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# Annual Report

**OF THE SECRETARY OF  
THE INTERIOR**



**FISCAL YEAR ENDED JUNE 30, 1943**

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**OF THE SECRETARY OF  
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FOR THE FISCAL YEAR  
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**United States**  
**Department of the Interior**

HAROLD L. ICKES, *Secretary*

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# Contents

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## REPORTS BY BUREAUS AND DIVISIONS

Letter of Transmittal . . . . .	v
Bureau of Mines . . . . .	1
Geological Survey. . . . .	33
Bureau of Reclamation . . . . .	61
Solid Fuels Administration for War . . . . .	89
Bituminous Coal Division . . . . .	95
Petroleum Conservation Division . . . . .	113
Bonneville Power Administration . . . . .	117
Division of Power. . . . .	133
Division of Territories and Island Possessions . . . . .	139
Puerto Rico Reconstruction Administration . . . . .	157
General Land Office. . . . .	161
Office of Land Utilization . . . . .	179
Grazing Service. . . . .	187
National Park Service . . . . .	197
Fish and Wildlife Service . . . . .	225
Office of the Coordinator of Fisheries . . . . .	269
Office of Indian Affairs . . . . .	273
Board on Geographical Names . . . . .	297
Division of Personnel Supervision and Management . . . . .	299
Office of the Solicitor . . . . .	303
Division of Information . . . . .	311
Interior Department Museum . . . . .	313
Civilian Conservation Corps . . . . .	317



# Letter of Transmittal

## The Secretary of the Interior

HAROLD L. ICKES, Secretary

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**M**Y DEAR MR. PRESIDENT: This report covers 12 months during which the Department of the Interior has been tested rigorously for those virtues which, it is sometimes said, have vanished utterly from the regular departments of the Federal Government.

In our biggest job, that of mobilizing the Nation's natural resources for war, we have been tested for agility in improvising new tactics on the field as new challenges arose and old ones changed, for economic performance, and for resistance to that wartime itch for overcentralized authority. In our secondary job, the prosecution of a minimized but inescapable conservation program, we have been tested for the plain gumption that is needed to know what to stop doing for the Nation's good as well as what to do, and for our ability to prepare for peace in time of war.

You will notice that our job is, by brief and limiting description, the same as it was last year. That is because we assumed the job of marshaling the Nation's natural resources on the very day that Pearl Harbor was bombed. But despite identical labels, this year's work has differed from last year's. It is one thing to conceive and launch a great new program, and a quite different thing to push the program through when the obstacles loom in front. This has been the year of the big push, and execution has been a real test, as I have said.

From the very beginning, we have labored under a modern version of the ancient and vexatious command to make bricks without straw: we have had to do more, vastly more, with less and less to do it with. The huge new war-production plants of the West depended upon us for more hydroelectric power to make more implements of war—more ships, more tanks, more planes. The normal ways of increasing power, the installation of more generators, the construction of more dams and more transmission lines, were barred. The construction materials that we needed were needed elsewhere. There was a man-

power shortage to contend against, and other obstacles were numerous and formidable. We had to push for larger food crops, but to economize on scarce materials, many projects that might have extended irrigation were closed. We had to promote the production of more fish and fishery products despite a shortage of fishermen and fishing equipment. The world looked to the Federal ranges for more meat, but in order to concentrate on even more pressing war needs we had halted many activities that keep the ranges conditioned to fatten cattle.

Being denied the normal means of increasing the production of one resource after another, we turned to other means. We narrowed our demands for materials with which to build for increased power to that which was essential to the national safety, then pleaded the case for that minimum convincingly enough to get it. Or, we moved a generator from the plant for which it was intended to another plant at which it could produce power quicker or to better advantage. Where larger catches of fish that are customary food were not possible, we persuaded the industry to land edible species which were taken with the usual catch, but formerly discarded because they were not in demand. Then we persuaded consumers to accept these species as food.

The important thing is that, in the end, we did vastly increase production. We doubled our output of hydroelectric power. We increased our capacity to produce power by nearly half a million kilowatts. The salmon pack in western Alaska will exceed last year's pack by about a million cases. Despite our shattered range-improvement program, 85 million more pounds of meat were taken from the Federal range this year than last. We can report progress also in our search after the ores from which industry extracts the metals that armies and navies fight with. In response to the smelters' appeal for more zinc and copper for war, we revealed domestic reserves which contain 33 million pounds of copper, and 8 million tons of zinc and zinc-lead ores.

We not only did these things and many others: we did them economically. We cut this year's budget 10 million dollars below the amount which you approved, and voluntarily began operations on a budget that was 25 percent below the appropriation for the previous fiscal year. During this fiscal year we prepared next year's budget, scaling it down to 66 percent below the appropriation for 1943.

We achieved many of our economies by abandoning activities which could be dispensed with temporarily, and by minimizing others which could be curtailed, if not eliminated. I have heard that Federal departments never stop any activity until forced to do so, but we have



suspended many operations aside from those that ceased for lack of men and materials. The Grazing Service alone held in abeyance a score of range-improvement projects. I have already reported the gains which particular bureaus made despite their curtailments. Other bureaus and offices economized similarly, but contributed impressively to victory just the same.

