year become acutely and increasingly aware of another insidious enemy within. It is the "White Plague." The incidence of tuberculosis has long been high in

Alaska, approximately twice that in the 48 States, with correspondingly high mortality. Apparently the disease is on the increase. The last, the Sixteenth Territorial Legislature was the first to indicate the awakening local interest in this peril by appropriating \$25,000 for the Territorial Department of Health for the hospitalization of tubercular patients. But since the health authorities estimate that there are at least 2,000 active cases in the Territory that require hospitalization—for only 5 percent of which hospital beds are available—this is only “a drop in the bucket.” Efforts during the last year to secure the construction with Federal funds of additional hospitals for tuberculosis have failed, because new construction requires military endorsement. Attempts to secure from the Alaskan Department of the Army one or more of the various new hospitals constructed for war purposes and closed as the military situation changed and the war moved westward, were likewise unsuccessful. Fortunately, however, the Northwest Service Command, which had jurisdiction over a small portion of southeastern Alaska, took a different attitude and was agreeable to the transfer of the abandoned military hospital at Skagway for the purpose. At the close of the fiscal year authority was obtained for the transfer of that hospital to this Department and an appropriation was made by Congress to finance the operation of the hospital for native tuberculosis patients, at least until the next Territorial Legislature, convening in 1945, could determine its desires and responsibilities in the matter, and make provision for operation of the hospital for all civilian tuberculosis sufferers.

THE ALASKA ROAD COMMISSION

The Alaska Road Commission has worked under difficulties due to shortage of labor and equipment but it has succeeded in keeping the main highways in passable condition to meet civilian as well as military traffic demands. The Glenn Highway was kept open throughout the winter. Maintenance work on the Alaska portion of the Alaska Highway was transferred from the Army to the Road Commission at the close of the year.

Reconstruction and improvement work on the Richardson Highway, necessary to make it suitable for the heavy truck traffic to which it was subjected was continued to the limit of available funds. Several new steel spans were substituted for weak and inadequate wooden bridges and trestles. No new mileage was constructed.

ALASKA RURAL REHABILITATION CORPORATION

The Matanuska Valley project has shown notable improvement. The total area of cleared land is over 6,000 acres, of which 4,000 are in cultivation. The Army and increased civilian population of central Alaska have created good markets for all products of the valley.

The farmer's cooperative is now supplying all of the fresh milk and cream used in Anchorage and is in sound financial condition. Several of the original colonists have paid their indebtedness in full and repayments generally are more satisfactory than formerly. With the approval of the Secretary of the Interior, the Board of Directors voted to eliminate all restrictions contained in land contracts when full payment is received and to issue fee simple deeds. Several tracts abandoned by or repossessed from original purchasers have been sold to new settlers. The Matanuska Colony is well on the road to becoming a thriving community of hard working, successful farmers and homemakers, fully justifying the sponsorship of the project by the Federal Government. Agricultural development in the Kenai Peninsula and in the Tanana Valley is also showing progress.

THE ALASKA RAILROAD

Operations of the Alaska Railroad were the most successful in its history. For the second successive year, the volume of both freight and passenger traffic exceeded all previous records. Net ton-miles of revenue freight carried were more than four and one-half times the volume in 1939, and passenger miles were more than twice those in 1939, the last year before war activities affected transportation.

Shortage of skilled manpower continued as the most serious operating problem throughout the year. The Railway Operating Battalion, loaned by the War Department on a reimbursable basis, continued to render valuable assistance throughout the year. Nevertheless, the railroad was handicapped by a continuing shortage of qualified personnel, especially in its repair shops at Anchorage. Strong efforts were continued throughout the year, with assistance of the Alaskan Department of the Army and the United States Employment Service, to recruit civilian personnel in the States. The results of these activities have been only partially successful. A comparable labor situation prevailed in Alaska's coal mines. However, the Eska Mine, operated by the railroad, produced 67,300 tons of coal.

New construction included an addition to the Anchorage roundhouse, a new engine house at Fairbanks, and extensions to sidings at a number of stations, totaling approximately 13,000 feet. An extensive tie renewal program was carried on throughout the summer months of the fiscal year and extensive ballasting was undertaken on the Whittier line and at other points. Efforts to improve the standard of maintenance were, however, limited by shortage of manpower.

To provide adequate wartime transportation it was necessary to purchase much additional rolling stock and equipment, most of which unfortunately had to be second-hand.

The Whittier Cut-Off has been in full operation throughout the year with the result that the railroad has been able to handle a large

increase in the volume of freight traffic without a corresponding increase in existing equipment and with approximately the same number of employees. Two new Diesel locomotives were purchased for operation on the Anchorage-Whittier line in lieu of providing forced draft ventilating systems in the tunnels necessary for operation of steam locomotives. Many of the terminal facilities at Whittier were completed and turned over to the railroad for operation.

River boat service on the Yukon and Tanana Rivers was maintained throughout the summer season. The river fleet was augmented by the transfer from the War Department of the steamer *Barry K*, and the loan of two barges. Also a new 300-ton barge was completed and placed in service. The amount of river freight handled increased approximately 10 percent, totaling 15,412 tons.

The McKinley Park Hotel was not operated by the railroad, as it has been turned over to the Army for the duration of the war as a recreation center for the Alaskan Department. Groups of officers and men from outlying posts are given the opportunity of spending a week's leave at the park.

TERRITORY OF HAWAII

During the fiscal year Hawaii continued to accommodate all of its governmental and its commercial and industrial facilities to the maintenance of internal security and to the military effort centered in these islands. Planning for the future necessarily has been subordinated, but it has not been neglected.

The Governor established a post-war planning division of the Department of Public Works and an advisory board to assist this division. This agency is coordinating all other local efforts to formulate plans and policies involving the development of Hawaii's natural and human resources and the expansion of its facilities to the highest attainable degree of usefulness to itself and to the Nation.

The operating experience of agencies created under the Governor's emergency powers to meet war-created problems has provided a record which should be of great value in establishing future legislative policies. Citizens, trained as wardens and as auxiliary police and fire-fighters and defense corps, are unified and alert to the requirements of community safety.

The problems which have had to be surmounted in connection with the control and development of food production and importation, and the procurement locally and from the mainland of other essential civilian commodities, have emphasized our dependence upon regular trans-Pacific shipping facilities and the necessity for future expansion of local production for local use.

Widespread development of community interest in mosquito and rodent control and in other public health security measures fostered

by the various territorial, Federal and municipal agencies involved, will pay dividends for years to come. Dengue fever, which became epidemic about the beginning of the fiscal year, was under control at its end. The disease was probably brought here from the western Pacific, which emphasizes the necessity for the intensification of protective measures (including embargoes against and quarantine of animals) designed to prevent airborne passenger and freight transport from bringing to Hawaii or to the continent human or other diseases which are prevalent in areas to our west.

Two new public health centers, constructed with Federal funds, were opened during the year. Lanham Act funds also helped to provide additions to Hawaii's general and mental hospitalization facilities. At least one of the hospitals established as part of the emergency medical service will remain as a community asset at the end of the war. Plans exist to continue the emergency blood bank on a permanent basis. Compulsory "booster" injections of typhoid vaccine, the second since Pearl Harbor, provided immunization which should tend to keep down this disease in the future.

Construction had started on two new refuse incinerators in Honolulu, partly financed with Federal funds, and the municipal government was in the midst of a survey of sewerage requirements which should, prior to the war's end, produce final plans for the complete sewerage of Hawaii's capital city.

Some progress was made toward solution of the continuing acute housing problem and efforts are continuing. All agencies concerned are endeavoring to tie in relief of current conditions with post-war plans for slum clearance and orderly community development.

All major territorial seaports and harbor facilities and all airports continue to be operated under the direction of the military authorities, but payment for the use of territorial wharves is now being made by the Army and Navy. Extensive reconstruction and repair of harbor facilities will be necessary at the war's end. Substantial improvements have been made to major airports by the armed forces. Plans for continuation of these improvements are being prepared. Highway maintenance; i. e., prevention of total disintegration, continued to be a major problem and reconstruction will afford a major source of post-war employment if efforts to secure war damage reimbursement are successful. The Territorial government urges strongly that since the deterioration of the highways is due to their use by vehicles of the armed forces of a weight and character for which they were not built, those services should be obliged to finance their reconstruction. New construction, except for the Pearl Harbor Road, was confined to military access roads financed by Federal funds.

Large park and other recreational areas are still devoted to active military use. Plans are ready for coordinating the extensive restora-

tion work which will be necessary with further improvement and extension of these areas.

Hawaii's teen-age citizens again cheerfully assisted in the production of its vital crops. Retail and other business remained at a relatively high level in spite of acute manpower shortages and continued curtailment of shipping space. Tax collections, both Federal and local, and bank deposits and postal receipts increased over the previous year. Territorial and county bonded indebtedness is being reduced, which will increase post-war borrowing capacity. Previously established rationing and price control procedures continued to be effective. Control of commercial rents was effected by a Defense Act rule.

Territorial, municipal, and Federal departments and agencies, as well as the post-war planning division and certain committees, are formulating plans for the reassimilation into Hawaii's economy of her returning servicemen.

Administration of Hawaii's civilian affairs by civilian agencies, existing under the authority of law, was further extended during the year.

PUERTO RICO

The year has seen the tides of war recede from Puerto Rico but the effects of the crucial danger period of 1942 are still noticeable. In spite of this it is not possible to relax in vigilance as Puerto Rico's life blood flows through arteries of ships. So long as the war is on, the possibility of the diversion of ships for our invasion needs or of a final desperate attempt by the enemy to destroy our commerce through a renewed submarine campaign, necessitates Puerto Rican preparedness to keep its people from starvation.

Unlike the continental United States, the war has brought little benefit to the people of Puerto Rico with the exception of increased revenues from rum. Even this has been a mixed blessing as it has been used as a reason for reducing Federal aid to the Island and for proposals to change the fiscal relationships that have existed for over 40 years. The Federal Works Agency liquidated its work relief program on the island on November 30, 1943, and the Insular War Emergency program financed by these internal-revenue taxes carried on the task of providing work for the island's unemployed. Military construction dwindled during the year until at the present time there is virtually none. The unemployment created by the completion of this work has been partially offset by increased inductions into the armed services, although the benefits do not always go to the same families. The short sugar crop of this year meant less work for many thousands of workers. No war industries are located in Puerto Rico although plans are being formulated to utilize the needle-work trades in the manufacture of garments for the liberated peoples of

the world under the United Nations Relief and Rehabilitation Administration program.

Keen interest is always displayed in politics in Puerto Rico, but with the approach of the elections in November, the battle cries of the opposing forces become almost deafening. The annual session of the insular legislature which started in February was unfruitful because of the impasse between the Senate and the Lower House; and only legislation of minor importance was passed. One very serious result of the deadlock was the failure to pass a bill appropriating additional funds for relief and work projects. This has led to litigation to test the applicability of section 34 of the Organic Act which provides for the automatic reenactment of appropriations in the event of a deadlock.

Puerto Rico has followed with passionate interest, the proceedings of both the Senate and House committees which are considering the proposed changes in the Organic Act.

AGRICULTURE

A prolonged and severe drought, the worst on record, had a serious effect on all crops. Sugar production, the biggest employer of labor, dropped from a normal of over 1,000,000 tons to 728,000 tons because of the previous year's fertilizer shortage and the drought. The Agricultural Adjustment Agency will make deficiency payments to growers for crop losses due to the drought. The quality and yield of tobacco were both adversely affected.

The effects of delayed and lost planting on many root and vegetable crops will be felt for some time to come. For a time this spring there was a relative shortage of locally grown vegetables and these were of an inferior quality.

INDUSTRY AND COMMERCE

The manner in which a limitation on the production of rum in Puerto Rico was imposed as a consideration to Cuba to make its molasses available for industrial alcohol production created a very bad impression in Puerto Rico. Although recent partial relaxation of the limitation similar to that granted Cuba at the same time has helped to relieve this situation, almost the entire quota for the calendar year had been produced by midsummer and the resulting unemployment and loss of revenue for the fiscal year 1945 are viewed with alarm.

Slow but steady progress is being made in the introduction of new industries. The glass plant, under construction by a subsidiary of the Puerto Rico Development Co., ran into unforeseeable wartime delays but is now rapidly nearing completion. The ceramics plant is functioning well and plans are formulated for expanding its operations into other types of clay products. Construction of the

paperboard factory has been started and plans are virtually complete for the wallboard mill. A proposed spinning and weaving mill for coarse fabrics and sugar bags is still in the planning stage. Private interests are about ready to start operation of a coconut fiber bag plant which is being completed at Mayaguez and a leather goods manufacturer is now operating in Cabo Rojo.

While many types of consumer goods are either nonexistent or scarce, the variety and quantity of goods on merchant shelves has shown a steady increase. Generally, merchants have suffered little or no financial loss despite shortages of goods because of higher than normal profit margins.

LABOR

There has been considerable unrest in labor ranks this year, particularly in the sugar industry. The time lost in strikes, however, has not been higher than usual. The two principal unions are engaged in a struggle to determine which will be the bargaining agent for the sugar workers. The Insular Labor Relations Board with the assistance of technical advisers lent by the National Labor Relations Board has held hearings on the question of an election among the workers to settle the issue.

THE CONSUMER AND THE COST OF LIVING

The War Food Administration, the Department of the Interior, the War Shipping Administration, the Office of Price Administration and agencies of the insular government have effectively cooperated to see that Puerto Rico was supplied with its basic needs and that prices did not skyrocket. Wages have increased in Puerto Rico during the war period but have not kept pace with the increased costs of living. The purchasing power of the wage earner's dollar of March 1941 has dropped to 71 cents and on some items such as food and clothing to 66½ cents. However, virtually no change has occurred in the purchasing power of the dollar in over a year and further devaluation of the dollar has been successfully blocked.

The total dry cargo tonnage for civilian use received during the 12-month period ending June 30, 1944, was 875,839 short tons, compared with 636,330 short tons received during the 12-month period ending June 30, 1943.

In accordance with previously announced policy, the procurement of many types of foodstuffs as well as animal feeds has been returned to private channels as fast as supply conditions warranted. The transfer of responsibility in most instances was accomplished without serious disturbance of distribution. The increase in available shipping tonnage has also permitted the importation of numerous articles which were of a less essential nature but desired by the people to be resumed.

THE FUTURE

Undoubtedly, the rate of revenue that Puerto Rico has received from internal revenue taxes will decline appreciably as beverage alcohol production increases in the States. Plans have been made to use the surpluses now in the Treasury for the permanent benefit of economic and social conditions on the island. It has been impossible during the war to obtain the building materials and supplies to do the seriously needed work on schools, housing, sanitation and hospitals. Plans for all of these have been prepared and this work can start as soon as material is available.

THE VIRGIN ISLANDS

This year saw the application to the Virgin Islands, for the first time, of the Selective Training and Service Act of 1940. As this act was not heretofore applied to the Virgin Islands, registration of Virgin Islands youth for service in the armed forces of the United States was not accomplished until the President of the United States by proclamation dated October 26, 1943, directed the registration of all male citizens of the United States not previously registered. Registration of Virgin Islanders began in November 1943. The first induction call was made in June 1944. At the close of the fiscal year there were 2,185 registrants in the age group 18-44 under the jurisdiction of the St. Thomas local board and 1,475 under the jurisdiction of the St. Croix local board. In the first call for 200 inductees, 149 were supplied from St. Thomas and 62 from St. Croix, all of whom were volunteers for immediate induction.

The financial condition of both municipalities improved materially during the year, especially in the municipality of St. Thomas and St. John where income taxes yielded \$1,295,380.50 as compared with \$465,447.76 in the preceding fiscal year, an increase of 178.3 percent.

In the municipality of St. Croix income tax collections were \$114,836.45 as compared with \$46,977.22 in the preceding fiscal year, an increase of 144.45 percent. Total revenues of this municipality amounted to \$262,684.89 as compared with \$194,440.62 in the preceding year, an increase of 35 percent. This tremendous increase in revenue from income taxes is attributable primarily to the prosperity of the rum manufacturing business as well as the increased rates and lower exemptions.

The municipality of St. Thomas and St. John, with its surplus revenues, created a hospital building fund with a deposit of \$200,000; a high school building fund of \$50,000; a sewer system fund of \$150,000; a reserve fund of \$100,000; and a scholarship fund of \$10,000. Almost \$300,000 of these funds were invested in War Savings bonds. In spite of increased revenues the municipality of St. Croix still re-

quired a congressional appropriation to meet the deficit in its treasury, even though municipal services have continued at a minimum.

The withdrawal of the Work Projects Administration of the Federal Works Agency from the Virgin Islands in December 1943 left a considerable number of unfinished projects. It also eliminated relief employment for approximately 1,500 persons. Projects for nursery schools, school lunches, sewing, health, and vegetable growing projects, formerly operated by the Work Projects Administration, were taken over and operated by the Municipal Governments from December 1943 to June 1944. With the curtailment of employment on defense construction projects in St. Thomas during the closing months of the fiscal year, unemployment conditions were accentuated. In St. Croix there was considerable unemployment until the Virgin Islands Co. opened the cane harvesting season late in February which continued well into the month of May. It is estimated that there are at the present time between 1,500 and 2,000 unemployed employables in the Virgin Islands. For a small portion of these, employment will be provided on municipal projects made possible by the increase in income taxes on largely increased distilleries' profits.

Legislation was introduced in Congress for extension to the Virgin Islands of the benefits of those titles of the Social Security Act providing for old-age assistance, aid to dependent children, aid to the blind, maternal and child welfare and public-health work. As American citizens, Virgin Islanders should share equally with continental citizens in the benefits of this act. Certainly there are few spots under the American flag which so desperately need these aids. No action has been taken on this bill beyond hearings held by a subcommittee of the Senate Finance Committee.

The Agricultural Experiment Station continued its efforts to improve farming practices and livestock for the farmers of the Islands. For years the policy of the station has been to provide extension and demonstration services. Experimentation has been reduced to a minimum. Limited appropriations have prevented an adequate broadening of the scope of its usefulness. It is proposed to request sufficient funds to carry out a real program of agricultural extension which includes growing and distributing various kinds of vegetable slips, importing and selling vegetable seeds, growing of field corn for seed distribution, using station equipment for land preparation for small farmers, classroom lectures and field demonstrations in agriculture, instruction by staff members in better methods of planting and cultivation processes, breeding and selling of purebred animals to improve the breeds on the Islands and free veterinary service.

For many consecutive years, municipal departmental operations in the Islands, particularly on St. Croix, have been below reasonable standards. Employees have been underpaid. Buildings have de-

teriorated, hundreds of pensioners were receiving pitifully low monthly allowances. The lepers have had woefully inadequate provisions. Commercial and vocational education were hardly existent. Water supply is precarious and insufficient for drought periods. The increase in revenue of the municipality of St. Thomas and St. John during the past 2 years enabled correction of many of these deficiencies in that municipality. Departmental operations have been improved and expanded. Scholarships in health education, public-health nursing and agriculture have been provided. In the municipality of St. Croix an increase in revenues during the past fiscal year and an estimated increase in the coming fiscal year have been budgeted to relieve some of the worst of these deficiencies and also to liquidate the indebtedness which has been long hanging over St. Croix's head—monies which were borrowed to meet operating deficits for previous years. A deficit for the fiscal year had to be met by congressional appropriation as usual.

A Bill, H. R. 5029, was introduced into the House of Representatives to assist in providing capital funds to remedy many of these conditions in the Virgin Islands. If this bill passes the Congress it will provide total appropriations approximating ten million dollars for certain new hospital facilities, sanitation and fire protection, sewer and water systems, water supply, schools and educational facilities, highways, roads and streets, recreational facilities, telephone and radio communication, malaria control, and slaughterhouse and public market facilities. Unfortunately, its terms narrowly limit the works to be undertaken to those recommended by a survey undertaken some time ago with no provision for administrative revision in the light of needs that may exist after the war. No funds would be allowed for continuation of water-conservation work in St. Croix, a project vital to the agricultural life of the island.

THE PHILIPPINE ISLANDS

The Philippines have now been under enemy control for more than 2 years. Despite extravagant Japanese claims as to the extent to which the Filipino people are embracing the idea of the Greater East Asia Co-Prosperity Sphere, there is increasing reliable evidence that the great mass of the Filipino people are in no way deceived and remain steadfastly loyal to the cause for which they have made such heavy sacrifices. That the Japanese and the puppet government, which they have established, are having serious troubles is indicated by information obtained from many reliable sources, including the rather naive admissions of the Japanese themselves. There are evidently serious shortages of almost all essential commodities, notably food and clothing. This and the issuance of worthless currency have brought about inflation, which has made it necessary for the Japanese, after first

reducing the wage scale, to increase it far beyond anything known under the former commonwealth administration. It is inevitable under such conditions that unrest and disorder will result, and that this has occurred is evidenced by the frequent appeals of the puppet leaders and the Japanese for the people to be patient and peaceful and for repeated announcements that law and order have been reestablished. The Japanese have made a great show of attempting to convince the people of their honest intentions. The principal step in this direction was their sponsorship of a convention for the adoption of a constitution followed by the establishment of a so-called independent government.

The constitution was drawn up and approved by an organization headed by persons collaborating with the Japanese, and there was not even any pretense of participation by the people themselves.

Stripped of all excess verbiage it provided for a one-man rule upon whom the only check is by his own appointees and in whose selection the people at large have no voice. By controlling one man, the Japanese control the entire government.

José P. Laurel, who from the very beginning has been one of the leaders among those collaborating with the Japanese, was, in due course, named president of the puppet regime.

It must be recorded with regret that the individuals who have taken the leading part in this hollow mockery are for the most part men who were formerly high in the councils of the Commonwealth Government.

That their activities are a matter of serious concern to this Government is indicated by the fact that the President on June 29, in announcing his approval of a bill relating to the rehabilitation of the Philippines, said, "Those who have collaborated with the enemy must be removed from authority and influence over the political and economic life of the country."

The Commonwealth Government in Exile under the leadership of President Manuel L. Quezon¹ and Vice President Sergio Osmeña continued to function in Washington. Under the provisions of the Commonwealth Constitution, President Quezon's term of office was to expire on November 15, 1943, and the vice president would assume office. However, at the request of the Government in Exile, Congress, by a joint resolution approved by the President November 12, 1943 (now Public No. 186), provided that President Quezon should continue office until the President of the United States should "proclaim that constitutional processes and normal functions of government

¹ President Quezon died at Saranac Lake, N. Y., on August 1, 1944, and Mr. Osmeña was sworn in as president of the Commonwealth the same day, in the Office of the Secretary of the Interior.

President Osmeña landed at Tacloban, Leyte, with General McArthur, commander of the American forces, which began the reoccupation of the islands on October 20, 1944.

shall have been restored in the Philippine Islands." Thereafter, the vice president is to assume the office of the president and serve until his successor is elected and qualified.

On June 29, 1944, the President approved two joint resolutions of Congress pertaining to the Philippines. The first (now Public No. 380) declares it to be the policy of the United States Government to establish an independent government after the repulsion of the enemy and the restoration of democratic processes. The President is authorized, after negotiation with the president of the Philippines, to acquire bases in the islands for the mutual protection of the United States and the Philippines, and if he finds that orderly processes of government have been restored, to proclaim Philippine independence prior to July 4, 1946, which is the date originally contemplated by existing law in the Independence Act.

The second resolution (now Public, No. 381) provides for a joint rehabilitation commission to be composed of 18 members, 3 to be appointed by the President, 3 by the president of the Senate, 3 by the Speaker of the House, and 9 by the Philippine Government. This commission is directed to investigate and make recommendations concerning all matters affecting post-war economy, trade, finance, economic stability, and rehabilitation of the islands.

The functions of the United States High Commissioner were transferred to the Secretary of the Interior by an Executive order of the President dated September 16, 1942. In compliance with instructions of the President to the Secretary at that time, the Department has been engaged in a study of the many problems which will arise when the islands are reoccupied.