To take up the question of our ability to prepare for the future, is to continue the discussion of these deferred projects. We have consolidated them into a vast post-war work program, and we have kept the working plans for these projects up to date, ready to unfold and follow when the firing ceases. We could launch much of our program within 30 days after victory. On one type of project alone—power and irrigation construction—we could keep 480,000 demobilized service men and war workers gainfully employed for 3 years—225,000 of them at construction sites and 255,000 in the plants and factories that would provide materials for the developments. When complete, this construction would open farm settlement opportunities to 165,000 families.

We have wrestled with the problem of keeping the huge new industrial plants of the Northwest busy when peace comes. They have grown up on the low-cost power which we provide, and flourish now on war production, but what shall they manufacture and to whom shall they sell it when the last war contract is finished? The Bonneville Power Administration, which distributes this power, searched diligently for the answer during the year with some encouraging results, and the search continues.

We have kept in mind the huge contribution which the United States will have to make to replenish the world's war-depleted larder. Consequently we gave an important place in our post-war program to irrigation projects. We are prepared to extend irrigation to 6,000,000 additional acres, and to supplement the water supply which now irrigates 9,000,000 acres, but which irrigates them inadequately. Six of our bureaus have worked together, and continue to work, on a food production program that embraces extended irrigation, range conditioning for the production of more meat, various means of increasing the production of fertilizer, the further tapping of fish and wildlife resources, and much besides.

We also continued to prepare for the day, only decades—not centuries—in the distance, when our liquid fuel reserves will be depleted to dangerously low levels. To cushion the shock of that inevitable occurrence, we furthered our experiments in extracting liquid fuels from coal and oil shales which are abundant.



Instead of centralizing authority, we tended generally toward decentralizing it. In particular, we decentralized one of our most powerful and far-reaching functions; that of directing local use of Reclamation projects in accordance with Federal conservation policies. We established six regional offices and appointed local directors to give order to the use of power and irrigation projects which are now in operation, and to recommend new projects in accordance with the varying needs and prevailing practices of their respective regions. They are not free, of course, to override fundamental conservation policies; but they are granted "extensive latitude for independent action," in behalf of their communities within the ample premise of sound conservation policies.

I have not expressly mentioned the assistance which some of the bureaus and offices of the Department have given me in my capacity as Petroleum Administrator for War, Solid Fuels Administrator for War, and Fisheries Coordinator. But that assistance has been considerable, and in some instances a Departmental bureau or office has been the mainstay of an extraordinary agency.

You will find a fuller account of the regular and special functions of the various bureaus in the remainder of this letter, but even that account will not be as detailed as usual because we have cut our report to half-length for economy's sake as we did last year. Still, I think that you will find enough detail to support my assertion that we have been through a severe test, and enough about the results to determine whether we have acquitted ourselves well or have failed.

## THE BUREAU OF MINES

The United States, manufacturing for war at a record-breaking pace, called for an unprecedented production of minerals. In response the Bureau of Mines again took a leading part in finding new ore reserves and in devising methods for their rapid utilization in the multi-billion-dollar production program of American industry.

Blast and open-hearth furnaces required more ore, more flux, and more coke. The Bureau of Mines, with 32 years of progressive research in all fields of the mineral industries, found usable iron-ore deposits in 20 States to provide potential supplements to the iron reserves currently utilized; and intensified its experiments in the production of sponge iron as a possible substitute for steel scrap. It promoted the production of high-quality coke of a uniform grade; it carried on extensive exploratory work to help the output of fluorspar for flux; and assisted in the greater recovery of ore from operating underground iron mines.

Smelters called for more ore for zinc and copper to provide weapons and equipment for war materials and lend-lease. The Bureau's exploratory projects revealed additional domestic ore reserves containing 33,000,000 pounds of copper, and disclosed 8,000,000 tons of zinc and zinc-lead ores, substantial amounts of which are being brought into production.

The demands for mercury increased steadily and the Bureau sent its crews into seven mineral-bearing areas to increase the known reserves of cinnabar. At the end of the year they had made known more than 600,000 tons of ore.

The production of 6,000 or 7,000 war planes monthly resulted in a heavier drain on domestic bauxite for aluminum. In less than a year the Bureau's engineers had increased the known reserves of bauxite by more than 10,000,000 tons and, in addition, had charted some 100,000,000 tons of alumina-bearing clays for possible future use.

Such achievements by the Bureau were added to the long list of war-time accomplishments which date back 2½ years before Pearl Harbor when the Bureau, at the direction of the Congress, embarked on the long-needed inventory of the Nation's mineral wealth.

Because many of our domestic ores are lean in war metals or are difficult to beneficiate, the Bureau conducted studies to determine which low-grade ores could be processed advantageously, which could not be, and which method should be applied to those that could be processed. Thousands of samples were analyzed. By this rapid, authoritative system of reporting to industry the comparative amenability of various ores to processing, the Bureau helped to eliminate costly, chance-taking explorations of doubtful deposits.

Advancements were made in the methods of producing chromium, manganese, vanadium, cobalt, copper, nickel, molybdenum, tungsten, and other war metals from complex or low-grade ores. When significant findings occurred, the war agencies and appropriate industries were advised regarding the Bureau's progress. Simultaneously, the Bureau gained steadily in cooperative research projects, undertaken with industry, to solve specific problems.

Significant attainments resulted from exploratory, laboratory, and pilot plant work in nonmetallics. Millions of radio insulators, made from domestic talcs tested by the Bureau, were processed in a Bureau laboratory to aid the manufacture of essential communications equipment for the armed forces. Exploratory crews proved that there were deposits of more than 1,000,000 tons of flake graphite, and the War Production Board approved the building or reconstruction of mills to process this domestic graphite.

In analyzing more than 23,000 samples of coal for Federal agencies, particularly the Army and Navy, whose purchases of solid fuels total several millions of tons annually, the Bureau saved considerable sums of money for the Government. Coal-storage and coal-procurement problems were brought to the Bureau by industry and solutions were provided by experts who have had long experience in those fields. One such problem involved the storage of 50,000,000 tons of coal on Great Lakes docks. To help solve the fuel-oil shortage problem, the Bureau cooperated with an oil company in operating a boiler plant on colloidal fuel, a mixture of pulverized bituminous coal and bunker C fuel oil.

The Bureau embarked on laboratory-scale investigations of the indirect process for making synthetic gasoline, oil, and other petroleum products from coal and continued its research in the direct hydrogenation process. Although the experiments in coal hydrogenation were launched by the Bureau in 1935, they came into greater prominence during the year because of recurring gasoline shortages for civilians, and because of the growing concern over the depletion of domestic petroleum reserves.

Symbolic of the Bureau's ability to dovetail its activities most effectively with the whole war program was its production of helium for Navy antisubmarine blimps, for meteorological balloons, and for a dozen other essential uses. From its plant at Amarillo, Tex., and from a newer plant that was completed during the year the Bureau pushed production of the lightweight, inert gas to about 25 times that of 1941. To supply anticipated needs, the Bureau rushed the construction of three other helium plants in the Southwest, and drilled additional wells in the Texas helium field. Every demand for this noninflammable gas by the armed services was met.

Demands for special lubricants and 100-octane gasoline for war planes, the need for more chemicals for explosives, and the heavier use of gaseous fuels by industry threw greater emphasis on the Bureau's special research in petroleum and natural gas. Several new research programs were begun, and the Bureau's findings helped to increase the production of high-test gasoline, benzene, toluene, and other petroleum byproducts. A mobile field laboratory was dispatched to petroleum fields to speed the flow of technical information to operators. An extensive field-testing program was undertaken for a natural-gas reservoir in the South-Central area, and valuable assistance was given the Petroleum Administration for War by the Bureau through its studies of deep, high-pressure fields of the Gulf Coast.

The health, safety, and plant-security activities of the Bureau increased manifold as Americans in war production worked closer to-



gether, for longer hours, and at higher speeds. As the need to conserve manpower, equipment, and other plant facilities of the mineral industries became more pressing; safety experts in the Bureau gave first-aid training to more than 45,000 workers; and coal-mine inspectors visited more than 1,100 mines in the United States and Alaska to investigate health and safety practices and to counsel workers and officials on safer methods of performing their jobs so that the wartime production of coal would not lag. Improvements in many mines resulted from this work and, despite a general increase in industrial accidents, numerous mines cut their accident toll while increasing their output.

In administering the wartime Federal Explosives Act, a barrier to sabotage, the Bureau investigated 9,000 stores of explosives, approved the granting of more than 350,000 licenses under the act, and investigated accidents in which nonmilitary explosives or their ingredients were involved. Plant-security studies of the Bureau—another wartime assignment—were conducted at nearly 2,000 mines and related facilities. Many inspections were made jointly with Army officials.

The special confidential laboratory experiments and studies undertaken by the Bureau for the Army, the Navy, the Maritime Commission, and others closely associated with the prosecution of the war, increased in number and scope. Typical experiments inquired into the characteristics of explosives, metallic and nonmetallic dusts, gases, vapors, and liquids, the safety qualities of protective equipment, and the prevention of accidents involving the handling of inflammable materials.

Assisting such war agencies as the War Production Board, the joint War Production Board, Office of Price Administration Quota Committee, the War Manpower Commission, and the Solid Fuels Administration for War, the Bureau completed many special studies which provided these offices with up-to-date interpretative facts regarding the production, consumption, uses, stocks, and other information involving mineral commodities. The Bureau provided specific information about war minerals to hundreds of inquirers each month.

## THE GEOLOGICAL SURVEY

The Geological Survey also did much of its work in response to industry's insatiable demand for mineral commodities. War-production demanded not only more of the materials that are ordinarily recognized as of strategic importance; it also demanded more of many

minerals, the supply of which had hitherto been considered adequate, because deposits were abundant, or because demand had been slight.

The Geological Survey was especially qualified to evaluate the sources of needed minerals in the United States and in other American Republics. Its Geologic Branch was on a war footing, acting as a fact-finding organization and as an adviser on policies of mineral production and problems of reserves. During the year more than 700 mines and mineral areas were examined, and reports of the findings were made to various Federal agencies, in response to their direct requests in many instances.