Many thousands of Americans are prisoners of the Japanese, including some 4,000 civilians, for whom the Department feels a special responsibility. In cooperation with the State Department, the Red Cross, and others interested, all possible means of assisting them all are being constantly explored. The plight of these unfortunate people, who have now been held for more than 2 years, is made much more serious by reported food shortages and inflationary prices.

Puerto Rico Reconstruction Administration

BENJAMIN W. THORON, Administrator



WHEN the President under authority of the Emergency Relief Appropriation Act of 1935 established the Puerto Rico Reconstruction Administration as an agency to administer approved projects for providing relief and work relief and for increasing employment in Puerto Rico, he stated that its main objective should be permanent reconstruction of the island's economy in terms of agricultural rehabilitation, rather than mere immediate palliative relief. Continuation of such progress as has thus far been achieved through projects with long range reconstruction possibilities, will be no less essential in the post-war period than it has been during the war, when the ever-prevailing unemployment problem was alleviated, but only temporarily, by work on Army and Navy projects.

During the fiscal year 1944, as in the 2 previous years, the Puerto Rico Reconstruction Administration has been financed with funds allotted by the President out of the Puerto Rico revolving fund, consisting only of income and the proceeds of the disposition of property derived from the Puerto Rico Reconstruction Administration's operation of projects which were financed with funds originating in the Emergency Relief Appropriation Act of 1935. The comparatively small amounts thus available have limited the Puerto Rico Reconstruction Administration's activities primarily to preservation of the most essential features of its former broad program of rural rehabilitation, and to protection of investments of the Government in housing, loans to cooperatives, etc., produced by projects of previous years. Despite these limitations the Puerto Rico Reconstruction Administration has endeavored to make its work useful to the prosecution of the war as well as of service to the island's post-war needs.

For its activities during the fiscal year 1944, the President authorized expenditures by the Puerto Rico Reconstruction Administration out of the Puerto Rico revolving fund (49 Stat. 1135) as follows:

Operation and maintenance of housing projects and facilities.....	\$250,000.00
Management of lands and leases connected with the Lafayette project.....	60,000.00
Operation of Castaner farm project.....	60,000.00
Supervision of and making and servicing of loans to cooperatives.....	610,000.00
General administration.....	160,000.00
1943 unobligated balance for construction of rural houses.....	204,644.43
Operation of Central Service Farms.....	150,000.00
Subdivision and sale of lands in Lafayette district for food crop production.....	11,000.00
Total.....	1,505,644.43

A summary of the year's principal activities follows:

HOUSING MANAGEMENT

Operation of the Puerto Rico Reconstruction Administration's 1,210 urban family dwelling units and 6,254 rural houses, together with 4,891 3-acre parcels on which no houses have been built, produced rental collections in round figures of \$335,500 as against outlays for management and maintenance of \$245,000. On vacant parcels 300 additional rural dwellings were constructed of rammed earth (locally known as *tosca*), mixed with a small amount of cement. Farm laborers there resettled were assisted in raising subsistence crops to supplement their meagre earnings, so that completion of these houses added 1,500 acres of formerly unproductive land to the potential food supply of the island. As of June 30, 1944, all of the urban houses and 98.5 percent of the rural houses were occupied, and 80 percent of the parcels without houses were rented to farm laborers of the neighborhood for the nominal sum of 50 cents per month. It has been the policy to permit tenants who desire to become owners of the homes or parcels they occupy to enter into long-term purchase agreements, of which 287 in the urban zone and 3,621 in the rural districts were executed during the fiscal year.

RURAL REHABILITATION

Closely tied to the rural housing developments, which are really the backbone of the rural rehabilitation program, is what is known as the Central Service Farms Project. Federal funds of \$150,000 were supplemented by an insular legislative appropriation of \$60,000 and approximately \$110,000 made available by the Insular Emergency Council. The most important accomplishment of the project was its contribution to the food supply and income of the island by the planting of 15,000 acres in subsistence crops and 3,000 acres in cash

crops on lands of the Federal Government occupied by the Puerto Rico Reconstruction Administration resettlers. Seeds produced by 550 acres of seedbeds in the seven Central Service Farms were distributed, and fertilizers and insecticides were furnished to resettlers. Agronomists gave constant advice and supervision to cultivation, harvesting, and marketing of their subsistence crops. Resettlers were not paid for labor on their own parcels, but were paid from both Federal and insular funds for labor performed in the Central Service Farms, in the planting of fruit trees on Federal lands, in the repair and maintenance of the intrafarm roads, and the operation of some 34 rural waterworks systems, which supply potable water gratis to approximately 100,000 rural dwellers.

At the Castaner project 1,163 acres were devoted to production of coffee, sugarcane, citron, vanilla, and minor crops, furnishing employment to 200 rural families resettled on 1-acre subsistence parcels. Sale of produce from the farm proper fell \$4,780 short of the \$60,000 allotted for operation, not a bad showing considering the storm of near hurricane proportions in October 1943 which damaged much of the planting, and the 7 months' drought which greatly reduced the coffee crop. In addition to the 25-bed hospital at Castaner mentioned in last year's report as established by the National Service Board for Religious Objectors, a similar 25-bed hospital was opened during the latter part of the fiscal year 1944 at the Puerto Rico Reconstruction Administration's La Plata project, and another health unit has been started at the Zalduondo Rural Rehabilitation Unit. These institutions, authorized by the Director of Selective Service as adjuncts of Civilian Public Service camps, with technical supervision of the planning and direction of the work program by the Puerto Rico Reconstruction Administration, are providing preventive and curative health treatment to thousands of the Puerto Rico Reconstruction Administration resettlers and other rural dwellers for whom such facilities were never before available.

COOPERATIVES

As in previous years, particular attention has been given to the vegetable, cotton, and other marketing cooperatives, and to increasing the production of the butyl alcohol plant of the Lafayette Sugar Mill Cooperative. Increase to \$610,000 of the previous year's \$250,000 allotment for loans to and supervision of cooperatives, was occasioned by needs of the Lafayette Cooperative. Difficulty in meeting its obligations due mainly to former operating losses of its pioneer solvents plant, required the furnishing of an additional \$500,000 loan last December as part of a general refinancing of the mill's obligations to the Government. If for no other reason, this additional loan and re-

financing were justified by the fact that the butyl alcohol plant was able to increase production, as desired by the War Production Board, to its full capacity of more than 5 million pounds of solvents per year for the exclusive use of lend-lease and war contractors, as contrasted with 3½ million pounds exported the preceding year. Further, operations of the solvents plants have produced a substantial profit for the year, amounting to about three times Lafayette's loss from its ordinary sugar mill operations. That loss and a comparable loss sustained by the Los Canos Sugar Mill Cooperative, which is likewise financed by the Puerto Rico Reconstruction Administration, are attributed to a reduction of about 25 percent in the sugar produced in the respective areas, due partly to shortage of fertilizer, and partly to the island-wide drought. Prospects for a better crop the coming season at present are good.

A new cooperative known as the "Cooperativa de Cosecheros de Cidra" was organized and obtained a loan from Puerto Rico Reconstruction Administration of \$50,000 for the purpose of stimulating the growing, curing, and marketing of citron and kindred fruits in distressed coffee areas. These products, for which there is constant demand, have hitherto had little encouragement. Market conditions are favorable, and while operations were started late in the fiscal year, the citron curing plant is now operating at full capacity. Additional loans totalling \$22,000 were made to four vegetable marketing cooperatives; operations have so stimulated plantings by farmer members as to increase the cooperatives' 1943 business of \$100,000 to approximately \$300,000 for the fiscal year 1944. Further, the vegetable cooperatives have recently organized a central marketing agency at Rio Piedras to attract buyers in the metropolitan district, and to offset the loss of the former New York market for some of their produce, particularly tomatoes, which before the war brought a high export price. The Vanilla Cooperative has processed and will market the largest crop in its history, approximately 5,700 pounds of cured vanilla beans. The Cotton Growers Cooperative has continued to market sea island cotton (in demand for war needs) amounting to about 1,600 bales. The Sociedad Agricola, a Puerto Rico Reconstruction Administration-financed cooperative which purchases farm supplies for members and patrons, has had a particularly successful year, increasing sales of fertilizer, insecticides, feeds, etc., to over \$900,000 as contrasted with the previous year's record of around \$350,000. Close supervision is maintained of the accounting and operations of all the cooperatives to which the Puerto Rico Reconstruction Administration has made advances.

CONCLUSION

For the fiscal year 1945 beginning July 1, 1944, the President has authorized the Puerto Rico Reconstruction Administration to expend \$1,190,324 out of the Puerto Rico revolving fund for the continuation of projects similar to those herein reported. These will at least conserve some of the social and economic progress achieved, which would be completely lost if the program were entirely terminated. But very much larger sums of money, whether Federal or insular, will have to be expended for many years to come if permanent reconstruction of the island's distressed economy is to be accomplished.

War Relocation Authority

DILLON S. MYER, Director



THE fiscal year ending June 30, 1944, was an especially significant period in the history of the War Relocation Authority which became an agency of the Department of the Interior on February 16. This year brought about a full-scale development of the Authority's program to provide for the relocation, maintenance, and supervision of 110,000 persons of Japanese ancestry who were evacuated by military order from the West Coast in the spring of 1942.

The general objectives of the program had been defined in broad outline shortly after the agency was created by a Presidential order on March 18, 1942, but much had to be done before the program could be put into full operation. Of foremost importance was the need to acquire knowledge of the essential character and composition of the evacuee population in order to devise the most practicable procedures and techniques for resettling in normal communities those people who presented no danger to the national security. Methods of separating the loyal and law-abiding element from the trouble makers and others whose stronger ties were with Japan had to be developed. Ways to relocate those who were law-abiding and loyal had to be planned and organized. At the same time, the establishment of the relocation centers and the organization of personnel and services to provide adequate care and supervision for the people temporarily quartered in them also called heavily on the time and resources of the War Relocation Authority in the first year of its existence.

Three basic considerations have been taken into account in formulating the Authority's program for the past 12 months. First, the War Relocation Authority has been fully cognizant at all times of the necessity for observing adequate precautions for the national security. Secondly, it has recognized an obligation to preserve the basic American principles of humanity and justice by protecting the constitutional rights of the American citizens involved in the evacuation, and by dealing fairly with the aliens. Thirdly, it has held con-

sistently to the belief that the best interests of both the evacuees and the Nation call for the liquidation of the relocation centers as rapidly as possible by returning the eligible residents to the mainstream of American life.

The ultimate goal of the War Relocation Authority is to complete the job of relocation of all evacuees in normal communities outside of relocation centers. The sooner it can complete its program, the more successful its service to the Nation will have been.

THE RELOCATION PROGRAM

Several factors had combined to delay the progress of relocation outside the centers before the summer of 1943. At the start, it was necessary to develop procedures for determining which members of the evacuee population should be permitted to depart from the centers on indefinite leave, and which ones should be detained. Time was needed to perfect these procedures, and to conduct individual hearings for thousands of evacuees whose eligibility or ineligibility for leave clearance could not be otherwise established.

There was, furthermore, the need to develop practicable plans for getting older people and families out of the centers. In the year preceding July 1, 1943, between nine and ten thousand people had relocated, but the great majority of them were young Nisei without family responsibilities. The population of the centers was getting harder to move as the percentage of younger people decreased.

Various other deterrents were also in evidence. Among them were the uncertainty of the evacuees regarding public sentiment, the difficulty of obtaining clearance for them to work in war plants, and housing shortages.

It was early recognized that the success of the relocation program would be determined, in a large measure, by the degree to which the evacuees approved its purposes. As early as July 1943, relocation committees to plan and encourage relocation had been organized among the residents of several centers, and increasing emphasis was placed on strengthening these committees and organizing new ones in the months that followed. By the end of the year, every center had a relocation planning committee, composed either entirely of evacuees or jointly of evacuees and staff members. Issei were well represented on these committees and were especially helpful in bringing evacuee questions and suggestions to the attention of the administrative staff.

The earlier relocation of younger Nisei had been mainly to the cities, but evidence was mounting in the centers that more emphasis was needed on rural relocation. Approximately 43 percent of the evacuees had come from farming communities, and most of those with agricultural backgrounds wanted to return to the land. They wanted opportunities which would enable small groups of families to relocate

together, where they could have the association of neighbors of Japanese descent, and they stressed the necessity of sending responsible evacuee representatives into the field to investigate the opportunities before decisions could be made.