In addition to studying mineral deposits, the Survey assigned about 30 geologists to help meet the increasing demands of the War and Navy departments for geologic information about strategic foreign areas. This information was for use in military engineering abroad.

One of the outstanding activities of the Geological Survey was (and still is) the compilation by its Alaskan Branch of aeronautical charts which were needed by the Army air forces. In the course of that work trimetrogon planimetric mapping covering 2,146,000 square miles of strategic areas, widely distributed throughout the world, was completed. The high quality of the product and the speed and the low cost at which it was made available established records. This remarkable performance was made possible through the utilization of the Survey's engineers who are skilled in rapid reconnaissance field surveys and who have trained a special force of assistance to use the unique methods and special apparatus that have been designed largely by the staff of the Alaskan Branch. In this work they have had the close cooperation of members of the Survey's map reproduction plant in the use of all its facilities.

The Topographic Branch emphasized the making of maps within the strategic areas outlined by the War Department. Of 241 quadrangles for which maps were published during the year, 160 were within the strategic areas; of 228 quadrangles for which mapping was completed, 166 were in such areas, and of 456 quadrangles for which work was in various stages of progress at the close of the year, 416 were in strategic areas. These figures indicate the importance of the Geological Survey's part in the military program. The aerophotogrammetric unit at Clarendon, Va., with increased production facilities and working two shifts, continued to accomplish a large amount of photogrammetric mapping. This unit also maintained a central laboratory for designing, testing, repairing, and adjusting all types of special optical and mechanical equipment which was needed for stereophotogrammetric work. Up to the present time, 47.1 percent



of the total area of the United States has been covered by adequate topographic maps which the Survey has produced.

The strategic importance of water in all human activities is accentuated when those activities are directed to the waging of war. Military establishments and war production plants are scattered from coast to coast, and many problems of water supply confronted them. The geologists, engineers, and chemists of the Geological Survey helped to solve them, and contributed effectively in a surprising number of other ways to the success of the war.

The information on water accumulated in the routine reports of the Water Resources Branch affords a dependable basis for the wise planning of water projects related to the war. This information was adapted to local problems and was supplemented by many special investigations. During the year more than 4,000 special reports on water were made to military agencies; to industrialists and engineers engaged on war contracts; to municipalities that sought to enlarge their water-supply systems in order to serve new concentrations of population; to producers of power who were obliged to build or enlarge power plants to increase the supply of electric energy for use in manufacturing establishments; and to irrigation engineers who were assisted by this data in expanding irrigation systems for the production of more food.

The water experts of the Survey have served also with the armed forces, either as officers or civilians, in obtaining water for the armies in the field, where a wide variety of new situations extending even up to the fighting lines must be met quickly and surely.

Increased demand for minerals, fertilizers, chemicals, water power, and petroleum accelerated prospecting on the public domain and on certain Indian lands which are under the supervision of the Geological Survey. The conservation and development work fostered by the Survey includes surveys and investigations of water and mineral sources and supervision of certain phases of mineral and power production on these lands. The production of coal, sodium, potassium salts, phosphate rock, and crude oil from public lands during 1943 was substantially greater than in 1942. On Indian lands an increased production of coal, vanadium and petroleum, and the working of substantially lower-grade lead and zinc ores were reported.

Continuing efforts, though hampered by manpower shortages, are affording enhanced consultive activities, accelerated field investigations and studies, particularly in regard to secondary recovery methods and an increased contribution of minerals from federally supervised land in support of the war program.

## THE BUREAU OF RECLAMATION

Wherever American troops have fought this year they were better equipped and better fed as a result of the contribution of the Bureau of Reclamation. Guns, tanks, and planes were produced in large quantities in plants that operated on power which was generated on Reclamation projects. Much of this matériel was carried to fronts on which it was sorely needed in ships that were built with power from the same source. Troops and civilians at home and abroad were provided with food that was grown on land which Reclamation projects irrigated. Industrial and military concentrations tapped Federal reservoirs for homes and plants and barracks.

The Bureau's continued expansion of power production for war was impressive. The output of 30 plants on 19 projects—9½ billion kilowatt-hours—was double the 1942 total. The production was equivalent to that of all plants in the 11 far Western States 20 years ago. Nearly half a million additional kilowatts were developed during the year. The capacity is now 1,850,000 kilowatts—twice the Bureau's pre-Pearl Harbor installation.

Most of 900,000 kilowatts that were made available in a 2-year period were installed 2 to 10 years ahead of schedule, at Boulder, Grand Coulee, and Parker Dams. These giant structures were erected in time of peace as part of the Department's far-sighted policy in planning for construction to keep ahead of the inevitable industrial expansion of the West. In terms of war equipment, the new generators potentially are capable of providing annually the power required to build 30 large battleships, or to construct more than 11,000 "Flying Fortresses".

The production of essential foods on the 4,000,000 acres of land that were irrigated by Reclamation facilities in 15 Western States, also contributed toward victory. From these highly-productive areas, once desert wastes, came enough beans to provide an annual supply for nearly 22 million persons, enough potatoes for 13 millions, (through alfalfa fed to beef and dairy herds) enough beef for 4½ millions, and milk for 3¾ millions.

Even greater harvests of food crops may be expected this fall as the result of the response of irrigation farmers to the plea of the War Food Administration to shift from the less essential to the more important war crops. Spring plantings of potatoes this year were 44½ percent greater than last year, and the bean acreage is 36 percent higher. The 1943 cultivated acreage on Reclamation projects is expected to be the largest ever reported.

The huge irrigated yields are materially reducing cross-country shipments of certain foods, chiefly processed meat and dairy products, on which the West has always been dependent. This releases transportation facilities for other war activities and saves large quantities of fuel and equipment required to operate trains and trucks.

The gross value of crops produced on the land that was served by Reclamation works during the calendar year 1942 was \$272,048,516, an increase of more than 45 percent over the 1941 value and a 100-percent gain over 1940.

Conditions beyond the control of the Bureau prevented it from carrying out in full the power program outlined in 1941. This called for increasing the installed capacity to more than 3,300,000 kilowatts by 1945-46. Studies showed that the industrial demand of the West would absorb the output of the additional generators. The War Production Board, however, took the position that critical materials were more urgently needed in other war activities, and stop-construction orders were issued against the 865,600 kilowatts. The Bureau was permitted to proceed with installations which will increase the capacity of its projects to 2,436,000 kilowatts by October 1944—placing more generating equipment under its control than that of any other agency—Federal or private.

In order to grow more food for war, I directed the Bureau, in 1942, to prepare an irrigation construction program which would enable the West to increase agricultural production. But the requirement for the critical materials for other purposes was regarded as more acute, and nearly all irrigation construction was halted later in the calendar year 1942.

In the war food program which was submitted to the Department of Agriculture in March 1943, the Bureau indicated that by 1947 it could extend irrigation services to more than 9,000,000 additional acres, provided that critical materials, manpower, and funds were provided promptly. The program was modified later to embrace projects which would produce a more immediate effect through services to 2,000,000 additional acres by 1943. By June 30, clearances had been given by the War Production Board on projects aggregating less than 300,000 acres. Committees of the Congress joined in recommending irrigation construction as a means of advancing war food production, and additional substantial appropriations of funds were made.

In addition to power and irrigation services, supplemental municipal and industrial water was provided for cities, military concentrations and industries in areas served by Reclamation projects. In all, nearly 5,000,000 persons live in western regions which look to the Bureau for these services.



At the end of the fiscal year, 71 projects were in operation, under construction, or authorized. Fifty-two of these were for generating power or supplying water for irrigation and other beneficial uses. On or near practically every Reclamation project are air bases, other military establishments, and war industries, including aluminum and magnesium plants, airplane factories, shipyards, chemical and other manufactories.

The storage capacity of 81 reservoirs reached a new high, or more than 64 million acre-feet of water during the year. The active storage content on June 30 was 43½ million acre-feet.

While war contributions were of paramount importance during the year, attention also was focused on the problems due to arise in the post-war era. In anticipation that the Nation will be called upon to provide employment and settlement opportunities for the returning service men and war workers, the Bureau continued to assemble an impressive list of projects for construction during the post-war period.

Included in this program will be projects on which work has been halted or retarded during the war and about 50 others for which blueprints will be ready when the victory is won. It is estimated that 3 billion man-hours of work could be provided if this public works program can be carried out in full. It would extend irrigation to 15,000,000 acres of land, and would provide 3,300,000 new kilowatts of power for war industries converted to the production of peacetime necessities.

I have already referred to the decentralization plan for this Bureau as an indication of our willingness to disperse authority. I also expect that this reorganization, which provides for four major branches with offices at Denver in addition to the six regional offices, to increase our efficiency. The greater number of interrelated and complex problems arising from the construction and operation of the many Reclamation projects for irrigation, power, and related purposes, makes a closer coordination of Bureau activities essential, particularly during the war. For the long-term program, I believe that the decentralization will bring the people of the West into closer contact with the many functions which affect so vitally the future of a third of the Nation's land area.

## THE SOLID FUELS ADMINISTRATION FOR WAR

The difficult task of assuring an adequate supply of coal for war industries and for essential civilian uses was carried out successfully during the past fiscal year and steps were taken to provide, so far as possible, assurances of a continued supply in the future.

Pursuant to your Executive order of April 19, 1943, directing me, as Secretary of the Interior, to serve as Solid Fuels Administrator for War, I established this office, which absorbed the personnel, records, and programs of the Office of Solid Fuels Coordinator for War which I had established under your instructions in 1941.

The present office, under its broad authority, has been carrying out your Executive order of May 1, 1943, directing the Secretary of the Interior to take possession and control in behalf of the Government, of coal mines in which work stoppages had halted or were threatening production. The Administration continued to serve as the Government's agent in operating the mines during the next 2 months, through periods of new work stoppages, until I transferred the operation of the mines to the Coal Mines Administration.

The Solid Fuels Administration and its predecessor, the Office of Solid Fuels Coordinator, has worked in close cooperation with the coal industry. Through its Solid Fuels Advisory War Council it has initiated and coordinated policies to the end that the Nation's coal supply might be adequate.