Many families had suffered heavy losses in the evacuation. If they were to leave the centers to start new farming ventures, they needed financial assistance.

In November, the national office undertook a program to make available to these farm families the assistance that they seemed to require. The relocation officers in the field were directed to give specific attention to the development of opportunities for families to resettle in small groups, and exploratory trips by responsible evacuee representatives were authorized. On the financial side, the stimulation of credit unions among the residents of the centers was suggested as one means of providing funds for families that needed financial aid, and detailed information was provided on the availability of loans from Federal and private agencies.

Other developments of the relocation program were made, following studies and surveys of the problems presented. During the early part of 1943, each individual who left a relocation center on indefinite leave was given a leave assistance grant of \$50, with \$100 as the total amount that could be granted to any one family. To encourage the resettlement of larger families, the grant was reduced in October to \$25 per individual and the \$100 limit was removed. An agreement was made with the Federal Security Agency which made relocated evacuees eligible to receive assistance under the program for aliens and other persons affected by restrictive governmental action during the war. The cooperation of the Federal Housing Administration was obtained to help the War Relocation Authority staff in determining the acceptability of the evacuees for housing in various localities, and to suggest localities where housing opportunities for evacuees appeared more promising.

At the relocation centers, welfare counselors were assigned to interview families with a view to breaking down the rationalizations of reluctant families and to gathering information which would help the War Relocation Authority to plan its future course of action more realistically. Relocation officers and other staff members who were familiar with conditions in various sections of the country visited the centers both singly and in teams to bring first-hand information to the residents and to answer questions for them. Meetings and forums were held, informational publications were distributed, and motion pictures borrowed from public and private agencies were shown, depicting various cities and rural areas.

The need to get information into the centers, regarding the communities and areas where the people were encouraged to relocate, was

emphasized repeatedly. Few of the evacuees had ever been east of the Sierra Nevadas before they were evacuated. The Middle West and East were regions almost unknown to them.

To facilitate the gathering of information, reports officers were assigned to the principal relocation offices in Denver, Kansas City, Chicago, Cleveland, and New York City. The Washington reports office also set to work on the preparation of descriptive and illustrated pamphlets designed to reveal the character of the relocation areas to the evacuees. Personal stories of individuals and families who had relocated successfully were found to be especially effective in the centers.

Prior to the fall of 1943, all phases of the relocation program, both at the centers and in the Washington office, were functions of an Employment Division which was also responsible for the employment of evacuees to maintain center operations. In November, however, a new Relocation Division was organized to give exclusive attention to the relocation program, while other functions of the Employment Division, which was then discontinued, were transferred to the Administrative Management Division.

Six relocation areas had already been established with headquarters in Salt Lake City, Denver, Kansas City, Chicago, Cleveland, and New York City. These offices now came directly under the supervision of the Relocation Division in Washington, and they, in turn, were responsible for supervising all branch offices set up in the regions that they represented.

It had been the policy of the War Relocation Authority from the beginning to discourage the concentration of the evacuees in large numbers in any one community; nevertheless, the people from the centers showed a strong disposition to congregate in certain localities. The most popular localities for resettlement were in the Rocky Mountain States, especially in Colorado and Utah, and in the Chicago metropolitan district. The concentrations aroused local opposition particularly in the Inter-Mountain region.

The Relocation Division moved to meet the problem, under the authority of the Director, by restricting permission to relocate in the Inter-Mountain and Western Plains States to the members of families already relocated in those areas, and by stressing the relocation program in the Middle West and East. The New England States were set apart in a new relocation area with Boston as its headquarters. In May and June, a start was made toward developing resettlement in certain parts of the South, by opening relocation offices in New Orleans and Savannah.

At the start of the relocation program, emphasis had been placed on securing job offers for the evacuees while they were still residing in the centers. Many offers were obtained, but for several reasons the

evacuees were reluctant to accept them. One reason was that many of the jobs were not the kind which they wanted or which they were trained and experienced to fill. Since the demand for domestics was especially keen, the supply of domestic workers at the centers rapidly approached the point of exhaustion. Another reason was reluctance to accept employment without meeting the prospective employers in advance and learning, from first-hand observation, the character and conditions of the job that had been offered. Too often, even when evacuees accepted offers, they stayed on the jobs only a short time before switching to other employment. It became obvious that a new approach was needed to the relocation problem.

To meet the situation, the relocation officers in the field were instructed to cease sending to the centers long lists of job offers, which were often more confusing than helpful, and to prepare, instead, brief summaries on employment conditions in the areas where they were assigned to duty, emphasizing information about the abundance or scarcity of certain kinds of opportunities, the attitude of the community, and the housing situations. They were directed to give more attention to the development of community acceptance and cooperation, and to seek community invitations for groups of evacuees to come from the centers to look over local conditions before accepting employment.

It was the plan to shift as much responsibility as possible to voluntary cooperating committees. The churches and welfare agencies have been especially helpful in organizing these committees which were functioning, by the end of the fiscal year, not only in every middle-western and eastern community where a relocation officer was stationed, but in a number of other communities as well.

The functions of the cooperating committees were to foster favorable community sentiment, and to assist evacuees in adjusting themselves to normal community life. Insofar as possible, they were to help arrivals from the centers to find acceptable employment and housing, and to develop social and recreational opportunities for them. Especially, they were asked to cooperate in the development of plans to accelerate the relocation of families and older people.

Two devices were used to provide temporary residence for evacuees while they were looking for employment. In several cities, special hostels were opened by cooperating groups; in other places arrangements were made with YMCA's, YWCA's, settlement houses, and churches, to make quarters available for them.

There had not been sufficient time, by the end of the fiscal year, to make a fully adequate test of the effectiveness of the new relocation policies in stimulating the resettlement of families and older people. Of the 16,846 individuals who departed from the centers on indefinite leave during the 12 months, by far the greater number were young

Nisei without family responsibilities, but an encouraging increase was noted in the number of total family groups that relocated toward the end of the period. More notable was the increase of relocation farther east. While the Great Lakes States—Wisconsin, Illinois, Indiana, Michigan, and Ohio—received the largest number, the percentage increases in the Middle Atlantic and New England States were much higher. The trend was definitely eastward.

The acceptance of the evacuees in the communities where they relocated was generally good. There were a few incidents, however, that emphasized the need for the cooperating committees, and for the development of favorable community sentiment before the evacuees arrived. In New York City, resistance developed to the establishment of a hostel in Brooklyn, but was overcome by the efforts and influence of individuals and organizations cooperating in the War Relocation Authority program. Other incidents involving small groups of evacuees occurred in New Jersey, Delaware, and North Carolina, and in two midwestern communities, one in Iowa and one in Nebraska. The general reaction of the country at large was distinctly critical of these communities and favorable toward the evacuees.

The progress of relocation to the end of the fiscal year permitted one center—the Jerome Relocation Center in Arkansas—to be closed on June 30. Four other centers, where space was available, were designated to receive the Jerome residents. A transfer of 2,489 Jerome residents was made by truck to Rohwer, 35 miles north; 2,049 were sent to Gila River in Arizona; 549 to Granada in Colorado, and 499 to Heart Mountain in Wyoming. Before the transfers started, efforts were made to induce as many people as possible to relocate. Those who chose to relocate numbered 518.

SEASONAL WORK LEAVE

An early development in the leave program of the War Relocation Authority was an arrangement whereby groups of evacuees were permitted to leave the centers to assist in harvesting crops in the regions where the centers are located. Under the provisions of the leave granted to them, they were required to stay in specific areas unless authorized to move elsewhere by the relocation officers. At the termination of the work, they were returned to the centers unless, in the meantime, they had obtained indefinite leave.

These workers, who were employed chiefly in the sugar beet harvest, were credited with saving thousands of acres of beets in 1942 and 1943. Others helped to harvest potatoes, long staple cotton, and other crops.

During the year a considerable number of seasonal leaves were converted into indefinite leaves to enable the workers to accept offers of permanent jobs in the communities where they had been temporarily

employed. When certain areas of the West were restricted for relocation purposes to avoid concentrations, however, the usefulness of seasonal leave as a stepping stone to relocation was considerably diminished. Moreover, as time progressed, a good many evacuees—especially young men—began to show a disposition to favor seasonal leave as more desirable than indefinite leave. Each season, after several weeks of outside employment at good wages, they could return to the centers with enough pocket money to satisfy their incidental needs until another harvest season arrived, and they were increasingly reluctant to apply for indefinite leave under terms that made return to the centers and the resumption of living at Government expense more difficult.

The competition among agricultural employers for workers from the centers also presented a troublesome problem. Even at the outset, the supply of available workers was never sufficient to meet the total demand, and, as the employable population of the centers dwindled, through relocation, the inadequacy of the supply became more acute.

In February 1944, the seasonal work leave program was modified to provide for the issuance of seasonal leave only to persons recruited for agricultural work through the War Food Administration, and employment was authorized only in counties approved by War Relocation Authority relocation officers. This modification of the program improved controls and the systematic granting of leaves to meet critical manpower shortages. It was still impossible, however, to supply enough workers to satisfy all of the calls that were made for them.

There were 7,603 seasonal work leaves granted during the last half of 1943, and 5,029 during the first half of 1944, making a total of 12,632 for the 12-month fiscal period.

THE SEGREGATION PROGRAM

It was recognized from the time when the War Relocation Authority was first organized that some of the evacuees preferred to think of themselves as Japanese rather than Americans. Among them were people who wanted to return to Japan, and possibly some who could not safely be granted the privilege of moving about the country at will in wartime. These people had to be set apart from the others who desired to remain law-abiding residents of the United States.

Three categories were established for segregation which was, by every measure, the major War Relocation Authority undertaking in the fall of 1943. First, all persons who had filed applications for repatriation or expatriation to Japan, and who had not retracted their requests before July 1, 1943, were scheduled for immediate segregation at the Tule Lake Center in northern California. Also included in the first segregation were those who, in a registration conducted at

all of the centers in the spring of 1943, had answered in the negative a question pertaining to their loyalty to the United States, or who had failed or refused to answer it, and who had not changed their answers to the affirmative before July 15, 1943, or who, having shown a disposition to change their answers, had failed to satisfy the project director involved in each case that the changes were made in good faith. In the third category were all persons to whom the Director had denied leave clearance after individual hearings. Designated to receive these individual hearings were all persons who (a) were subjects of adverse reports by Federal intelligence agencies, (b) had changed their answers to the loyalty question from a negative or a qualified affirmative to an unqualified affirmative, (c) had retracted their applications for repatriation or expatriation to Japan, (d) had not been recommended for leave clearance by the Japanese-American Joint Board established in the office of the Provost Marshal General, or (e) for any other reasons were believed to be loyal to Japan. Also involved in the segregation was a fourth group of considerable magnitude composed of the families and dependent relatives of the actual segregants.

The major movement of the first two groups of segregants was accomplished between the middle of September and the middle of October, when 8,573 persons were transferred to Tule Lake. In the same period, 6,250 persons, already residents at Tule Lake, who were not subject to segregation, were moved to other centers to make room for the arrivals. Another movement of 1,876 persons, whose transfer to the segregation center had been postponed to permit the construction of barracks to house them, was made in February, and a third transfer of 1,665 persons was conducted in May. These movements were all accomplished without disorders or serious mishaps of any kind.

Persons in the third category of segregants, designated to receive individual hearings, have been sent to Tule Lake from time to time, and others will be sent as they fail to convince the Director, or his authorized representatives, that they should be granted leave clearance. Decisions were made on 8,834 cases which were reviewed during the fiscal year; 7,307 were approved for leave clearance, and 1,527 were disapproved.

Evacuees who have been denied leave clearance may appeal to a board which has been chosen with special care outside the War Relocation Authority organization to give the appellants impartial hearings. This appeal board, however, serves only in an advisory capacity; the authority to grant or deny leave clearance rests in the final analysis solely with the Director of the War Relocation Authority. Twenty-four appeals were made prior to June 30, 1944, and were scheduled to be heard by the Appeal Board in July.