Coal production in 1942 totaled an estimated 580,000,000 tons of bituminous and about 60,000,000 tons of anthracite, thus exceeding estimate of the year's requirements. The surplus bituminous coal went into stock piles, as a result of a coal stocking campaign which was carried on by the Office in the summer months of 1942. These stock piles reached record heights during November and, although they had dropped as the result of rising consumption, prevented many production losses by industry during the coal mine strikes in May and June.

To meet the estimated requirements of 665,000,000 tons for 1943, I prevailed upon mine operators and labor to agree to lift their former 35-hour workweek limitation. The 42-hour workweek which was adopted made possible the maintenance of production despite continued losses of mine manpower to the armed services and to other industries.

The necessity for coal to meet the requirements of consumers who had converted from fuel oil to coal, to provide transportation for coal to areas where requirements had been greatly changed by the war, to supply anthracite for Eastern States, to make sure that vital mines were not handicapped by lack of equipment and repair parts created complex problems.

Many of the problems continue. Manpower shortages will make it difficult to compensate for production stoppages which occurred during the strikes. Conservation in the use of coal may help to restore the balance. If shortages should develop, the Administration will



put into effect programs to assure an equitable distribution of the available coal.

## THE BITUMINOUS COAL DIVISION

Although there had been furnished impressive evidence that the Bituminous Coal Act was an essential part of the Nation's war machinery and that its mechanisms were efficient and workable for the peacetime stabilization of the chronically distressed bituminous coal industry, the Congress permitted it to expire automatically August 23, 1943.

The opposition to the act which developed at a hearing before the Ways and Means Committee from June 21 to July 5, 1943, on several bills for its extension was based on contentions that the act established a system of regulation which is inimical to free competition and constituted an undesirable precedent for the establishment of post-war business regimentation. It was urged that it had been rendered unnecessary by the establishment of the Office of Solid Fuels Administration for War and by improved conditions in the industry, and that the strikes in the coal mines because of the inability of management and labor in the bituminous coal industry to reach a wage agreement demonstrated that the act had not stabilized the industry.

While the opponents of an extension of the act admitted that the industry had achieved stability with respect to costs and realization during the period that the act was in operation, they insisted that this rehabilitation was attributable solely to wartime expansion in demand for coal. While contending that the act had nothing to do with the rehabilitation of the industry, opponents also argued that it had resulted in exorbitantly higher prices to the consumer of bituminous coal.

Abundant testimony was placed before the committee to show that the Coal Act did not provide an alien or novel system of regulation, but only precluded unfair methods of competition, and did not fix the price at which coal had to be sold, but only fixed the price below which coal could not legally be sold. It was demonstrated that the bituminous coal industry is composed of between 12,000 and 17,000 scattered business units and, like agriculture, has been consistently depressed because of the typical inability of the diffused industry to regulate a situation in which a relatively few strong buyers can play against each other numerous necessitous sellers. No testimony was offered before the committee to substantiate a belief that the Bituminous Coal Act would form a pattern for post-war business regula-

tions any more than the Act to Regulate Commerce in 1887 has furnished an all-time business regulatory pattern.

The record showed that the functions of the Secretary of the Interior as Solid Fuels Administrator for War were different from those of the Department under the Bituminous Coal Act, and that the existence of a sellers' market did not dispense with the necessity of maintaining the stabilization factors provided by the act.

It was indicated clearly that the inability of labor and management in the coal industry to negotiate a wage agreement consonant with the law could not be attributed in any way to the Coal Act because nothing in the act compelled either labor or management to reach an agreement. However, the removal of the assurance to the industry of the recovery of the cost of production furnished by the minimum price structure under the act might well make the execution of a wage agreement by the operators and mine workers more difficult.

For approximately 15 years prior to the enactment of the Bituminous Coal Act, the industry's yearly losses ran to millions of dollars. The Bituminous Coal Division offered the committee a precise statistical measurement to show that this loss continued through 1940 until October 1, the date on which minimum prices under the act became effective. There was no indication that the situation was improving. However, during the final 3 months of 1940, with minimum prices effective, the industry as a whole operated at a slight profit, and has continued to operate with a profit since. This rehabilitation cannot be attributed to exorbitant prices which have been prejudicial to the consumers, since the minimum prices in existence during the hearing on the extension of the act were only 29 cents a ton higher than the average depressed going prices of 1939.

It has been shown that the bituminous coal industry; because of the economic conditions that I have mentioned, has suffered distress for many years during periods which were unrelated to general periods of prosperity or depression. Between 1923 and 1929, generally prosperous years in other industries, 3,274 mines with an annual production of 1,000 tons or more each went out of business. While the impetus of the industrial activity due to the war may temporarily relieve these conditions, there is no foundation for believing that it will remedy them permanently. Unquestionably, instability in the coal industry remains, with the expiration of the act, an unsolved economic problem.

The stabilization of the industry through the operation of the minimum price structure accounts for its ability to meet unprecedented wartime coal requirements. The Bituminous Coal Division, the administrative agency of the act, accomplished many specific war-

time tasks for many agencies. This work either will have to be abandoned or accomplished by agencies established at additional expense.

## THE BONNEVILLE POWER ADMINISTRATION

The Bonneville Power Administration was able to more than double its power deliveries to war industry during the year, despite shortages of material and construction curtailments.

Only through the availability of power produced at Bonneville and Grand Coulee Dams was it possible for plants in the Northwest to produce ferroalloys for the armoring of thousands of tanks, and aluminum for airplanes. These two great dams were also the source of motive power and electric heat for the high speed production of merchant and naval vessels, and for the manufacture of many other essentials of war.

These things were made possible only because your administration steadfastly pursued its policy of developing the Northwest power resources well in advance of need.

This policy enabled the Bonneville Power Administration to meet continuous new calls for industrial production with a power supply and transmission facilities from the great dams on the Columbia River.

Bonneville and Grand Coulee Dams were first put under construction 10 years ago. At that time, and during the years following 1933, many persons expressed skepticism as to the need for the Columbia River development. But if this development had been required to wait until Pearl Harbor, the Nation's war production program would have been held back for years and there would now be few war industries of consequence in the Pacific Northwest.

In addition to tremendous power deliveries directly into war industry over the Federal transmission system, the Administration supplied nearly 1,000,000,000 kilowatt-hours to the systems of 10 other major Northwest utilities, thus enabling them to meet their war commitments. The formation of this wartime power pool, one of the largest in the country, was in conformance with the instructions of your administration, as set forth in the War Production Board's Order L-94. One utility system, interconnected with Bonneville, depended upon the Administration for virtually one-third of its entire power requirements. When it is considered that this utility system serves one of the most congested and productive war industrial centers on the Pacific Coast, the significance of the Bonneville Power Administration's contribution to the Northwest power pool becomes at once apparent.



In wartime, weapons, not dollars, are of first importance. Yet it is worthy of note that, during the fiscal year 1943, the Bonneville Power Administration collected more than \$11,000,000 in revenue, from the sale of power. This money, more than double the revenue of the preceding fiscal year, brought the total collections by the Administration for the first 5 years of its existence to more than \$18,000,000.

## THE DIVISION OF POWER

The work of the Division of Power has related primarily to the supervision of the power operating activities of the Department in a manner intended to assure that the greatest possible amount of power was made available in the war program, efficiently and economically. The work of the Division has increased greatly, due to the large increase in the power output of the plants of the Department and to our shift of emphasis from construction to operating and marketing. The Division consulted and worked with other agencies of the Government, such as the War Production Board, the Federal Power Commission, and the Defense Plan Corporation, in connection with a number of national and local power problems.

An order of the Secretary was issued outlining somewhat more in detail the basic duties of the Division and formalizing certain of the procedural relationships between the Division and the power operating agencies.

The Division staff reviewed a large number of power contracts, most of the effort being required on important and complicated arrangements to provide power for war. Members of the staff also participated with the operating agencies in the negotiation of a number of the more difficult war contracts for the sale of power from the plants of the Department. In cooperation with the operating agencies and other bureaus of the Department, a number of studies of special matters relating to rates, markets, cost allocations, legal problems and other questions were made or initiated.

## THE DIVISION OF TERRITORIES AND ISLAND POSSESSIONS

Wartime dislocations overhung the lives of the 2½ million inhabitants of the Territories and island possessions of the United States to a greater extent than in any area of comparable size in all of the mainland. These Territorial areas—Alaska, Hawaii, Puerto Rico, and the Virgin Islands—are geographically isolated from the mainland from which they import most of their supplies. Each is a busy, strategic

base for a part of our global war activities, and, as such, has encountered intensified health, housing, education, and food supply problems.

To solve these complex problems more effectively, the Division was reorganized during the past year and has worked closely with other agencies of the Government.

The strenuous efforts of the Insular and Federal Governments averted the food supply disaster which appeared inevitable in Puerto Rico in the summer of 1942. For a considerable period basic foods, such as rice and codfish, had been virtually unobtainable. Wholesalers and retailers were threatened with bankruptcy as the result of the depletion of stocks. By September of that year food supplies in the island reached bedrock. In October the Civilian Food and Supply Unit was established in this Division. An agreement was reached between the Department of the Interior and the Department of Agriculture under which the Food Distribution Administration, acting for this Department, began procuring foodstuffs on the mainland for distribution by sale to wholesalers in Puerto Rico in accordance with estimates of requirement set up by this Department. The War Shipping Administration allocates varying amounts of tonnage to the Puerto Rican route monthly, and the Interior Department assigns space on these vessels for the food and general supplies needed in the Island.

Since the time the Government took over, food shipments have increased regularly and a stock pile has been built up which would supply the basic needs of the island should there ever be a recurrence of heavy submarine warfare in that area or should there again be a shortage of shipping for any other reason. For the 9-months' period from October 1, 1942, when the Government took over, through June 1943, the average monthly shipments of foodstuffs, grains, feeds and fertilizers compared favorably with those for the three normal years, 1939 through 1941, when, according to Department of Commerce figures, 24,777 tons of foodstuffs were shipped monthly. Although there have been shortages from time to time, just as in this country, the basic products have been supplied since the Government assumed responsibility, and the people of the island have been provided with essentials. Satisfactory shipments have also been made of the general supplies which industry has needed. The Department of the Interior also allocates the shipping space for these supplies.