There were 8,981 requests for repatriation and expatriation during the year, which raised the total number of effective requests to 15,366. The cancellations numbered 1,060. Three hundred and thirteen persons were sent to Japan under an exchange of nationals arranged by the State Department.

A marked increase in the number of requests for repatriation and expatriation has followed every major change in government policy affecting the evacuees. About 10,000 of the requests on file were made during or immediately following crises brought about by the Army and leave clearance registration which was conducted in the spring of 1943, the segregation activities of the summer and fall, and the Army announcement on January 20, 1944, that Nisei were to be inducted under Selective Service procedures.

A large percentage of the requests appear to be based more on emotion than reason. The evacuation, the loss of economic security that went with it, and evidences of antagonism outside the centers have filled the evacuees with fear for the future, and any change of policy adds to their alarm. Few of them are motivated to request repatriation or expatriation because they have any real interest in Japan or expectation of going there. They are tired of moving and Tule Lake seems to them the one place where they may be allowed to stay for the duration of the war. They seek segregation to escape pressure to relocate under wartime conditions, to hold their families together, or to protest against the evacuation. Others who do look to a future in Japan have built up fantasies of life there with hardly any actual knowledge of the country they are choosing.

The population of Tule Lake at the end of the fiscal year was 18,672. Of this number, about 3,300 were minors under 17 years of age, and approximately 1,800 others were living at Tule Lake Center merely to be with members of their immediate families who had been segregated.

A relatively small element of troublemakers in the center has caused several disturbances which the major part of the population has had no voluntary or intentional part in abetting. The first occurred immediately after the first segregation movement when a group of ruffians attempted to gain control of the community. On November 1, during a visit of Director Myer to the center, agents of the troublemakers announced in the mess halls that the National Director would make a speech at the main administration building shortly after noon. As a result, between 3,500 and 4,000 men, women, and children gathered in the administration area. While they waited for the Director to appear, 17 men entered the building and presented a series of demands. Mr. Myer told them, and later repeated to the crowd outside, that the War Relocation Authority would consider requests from the evacuee population, provided they

were in the framework of national policy, but that it would not accede to demands. After he spoke, the crowd dispersed.

In the meantime, however, about a dozen rowdies, evidently members of a gang, had entered the center hospital and administered a beating to Dr. Reece M. Pedicord, the Chief Medical Officer. There was no evidence that the crowd as a whole was aware of the plot or consciously a part of it.

This demonstration was grossly exaggerated by certain West Coast newspapers. Charges that the crowd was angry and violent in spirit, that many members of it carried knives and clubs, and that others carried straw soaked in oil to fire the buildings were not substantiated by later testimony. Of the 31 witnesses, members of the War Relocation Authority's staff at Tule Lake, who commented on the attitude of the assembly, some described it as quiet but expectant, others spoke of it as quiet and friendly, and several remarked on the holiday spirit that seemed to prevail especially among the children.

Several days later, on the evening of November 4, a group of about 400 young men, many armed with clubs, entered the administration area where some of them congregated in the vicinity of the warehouses and the motor pool. Others surrounded the residence of the project director who telephoned to the commanding officer of the military guard outside the gates and asked him to take full control of the center. Troops entered at once and restored order, in accordance with a memorandum of understanding between the War Relocation Authority and the War Department, which had been in effect since the inception of the War Relocation Authority program. This agreement stipulated that the Army would provide special assistance to the War Relocation Authority in such emergencies.

The Tule Lake center remained under control of the Army until January 14, when the War Relocation Authority again took over internal administration. During the period of Army control, the War Relocation Authority personnel continued to function under the orders of the commanding officer.

About 375 persons who had been implicated in the November disturbance or whose influence was believed to be detrimental to the law and order of the center, were subsequently confined in a "stockade" under Army orders, and most of them were still confined when the War Relocation Authority resumed control of the center. The original group included approximately 100 aliens and 275 citizens. An arrangement was made with the Department of Justice to transfer from the "stockade" to Justice Department internment camps those aliens who were considered dangerous to the national security.

Later disturbances at Tule Lake were of a minor character and generally consisted of attempts by the strongly pro-Japanese element to intimidate other residents. These infringements on the peace

of the community have not been easy to curb, owing to the frequent difficulty of identifying the aggressors. They serve, however, to spotlight the fact that the population of Tule Lake—contrary to popular impression—is not exactly a homogeneous group entirely motivated by a feeling of allegiance to Japan.

NATIONAL SELECTIVE SERVICE

On January 21, the Army announced that Selective Service inductions of Nisei, which had been suspended in the spring of 1942, were to be resumed. The result was the calling of 3,377 men before July 1. Of this number, 1,430 were accepted, 460 were inducted into the Enlisted Reserve Corps, and 194 entered active duty. One hundred and eighty-eight refused induction when called, and 106 of them were arrested by officials of the Department of Justice. No action had been taken before the end of the fiscal year with regard to the others who continued to refuse induction.

The principal resistance developed at the Heart Mountain Relocation Center where 76 young men refused to be inducted owing largely to the influence of a group in the community which called itself the "Fair Play Committee." The head of this committee argued that it was unjust to draft Nisei until all discrimination against Japanese-Americans was eliminated, and the Nisei were admitted to all branches of the Army and Navy on an equal footing with other Americans. These arguments were cautiously phrased, however, in an effort to avoid statements that might incriminate the committee members. The committee chairman was a citizen of the United States, born in Hawaii, had never been to Japan, and had no record of disloyalty or disobedience to law prior to the evacuation. On April 1, he was segregated in Tule Lake, together with several of his principal supporters, where he was later taken into custody by the Federal Bureau of Investigation on charges of violating the Federal sedition and conspiracy laws.

The 188 young men who refused induction slightly exceeded one-half of 1 percent of the total number called by the Army. The great majority answered the call willingly, and the departure of most of the boys who have been summoned to active duty has been marked by patriotic demonstrations in the centers.

CONDITIONS IN THE RELOCATION CENTERS

The adoption of evacuee government charters at four relocation centers during the latter half of 1943 brought to eight the number of centers which have instituted formal plans of representative community government. At Manzanar, which remained the only relocation center on June 30, 1944, without a community council elected by the people, the project director continued to retain direct authority

over all community affairs, but with the counsel and assistance of a block managers' assembly. Under the War Relocation Authority regulations, Local government was not provided at the Tule Lake Segregation Center.

The community councils, together with other evacuee commissions and committees related to the community governments, have rendered much valuable service to the War Relocation Authority program. At several centers, they provided outstanding assistance in the reception of evacuees transferred from Tule Lake when it was converted into a segregation center, and from Jerome when that center was closed. They helped to stimulate relocation by conducting surveys, transmitting information, and facilitating the work of the relocation teams that visited the centers. When the reinstatement of Selective Service for Nisei was announced, they contributed to bringing about a better understanding of the War Department action by the people in the centers. They sponsored visits by Nisei war heroes, and supported the internal stability of the centers by negotiating for the evacuees in labor disputes, improving labor relations, and helping to meet critical manpower shortages.

Many problems of center operation have grown in acuteness as relocation and Army inductions have drawn away the younger residents and professional people. However, all divisions and sections of the War Relocation Authority cooperated in the major program of the agency to relocate people outside the centers as rapidly as possible without allowing any service essential to the life of the communities to lapse.

Among the activities affected by serious manpower shortages was the agricultural program which is designed to produce as much as possible of the food required by the residents of the centers. In spite of the loss of agricultural workers, however, only one center—the Granada Relocation Center in Colorado—was forced to curtail production. More than 7,500 acres of vegetables were planted and harvested at all of the centers. The meat production totaled 2,373,829 pounds of pork and 1,283,824 pounds of beef. An estimate of the value of all the food produced was placed at \$3,089,606.

Many competent workers in the business enterprises—accountants, storekeepers, beauty operators, shoe repairmen, laundry workers, dry cleaners and others—were also lost when they departed to accept employment in outside communities where they could make more profitable use of the skills and experience that they acquired in the centers. These business enterprises are maintained by the evacuees on a cooperative basis to provide the residents with essential goods and services not included in the basic needs supplied by the Federal Government.

Insofar as possible, all employment in the centers is designed to provide the workers with training and experience which will help

them to enter gainful occupations when they relocate. Agricultural and community enterprises have been especially helpful stepping stones to employment outside the centers. Other skills that find a ready market are developed by several community industries—particularly the garment and mattress factory at Manzanar and the silk screen poster shop at Granada. In the 12 months before July 1, 1944, 25,630 garments and 4,020 mattresses were manufactured in the former center, and 47,701 posters were produced at Granada chiefly to fill orders for the Navy. Also produced for the Navy were 67 ship models, including two large-scale models turned out by the evacuee shop at the Gila River Center. Furniture and food products were made at all of the centers.

Two major aims were stressed by the education program in the centers: (1) to provide standard elementary and secondary schooling for the evacuee children, and (2) to make available to the adults courses to prepare them for successful relocation. The inability of many of the older Issei to speak English has been one of the most serious handicaps retarding their relocation. To overcome this obstacle, special English courses were offered and practice exercises in speaking English were introduced into adult education classes at the relocation centers. Special courses in American customs, home-making, and various vocations were offered to develop interest in relocation, to prepare the older people to participate in community life outside the centers, and to equip them to earn their livelihoods. There were 10,175 people enrolled in adult education classes in May 1944; 2,779 in English courses, 1,186 in vocational courses, and 6,210 in other courses related to the orientation program.

The elementary and secondary schools also participated in developing interest in relocation through special projects in civics, history, and kindred subjects. The total regular school enrollment in May was 20,907.

Health conditions at the centers were generally good. There were no major epidemics; the deaths numbered 623, and the births 2,125. In the health and medical program, however, as in other essential programs in the centers, adjustments were necessary to maintain adequate services in the face of personnel losses. Only 30 evacuee physicians, most of them elderly men and some on duty only part time, remained in the centers at the end of the fiscal year. Relocation and Army inductions took 22 others who had been employed at the beginning of the period. This loss necessitated the appointment of 8 additional nonevacuee physicians, increasing the appointed staff to 20. The shortage of evacuee nurses was even more acute. Only 7 remained on June 30, 1944, and the recruitment of nonevacuee nurses to fill vacancies proved exceedingly difficult.

Average bed occupancy in the hospitals increased approximately 20 percent, owing in part to a gradual accumulation of tuberculosis patients, and in part to the need of providing care for elderly persons left behind by younger family members who relocated. Custodial barracks under minimum medical supervision were opened in several centers to provide care for them.

General maintenance costs were sharply increased at all the centers, owing to the deterioration of temporary construction. The quantities of materials needed to repair barrack roofs and to replace the tar paper used to cover the outside walls increased greatly. Many interiors required additional material to maintain them in livable condition. Lack of foundations caused many structures to settle; inferior lumber warped and cracked. Overcrowding in small apartments also brought about considerable damage.

Other maintenance troubles centered in the water systems which were often constructed of second-hand material. Old water mains sprang leaks; pipes and fixtures had to be replaced.

The problem of keeping motor transport equipment in operation was especially critical. Evacuees skilled in automotive repair work were among the first to relocate, and replacements from the center population were almost impossible to find. Additional difficulties arose from the scarcity of material and parts to make repairs of any kind.

The highly inflammable character of the construction at all the centers, and the dryness of the climate in which most of them are located, make for heavy fire hazards. On Christmas Day, a fire at the Colorado River Relocation Center resulted in the destruction of property valued, according to estimates, at about \$42,000. The major loss was suffered by the evacuees whose furniture and personal belongings were stored in the buildings consumed. On March 5, a \$16,000 fire occurred at Gila River. On both occasions, water shortages seriously hampered the fire fighters. Two other fires that caused damage in excess of \$5,000 in each instance occurred at Colorado River and Tule Lake.

All problems of center operation are bound to become more acute as the progress of relocation takes from them the younger, abler members of the communities, and as the physical equipment deteriorates with age and use. These problems have been frankly viewed by the War Relocation Authority which will continue to meet them with the best resources at its command.

LITIGATION

Two court cases of interest to the War Relocation Authority arrived at new developments during the 12-month period. In December, the Ninth Circuit Court of Appeals sustained the conviction of Fred T.

Korematsu for violating Civilian Exclusion Order No. 34 issued by the commanding general of the Western Defense Command. This decision held valid the evacuation and exclusion program. At the end of the fiscal year, the case was pending before the Supreme Court of the United States which had granted a writ of certiorari to review the lower court's decision.

The second case had to do with a petition for writ of habeas corpus filed by Miss Mitsuye Endo who originally sought to obtain release from the Tule Lake Center. When Tule Lake was converted into a segregation center, she was transferred to the Central Utah Relocation Center. This case was complicated by the fact that Miss Endo had been granted leave clearance. She was free to leave the center at any time by complying with the general provisions of the leave clearance regulations which require all evacuees who relocate to offer evidence that they can support themselves outside the centers, and to agree to report changes of address. These provisions she refused to accept.

When a Federal District Court in California denied the writ, Miss Endo appealed to the Ninth Circuit Court which considered the case but did not decide it. Instead, the Circuit Court certified to the United States Supreme Court four questions bearing on the validity of the War Relocation Authority leave regulations. This case was on the calendar of the Supreme Court at the end of the fiscal year.

EMERGENCY REFUGEE PROGRAM

On June 9, a new responsibility was given to the War Relocation Authority when President Roosevelt announced that the agency would be placed in charge of an emergency shelter at Fort Ontario, N. Y., for approximately 1,000 European war refugees. Plans to receive the refugees were under way at the end of the fiscal year. A director for the shelter had been named, and steps had been taken to organize the personnel necessary for its operation.

CONCLUSION

The objective of the War Relocation Authority, with regard both to the evacuees and the refugees who have been, or may be, placed under its supervision, is to hasten in every available way, through the direct use of its own resources and in cooperation with other agencies, the termination of the conditions that require the maintenance of Government projects to care for these people. The War Relocation Authority program is an emergency program which should be completed and liquidated as rapidly as possible. It should not be continued into the post-war era.

Board on Geographical Names

MEREDITH F. BURRILL, Director



GEOGRAPHICAL names, recognized to be important tools of war, may be equally important instruments of peace. Attu, El Alamein, Guadalcanal, Salerno, and Tarawa, little known in this country 2 years ago, have become bywords. Tomorrow the peoples of the world will be tied together by even faster communication and an even greater number of common objectives. In post-war international trade and travel, consistency in geographical nomenclature will be as necessary as in time of war, and the names of far-distant cities will be as familiar as our own.

The Board on Geographical Names, in seeking and finding answers to the multiple problems of place names all over the world, is contributing to the peace as well as to the winning of the war. Although this emergency often has made necessary the adoption of principles emphasizing speed and quantity more than precision in the treatment of names, the overwhelming share of the Board's work will stand the test of peacetime requirements. With but few exceptions, the problems of geographical names, once they are solved, need never again hamper either the defense or the commerce of this Nation. Reorganized shortly before the beginning of the fiscal year, the Board has made rapid strides toward securing uniformity of name usage by Federal agencies, its basic function which it could not perform properly before for lack of staff and source materials. In the more than 50 years since the establishment of the original Board, a total of about 25,000 name decisions had been rendered, about one-fifth of which were foreign names. The simple rules covering foreign names laid down years ago have proved to be basically sound but inadequate for large-scale mapping. Proper application of these very general rules to the complex problems of geographical names in diverse countries without

further assistance from the Board would have required each agency using such names to make exhaustive studies. They were not prepared to do this, and consequently there was wide variance in names on the Federal maps and charts of foreign areas.

Much of the early part of the present year was spent in recruiting and training an adequate staff, developing techniques and procedures, and collecting and evaluating source materials. The Board now has a highly competent professional staff including geographers, linguists, and other experts brought together in the face of insistent doubts that such a technical group could be assembled at a period when competition for such services was necessarily great. The Board has collected and cataloged a library of over 100,000 maps and 12,000 textual sources which make this source-materials library the finest in the Western Hemisphere dealing exclusively with the problems of geographical names. Most of these sources have been contributed by persons and offices vitally interested in place-name problems.

During the fiscal year the Board has increased the output of decisions one-hundred-and-forty-fold over the yearly average of the last decade and has provided detailed directions for treating names in a large number of foreign areas, emphasizing those of greatest military importance. These directions have made possible a consistency of usage among map makers not otherwise obtainable and have enabled military map makers to compile maps not simply with names but with the best names that can be had in the absence of decisions. The Board has compiled finding lists for the rapid identification of more than 500,000 places and features on military maps. Hundreds of thousands of individual place names have been checked and corrected, in advance of publication, on maps and strategic intelligence and planning materials where consistency and good name-usage have contributed to the usability of military information.

The Board has established and maintained an information service that has assisted in the answering of individual place-name inquiries from more than 50 Federal war agencies and offices. By doing this kind of work for all, the Board has not only provided the best of such information and reduced confusion and delay but also has done so at a fraction of the cost in time, money, and manpower which would have been required if individual agencies had been forced to do this work for themselves.

The fund of experience necessary in carrying on this place-name work which has been accumulated is highly important for the future. Aside from the work of private individuals on a small number of specific problems and the relatively small amount of this kind of research previously carried on by the Board, there was extant in this country relatively little published work or experience dealing with place names as an integral part of map production and much of this

was not available to all compilers of maps and intelligence. The basic research which has been and is being carried on by the Board is making generally available adequate sources for names of literally millions of places and features.

The Board is in a position to render real and significant service to the Government and thus to individuals. Furthermore, it is much cheaper for one Government agency to maintain a central collection of place-name information than for each agency to maintain its own, and the same names—the right names—will be used on all Federal maps and publications in wartime and in peacetime only if all Federal agencies use the same source. This source can continue to be provided, as it is being provided, by the Board on Geographical Names.

Office of the Solicitor

FOWLER HARPER, Solicitor¹



THE Solicitor's office has concentrated during this fiscal year on aiding the Department to carry on its threefold work of supporting the war, preparing post-war action, and protecting the Nation's resources for their best long-term use. Achievements have been significant despite the complications of a wartime economy, of the new laws called forth by that economy, and of the constant need to reckon with post-war changes.

Wartime controls.—Certain activities are exclusively “for the duration.” Among these is civilian explosives control by the Bureau of Mines under the act of December 26, 1941. Greatly needed as part of this control were explicit regulations on the storage, handling, and transporting of explosives. These were drafted by the Mines Division of this office. The burden of the division's work, however, lay in the enforcement of the act and regulations, and a number of license revocations and convictions resulted. Troublesome questions of conflicts of powers and duties between State and Federal officers were solved and model State explosives laws were prepared for submission to the States holding regular legislative sessions.

Among the most urgent and novel war problems were those incident to the possession of the coal mines under the Executive orders of May 1 and November 1, 1943. Within the framework of principles and procedures mapped out for the handling of this emergency by the Solicitor's office, the Legal Division of the newly created Coal Mines Administration worked out the necessary orders, instructions, and instruments of operation and assisted in the conduct of litigation, as well as in negotiations leading to the termination of outstanding disputes and the return of the mines to private operation.

The Legal Division of the Solid Fuels Administration for War also operated as an integrated part of that administration. In perform-

¹ Warner W. Gardner served as Solicitor until his military furlough on August 31, 1943. Felix S. Cohen served as Acting Solicitor until Mr. Harper's appointment on September 7, 1943.

ing its main job of devising legal mechanisms for obtaining a fair and equitable distribution of the limited supplies of coal and other solid fuels, the division drafted the regulations and orders, organized industry advisory groups, and passed upon almost all proposed actions of the agency.

With the transfer to the Department of the War Relocation Authority on February 16, 1944, the Solicitor's office inherited a series of pending cases and problems raised by the enforced detention of over 100,000 persons, two-thirds of whom are citizens. Important aspects of the constitutional questions are now before the Supreme Court. At the same time this office found itself faced with the many-sided legal tasks of that authority in furnishing advice not only to the administrators, particularly with respect to hearing procedures used in segregating the disloyal, but also to the community organizations of the relocation centers, and to individual evacuees, particularly with respect to their abandoned property.

Public lands and resources.—Nowhere is the double objective of full wartime use and long-term conservation of the Nation's resources more in evidence in the legal work of the Department than in that performed for the agencies engaged in the administration of the public lands. In carrying out the war programs of the General Land Office, Geological Survey, and the National Park Service, the legal divisions of those agencies and the Public Lands Division of this office have aided in the withdrawals of public land, now amounting to over 16 million acres, for war purposes, and the utilization of the public land by lease and permit for the extraction of critical minerals, oil and gas, timber, and other products and for the location of military facilities. Similarly, the Conservation Division of this office and the Legal Division of the Grazing Service have passed upon the utilization of grazing land for military purposes and greater food production. Over 1,600 war emergency licenses for additional grazing have been issued following the determination by the Conservation Division of the authority therefor.

In line with the great increase of unit plans in oil and gas production since Pearl Harbor, the Public Lands Division and the Legal Division of the Geological Survey gave frequent consideration to unit and cooperative agreements, particularly for the development of wildcat areas to discover new reserves, for cooperative drilling arrangements to conserve materials, and for protection against drainage of deposits. Oil and gas rights were the subject of most of the important court cases handled by the Public Lands Division either directly or by furnishing assistance to the Department of Justice. Of the cases thus far decided, the United States has been successful in all except the litigation over oil rights in Los Cerritos Channel, Calif. The Public Lands Division also took part in the Department's con-

sideration of a domestic military oil reserve program. In anticipation of post-war large scale coal mining operations in Alaska, the coal mining regulations of the Geological Survey were amended to apply to that territory.

The Public Lands Division notably protected the permanent interests of the Nation when it discovered that certain ancient "forest lieu selection rights" offered for the purpose of acquiring surface title to potash lands for lessee potash companies and valuable timber lands were invalid. The Property Acquisition Division of this office assisted in the acquisition of extensive new acreage in its approval of title to over 25,000 acres acquired under the Taylor Grazing Act in exchanges which have aided consolidation of grazing lands, of over 263,000 acres acquired under the Forest Exchange Act, and of over 800,000 acres acquired for national parks. The exchanges of land for timber under the Forest Exchange Act, reviewed by that division, have facilitated the movement of timber for war purposes. The passage of Public Law 273, largely drafted by the Legislative Division of this office, has provided the Department with an important conservation mechanism in establishing the principle of sustained-yield forest management on federally owned lands and providing effective means for enlisting cooperation of private land owners.

Mineral development.—In aid of exploration by the Bureau of Mines for critical and strategic minerals, the Property Acquisition Division, through field attorneys, determined the ownership of the land being explored, and drilling contracts were made in the light of advice and instructions from the Mines Division. In aid of the experimentation by the Bureau for new or more efficient metallurgic processes, the Property Acquisition Division assisted in the acquisition of new plant sites and buildings and the Mines Division prepared the contracts for construction, supply, and operation of these facilities. By the same division of work, plants and rights-of-way were acquired for the vast expansion of the Bureau's helium production, and construction, supply, and operation contracts were executed. To enable the Bureau to undertake practical experiments in the production of synthetic liquid fuels from shale, coal, and natural gas the Legislative Division prepared legislation which became Public Law 290, authorizing demonstration plants. The problem of securing repayment to the Federal Government of expenditures to be made in the construction of the Leadville Drainage Tunnel, designed to dewater some of the richest lead and zinc mines in the country, was referred to the Solicitor's office at the beginning of the fiscal year. It was solved through the drafting and negotiating of royalty contracts which, by the close of the fiscal year, had been executed by nearly all of the operators benefiting from the project.

Reclamation and power.—Important blue prints for post-war use of land and water resources were drawn up in the legislative program of the Bureau of Reclamation with the aid of attorneys in the Legislative Division and of the Legal Division of the Bureau. This program included the Central Valley Soldiers Settlement Bill, now before Congress, providing a plan for the settlement of soldiers on lands receiving water under that project, authorization for the post-war construction of the Hungry Horse project (Public Law 320), and amendments urged to the pending rivers and harbors and flood control bills. The construction program for immediate war food purposes was forwarded by the passage of Public Law 152, drafted by the Department's attorneys, designed to increase food production through small reclamation projects, and by the negotiation of construction and supply contracts under seven war food projects reapproved by the War Production Board. The Bureau's Legal Division with the advice of the Conservation Division drafted important power contracts, particularly for the sale of energy from Boulder and Shasta Dams. An understanding was reached with the Bonneville Power Administration for the marketing of energy from the Grand Coulee Dam and a return of part of the Government's investment out of the power revenues. In the settlement of problems relating to the apportionment of waters, of particular note was the negotiation of the Belle Fourche compact between the States of Wyoming and South Dakota, ratified by Public Law 236. The apportionment of the North Platte River is now pending in the Supreme Court in the case of *Nebraska v. Wyoming and Colorado*, in which Bureau attorneys gave active assistance.

Territories.—Political and economic questions of major importance to the Territories demanded intensive consideration from this office, particularly from the Legislative Division, and from the legal staff of the Division of Territories. Assistance was given to the President's Committee set up to study further autonomy for Puerto Rico, in the preparation of legislative recommendations designed to achieve that objective, and to the congressional committees studying basic conditions in Puerto Rico. An Executive order was drafted to coordinate Federal activities in Puerto Rico. War and post-war economic measures for Puerto Rico which demanded attention included arrangements for the procurement and distribution of food, the consolidation of power and water facilities to meet military and post-war industrial needs, and the more equitable distribution of petroleum products. As the tides of war moved westward in the Pacific, new steps were taken toward completing the elimination of martial rule in Hawaii. Measures for the Virgin Islands included extension of social security services and Federal credit, and legislation for a public works program. Measures for Alaska included proposals for homestead opportunities for veterans and other settlers, for a development company to promote

post-war industrialization, and for the resettlement of evacuated natives. Legislation for post-war development of the territories was studied which became Public Law 320, amending the Hawaiian Homes Commission Act; Public Law 236, the so-called G. I. Bill of Rights, in which amendments were inserted to provide adequately for the returning veterans of the territories; and Public Laws 380 and 381, establishing a policy for Philippine independence and a commission to consider rehabilitation of the Philippines.

Fish and game.—The enforcement by the Office of the Coordinator of Fisheries of the orders of the Secretary for more effective use of fishery resources during the war required constant negotiation by the chief counsel of that office with interested parties, and, in connection with the pilchard program, the institution of 21 administrative proceedings against violators of the orders. The Conservation Division and the chief counsel, in cooperation with other officials of the Fish and Wildlife Service, drafted amendments and extensions of the departmental orders relating to the pilchard industry, the allocation of salmon in Alaska, the regulation of the salmon canning industry in Alaska, and the regulation of salmon operations in the Puget Sound area. Major conservation legislation drafted by the Legislative Division became Public Law 106, revising the Alaska Game Law to strengthen game control and extend protection to inland fishes, and Public Law 237 effectuating the 1942 provisional Fur Seal Agreement between the United States and Canada. The Conservation Division and the chief counsel of the Fish and Wildlife Service revised the regulations under the Alaska Game Law to effectuate Public Law 106 and the Alaska commercial fishery regulations to permit a maximum take this year. The chief counsel aided the temporary transfer of 400,000 acres to the military services, worked with the Office of Price Administration in preparing maximum ceiling price regulations for the raw fur industry, and drafted conservation agreements with other American Republics.

Indians.—Protection of Indian rights was the chief occupation of the Indian Division of this office during the past year. Litigation to eject trespassers who had for many years maintained ranches on the Pyramid Lake Indian Reservation in Nevada was brought to a successful conclusion when the Supreme Court declined to review the decision favorable to the Indians in *Depaoli v. United States*, 139 F. (2d) 225, cert. den., 321 U. S. 796, and the trespassers agreed to sell their improvements to the Pyramid Lake Tribe. Litigation against some 800 lessees in the Town of Salamanca, New York, who had defaulted in rentals due under long-term leases executed more than 50 years ago by the Seneca Tribe, resulted in nearly all of the defaulting lessees paying up the amounts due and entering new leases under which the Indians will hereafter receive rentals more commensurate with

the present value of the land. These two victories should go a long way toward commanding respect for Indian land ownership in quarters that have often considered Indian tribal lands as a kind of public domain open to all takers. Another old wrong was righted when, following a judgment in favor of the Menominee Tribe for \$1,700,000, the value of land promised the tribe in 1854 but never transferred to it, arrangements were completed for the use of this recovery to acquire the lands promised 90 years ago by a nation which still holds its word to be sacred. Further progress in the protection of Indian lands was made in Alaska, where a preliminary study of the status of Indian land claims resulted in the perfecting of arrangements for administrative adjudications of aboriginal claims within the public domain.

A large increase in important Indian litigation made necessary the assumption by the Solicitor's office of new responsibilities for brief-writing. Additional burdens were likewise cast upon this office in the field of taxation, where recent decisions have compelled reconsideration of various Indian tax liabilities under State laws. Further new responsibilities in the field of financing Indian land-use and industrial development were the result of congressional legislation at the start of the fiscal year extending the credit provisions of the Indian Reorganization Act to tribes which had not hitherto been entitled to the benefits of that act. Assumption of these new responsibilities was made possible by an extensive delegation of authority in other fields of Indian law and administration to the Indian Office and to the Legal Division of that office, on which have fallen greatly increased burdens, particularly in fields of land transactions, credit, law and order, and probate matters.

Government property and transactions.—To prepare for post-war property liquidation problems, the Legislative Division drafted a comprehensive bill, submitted to interested congressional committees, for the administration of surplus federally owned real property, and the Solicitor's office advised the Department's representative on the interdepartmental surplus war property committee. In the administration of the Department's order defining the Government's property interest in employee inventions, the Legislative Division drafted Public Law 357, authorizing the payment of rewards for inventions and suggestions, and the Mines Division prepared opinions on the relative rights of the Government and the employees, set up new procedures for reporting inventions to the Secretary and the Attorney General, and reviewed at least 109 new patent matters transmitted to the Department of Justice. The several divisions of the office, drafting, reviewing, and administering the contracts of the Department, studied and applied the numerous wartime Executive orders and in-

structions establishing contract procedures and provisions to meet critical labor and material shortages.

Departmental procedure.—To obtain more effective distribution and speedier conduct of the Department's business, the Solicitor's office was repeatedly called upon to analyze the Secretary's authority to delegate functions to the heads of agencies and to transfer functions among them. It drafted delegation opinions and orders concerning the Indian Office, Board on Geographical Names, General Land Office, Grazing Service, National Park Service, and the Bureau of Reclamation, and upheld the authority to transfer safety inspections of mines under Government lease from the Geological Survey to the Bureau of Mines and the authority to transfer, consolidate, and regroup, with one minor exception, all of the oil and gas functions of the Department.

Personnel organization.—To stimulate the interest of the Department's attorneys in the opportunities of Government service and in the possibilities for improvement of standards of work, the Solicitor put into effect a strict application of the Department's advancement-from-within policy and undertook the establishment of an in-service training program. Since January when advancement procedures were officially established, 13 of 17 vacancies have been filled from within the service. In organizing the in-service training program, as many as 20 different Government agencies were consulted. Courses are now planned, in cooperation with 13 other agencies, which will be open to lawyers newly entering the service, those in the service, and those returning from the armed forces.

The reorganization of the work of the office, previously approved, was carried on this year by the establishment of chief counsel positions in the Geological Survey, General Land Office, Grazing Service, and Office of the Coordinator of Fisheries, by the transfer of certain title work from the General Land Office to the Property Acquisition Division, by the reorganization of the Law Division in the General Land Office, and by the formal establishment of the fiscal and personnel law section in the Conservation Division.

Division of Personnel

Supervision and Management

MRS. J. ATWOOD MAULDING, Director



THE conservation and full utilization of manpower have continued to be the objectives during the fiscal year 1944. In the development of programs toward these goals the Division has endeavored to strengthen the whole personnel structure in preparation for the tremendous post-war problems, such as post-war expansions, the returning veterans, and the demobilization of purely wartime activities.

The Division has continued the policy of searching the Department's own personnel for needed talent first, not only as a part of the recognized promotion-from-within policy, but to avoid as much as possible a drain on the outside manpower sources. This has resulted in filling from within the Department 60 percent of the vacancies above the entrance grade in the District of Columbia and 38 percent of those in the field. In the specialized war work, however, there has been a continuing demand for topographic engineers, geologists, engineering aids, and draftsmen in the Geological Survey; mining engineers, metallurgists, and coal mine inspectors in the Bureau of Mines; as well as special services in coal and other fields. The supply has not been adequate, which has made it necessary to request occupational deferment from military service for a number of those professional and specially qualified persons to carry on effectively the strategic work. Our requests for deferment have been principally in the 30 to 37 age group, interfering as little as possible with the military program.

Every effort has been made to recruit women and those not subject to military service. The fact that the Department now has approximately 9,600 women, nearly 3,000 more than at Pearl Harbor, points up this policy. At the same time the Department has released to the

armed services more than 6,200; 267 have returned to duty in the Department and 32 have paid the supreme sacrifice.

There has been a constant shortage of stenographers, typists, and other types of clerical help. As part of the effort to recruit them a joint recruiting program was arranged with the Civil Service Commission which was conducted in Virginia, West Virginia, and North Carolina. While productive it did not meet fully the demands. The help of the Department's own personnel in locating recruits has also been enlisted.

A broad training program has been conducted this year in an effort to increase the effectiveness of persons presently employed in the Department, to improve further the efficiency of our supervisors, and to orient new employees. In addition to refresher courses previously conducted for typists and stenographers, over 400 new employees have participated in the orientation program. Representatives from the bureaus in Washington, Chicago, Denver, and Salt Lake City took the trainers' course for job instruction training, which course they have given to over 200 supervisors in these cities. To provide a reserve from which to draw administrative talent the Department's administrative course was again given to carefully selected candidates. Three employees were also selected for the in-service administrative training program of the National Institute of Public Affairs.

Four separate promotional examinations were designed and conducted in the Division, in which 436 employees participated in Washington, Chicago, and Denver. These were for the purpose of establishing the eligibility of clerks for higher grade vacancies, and messengers for clerical positions.

The classification office has reviewed and allocated 16,700 positions during the year, and has made numerous surveys of groups of positions, some in collaboration with the Civil Service Commission. Specifications have been prepared and promulgated for various classes of field positions, as part of a long-range plan for covering by specifications all of our typical field positions.

Consonant with the Stabilization Act the Division has endeavored to keep rates of pay for the trades and occupations at the prevailing level and wage board procedures have been extended to accomplish this.

Even under the abnormal conditions of wartime every evidence is that the morale of the Department's personnel is high. Information regarding recreational opportunities, housing, child care and so on has been disseminated; by cooperation with the Public Health Service chest X-rays were made available on a voluntary basis; health lectures were held; the welfare and credit union services have been available. While turn-over has been above normal, we have found very few individual grievances.

In order to give improved and more expeditious service to the three bureaus of the Department which were transferred to Chicago in 1942, a branch office of this Division was established there in January 1944. The results of bringing the departmental staff closer to the operating officials has been most gratifying.

During the fiscal year there were 18 retirements for age, 74 optional, 43 for disability. There were 21 employees reemployed after having reached the retirement age.

At the close of the fiscal year there were 43,879 employees in the Department, 4,858 in the Washington metropolitan area, and 39,011 in the field.

As part of an improved over-all program of the Division, plans have been going forward looking to more decentralization of paper work and the placing of more responsibility on the bureaus and offices, while retaining central control over policies and sound personnel standards and procedures. The first major delegation of authority was made in May 1944, to the Bureau of Reclamation in Denver. Others are in process. The Division is girding itself for the challenging tasks ahead.

Interior Department Museum

H. L. RAUL, Museum Curator



WITH vast national resources under the administration of the Department of the Interior and directed toward sure victory and post-war requirements, the vital contributions of the Department to these ends are illustrated graphically in the Interior Department Museum. The museum, operating in direct contact with the public, reflects the history, aims, and the current activities of all of the bureaus of the Department.

Its educational character is well attested by the popular use made of the museum by the general public, members of the armed forces, educators, and students.

The museum was visited during the past year by approximately 45,000 persons. The visitors' register recorded visitors from every State in the Union with the single exception of Nevada. Registrations were received also from Alaska, Hawaii, Puerto Rico, Argentina, Australia, Canada, China, Colombia, Cuba, England, Ecuador, France, Haiti, Holland, Iceland, Italy, Mexico, Mongolia, New Zealand, Scotland, Sumatra, Sweden, Switzerland, Panama, Paraguay, Thailand, Venezuela, and Yugoslavia.

In cooperation with the bureaus, revisions have been made in the display cases to reflect current conditions. During the past year the museum has served, upon request, numerous agencies including American Air Forces, Corcoran Gallery of Art, Fort Belvoir Engineers' Board, National Institute of Public Affairs, Navy Department, Public Buildings Administration, State Department, United States Service Organizations, Veterans' Administration, and the War Department.

A collection of antique Indian baskets, selected from the Colburn Collection of Indian Basketry, was exhibited, by request, at the Toledo (Ohio) Art Museum during the month of January. This exhibit proved its popular interest by a granted request for extension of the exhibition period for an additional month.

A silhouette, which is ten feet in length and which depicts "The Driving of the Golden Spike" at the completion of the first trans-continental railroad, at Promontory Point near Ogden, Utah, on May 10, 1869, was designed in the museum and installed in the General Land Office Gallery. Books added to the museum collection include *A Manual on the Origin and Development of Washington*, by H. Paul Caemmerer, Ph. D.; *The Crafts of the Ojibwa (Chippewa)*, by Carrie A. Lyford; and *Seneca Split Basketry*, by Marjorie Lismer.

Throughout the year conducted tours of the museum galleries were held for teacher groups and public and private school classes. A pertinent commentary on the educational value of the museum is indicated by the continuous use of the galleries for school purposes. Notwithstanding transportation difficulties which frequently prevented entire school classes from attending, the teachers visited the museum, singly and in groups, to avail themselves of material for arranging study courses on conservation, historical and other subjects pertaining to various activities of the Department. Numerous inquiries on the part of the general public have been complied with daily at the information desk. Many requests have been received from visitors in the uniforms of our armed services.

POST-WAR

In connection with post-war potentialities of the museum, certain improvements are desirable. The museum specimen collections have been largely augmented during the past several years. Much of this important new material now is held necessarily in storage, and, therefore, is not readily available for display or study purposes. Additional space will be needed to provide for these collections and for other important exhibit material. Furthermore, while present display cases currently are subject to additions and revisions to reflect the current bureau activities, space restrictions are evident.

As during the course of the war the facilities of the museum have been made available for the training of hundreds of departmental personnel in modern first aid techniques, developed and taught by the Bureau of Mines, a post-war expansion of the use by the bureaus of the museum facilities and equipment is suggested, should the need arise, in connection with possible post-war training and rehabilitation programs for returning war veterans, particularly those who were past employees of the Department. In this field the museum technical workshop could well serve as a nucleus for training courses in expert model-making, visual and graphic techniques, and other specialized training useful both to the veterans and to the Department.

From the post-war historical standpoint, when victory is won, many of the museum displays will require final revision and re-designing to illustrate and record the vital importance and the amazing scope of essential activities accomplished by the Department and under its auspices in the prosecution of the war. Post-war potentialities for the museum indicate that when the full story of the Department's participation in this great crisis in the life of our Nation can be unfolded in its entirety, by modern museum methods, this new great chapter in the history of the Department appropriately will require increased exhibit space for its presentation. It will comprise an inspiring story of vast achievement in many fields vital to victory. In reflecting this story for permanent visualization and reference, desirable post-war museum results are anticipated for the Department and for the public.

Division of Information

JOHN E. RYCKMAN, Director



DURING 1944 the Division of Information has endeavored to keep the public abreast of what the Department, as custodian of the Nation's natural wealth, has done, not alone in mobilizing our resources for war, but in planning for the post-war period.

The informational programs of the various Bureaus and Offices having to do with the development and wise use of such natural assets as metals, power, fuel, helium, food, land, timber, and fisheries, have been under the direction of this Division and channeled through it to the public. This Division is comprised of editorial, radio-television, photographic, and publications sections.

By appointment of the Secretary of the Interior, the Director of Information has acted as security officer for the Department in safeguarding secret and confidential material that might aid and comfort the enemy, as clearance officer for publications with the Office of War Information, and as editor in chief of the Interior War Records project, now in the process of being compiled for the future use of the Government in time of emergency.

The Division has been responsible not only for passing upon the editorial content and format of pamphlets, booklets, and other publications released by the Bureaus but also for deciding whether such printed matter should be issued at all during the emergency. In this connection, considerable savings in vital paper stocks have been effected through abridging many publications and restricting others for which there is not a definite war need.

The fiscal year has seen the assignment to the Division of the task of producing "Inside Interior," a monthly publication designed to keep the Department's own employees informed about its activities, as well as to enable the more than 6,000 employees in the armed services to maintain contact with their former associates.

The Division was also responsible for editing, designing the format and supervising the printing of the Secretary's annual report.

RADIO-TELEVISION SECTION

Under the general supervision of the director of information, the radio-television section, operating the only modern broadcasting and recording studios in the Government, has in the past year been increasingly called upon to serve Federal war agencies.

Principal use of these facilities was made by the armed services for the preparation of special training programs, including electrical transcriptions, direct broadcasts, and the production of slide film and film strips. These training productions were for use in every theater of the war.

More than 200 hours of secret and confidential utilization of radio-television section facilities were spent in the production of special materials for the Office of Strategic Services and for the War and Navy Departments.

A total of 29 different languages have been used in productions put out in the Section in the past year and broadcast as a part of the psychological war activity.

Diplomatic representatives of all of the United Nations and many distinguished war visitors have been presented by direct broadcast and by radio transcriptions both to American and foreign audiences. Notable in this category were a special broadcast of the arrival in Washington of General Charles DeGaulle, prepared for European listeners; the dramatic swearing in of Sergio Osmeña as President of the Philippines; broadcast for European and American audiences of special interviews with His Royal Highness, The Amir Faisal of Arabia and his royal entourage; a special broadcast to the men of the Marine Corps by General Holcombe upon his leaving his position as Commandant of the Corps for special duty. Representative of the type of series broadcasts produced in the section were the 482 special broadcasts by electrical transcriptions made by the Free Thai Minister, Mom Rajawongse Seni Pramoj, and shortwaved to the people of Thailand.

While these special services are being rendered to war agencies outside of the Department, our own bureaus and offices have in no wise been neglected. Programs, transcriptions and special recordings have been made in this period for the Solid Fuels Administration for War, the War Relocation Authority, Petroleum Administration for War, Board on Geographical Names, Bonneville Power Administration, Bureau of Reclamation, Bureau of Mines, Division of Territories and Island Possessions, Coordinator of Fisheries, National Park Service, and Geological Survey.

Within the past year, the radio-television section has cooperated in the preparation or production of radio and transcription material with most of the Federal departments and other agencies.

PUBLICATIONS SECTION

This is the first complete fiscal year during which the publications section has concentrated upon editing and publishing rather than upon the procurement of printing. Copy has not been merely processed for the printer. It has been examined editorially, and faulty manuscripts have been revised or returned to the issuing agencies for revisions. This change in practice has been justified by the results, one of which is that the public receives clearer and better-selected reports of the Department's findings.

The section chief has assisted in effecting clearance of publications, under the Office of War Information Regulation No. 8 and has also assumed greater control over all departmental and bureau publications as regards format. Economic practices in the printing and processing of all information material have been enforced and appreciable economies have resulted.

Much remains to be done in improving the appearance and the editorial content of our publications, and it is planned to make such improvements as rapidly as circumstances permit.

PHOTOGRAPHIC SECTION

Most of the offices and bureaus of the Department have continued to utilize the facilities of the photographic laboratories to effect considerable savings in descriptive matter in official reports. The photographic section has devoted its time almost exclusively to furnishing photographs and illustrations having a direct bearing upon activities related to the war.

In addition to work for the Department, it has continued to cooperate with other governmental agencies in the production of illustrative material involved in their war programs. It has also furnished pictures for textbooks, guidebooks, pamphlets and travel literature requested by scientific, trade and other magazines and publishing organizations.

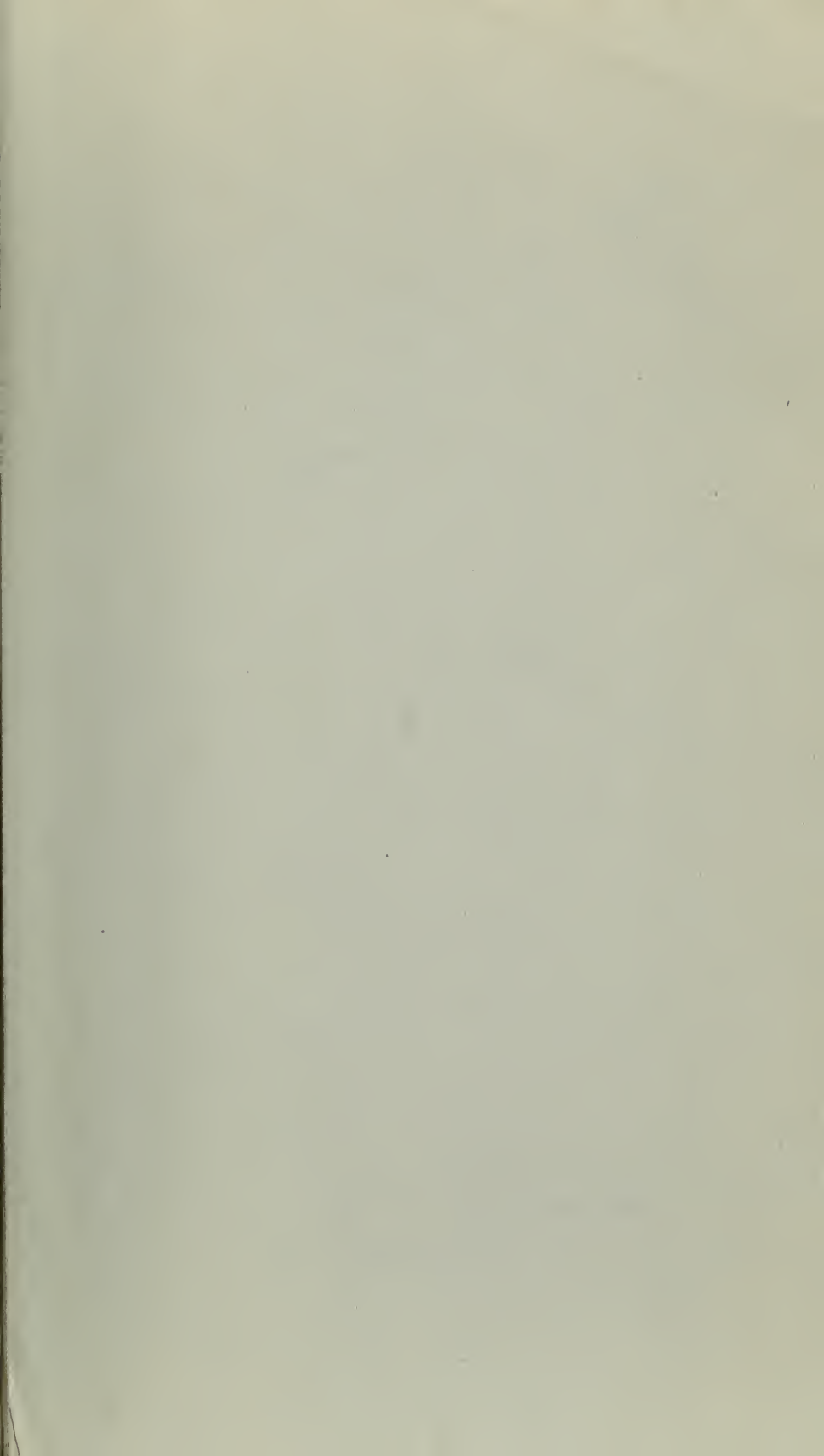
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