At the end of the fiscal year arrangements had been made, in accordance with original plans, to turn back the procurement of certain non-essential food items to the regular pre-war channels.



All procurement and shipping arrangements for Puerto Rico and the Virgin Islands have been considered jointly, because the areas are close together and because their supply situations are similar.

Inasmuch as it was realized that any increase in production of island-grown foodstuffs would help relieve the shipping situation and contribute toward insular self-sufficiency, the Department of the Interior, the Department of Agriculture, and the Insular Government assumed responsibility for local planting programs. The Food Distribution Administration distributed the seed to farmers in Puerto Rico and the Virgin Islands at half price and guaranteed a price for home-grown foodstuffs. Under this program the production of rice in Puerto Rico for 1942-43 increased 69.8 percent over 1939-40; legumes increased 26.4 percent; corn 56 percent; and starchy vegetables 22.2 percent.

In the development of the campaign to drive the Japanese from North America, the Aleutian Islands, previously almost uninhabited, have become centers of activity. As the tide of military action has swept westward, the military bases on the Alaska mainland, originally constructed for defensive purposes, have been used increasingly as depots for the transshipment of men and matériel to the islands. Alaska has seen such activity as never before encountered in her entire history. Here, too, large shipments of civilian food and other supplies were made in the fall of 1942. These have been properly warehoused at a number of strategic points in the Territory and replenished from time to time with fresh supplies.

Labor turn-over in Alaska has been heavy with the various Army, Navy, and civilian activities competing for the available supply. Despite the labor shortage and the fact that the winter was one of the most severe in the history of the Territory, the Alaska Railroad maintained its schedules almost without interruption and kept the flow of supplies and military equipment moving steadily.

In August this Department and the Department of Justice opened negotiations with the War Department for the restoration of civil jurisdiction in the Territory of Hawaii. An agreement was reached and on February 8, 1943, various specific functions were officially returned to civilian control.

Civilian defense in Hawaii continues to maintain a high degree of efficiency.

## THE GENERAL LAND OFFICE

Due to the foresight of your national conservation policies, the General Land Office was able to furnish from the public lands under its jurisdiction a noteworthy share of the natural resources which

were needed to fight the war and to meet the needs of the United Nations.

More than 5,000,000 acres of the public domain were made available for troop training, aerial bombing and gunnery practice, and other military purposes during 1943, bringing the grand total of public land areas devoted to such war use to approximately 15,775,000 acres—an acreage equal to that of several States. In addition, more than 70,800,000 acres were withdrawn so as to assure the development and production of strategic war minerals, while smaller tracts were furnished for defense plant sites and to provide housing sites for war workers.

An increase by about one-third in the amount of gasoline and butane produced from the public domain was recorded during the year, and other mineral products were secured for military use under the system of public domain leases which were maintained by the General Land Office.

Despite the heavy volume of its war work, this branch of the Department maintained its position as one of the few executive agencies in the Government which operates at a profit to the Federal Treasury. Returning \$4.25 for every \$1 spent, its cash receipts were \$9,758,066.48 as compared to \$2,304,416.39 in expenditures. Incidentally, 1943 was the second consecutive year in which total cash receipts exceeded \$9,000,000.

A great advancement was made in the program of your Administration for sustained-yield forest management on 2,500,000 acres of Oregon and California revested railroad grant lands, which will assure a permanent economic stability for communities and industries in that lumber-producing region in western Oregon. At the same time, efficient operations within the limitations of prudent conservation practices made possible the furnishing of approximately 417,000,000 board-feet of lumber for war use—lumber which ranged from heavy structural timber to airplane woods. These timber sales from the area produced nearly \$1,000,000 for the 18 Oregon counties in which the lands are situated.

Contributing its share to the supply of food, fiber and leather for fighting men and civilians, the public domain during 1943 afforded an opportunity for the grazing of livestock on 11,978,000 acres of land outside of Federal grazing districts in the continental United States and in Alaska.

During the year, 14 separate agencies of the Federal Government, including the Army and Navy, called upon the General Land Office for accurate field surveys of land areas under their jurisdiction. The development of production of potash and sodium in California, mag-

nesium in Nevada, coal in Utah and Wyoming, and timber in Oregon, was facilitated by these cadastral engineering activities.

The investigation of more than 4,000 mining claims to clear sites, selected by the Army and Navy for military purposes, was made by the Branch of Field Examination during 1943, the first full year of its operation as an agency of the General Land Office following its reorganization from its prior status as a departmental division.

In addition to its administrative responsibilities under the more than 5,000 public land laws, the General Land Office met many requests from Federal agencies and from the Congress for expert cooperation in the consideration of problems concerning the national land pattern.

## THE OFFICE OF LAND UTILIZATION

The Office of Land Utilization, established pursuant to departmental Order No. 1466, dated April 15, 1940, to coordinate the land-management functions of the Department, continued its operations under the policy which prevailed during 1942, namely, a concentration upon activities which were either directly or indirectly related to the prosecution of the war. Immediate results have been increases in timber production, improvement in western range lands and the maintenance of a high degree of protection against subversive action, forest and range fire hazards, and sabotage seeking to disrupt or destroy strategic production facilities on lands under the jurisdiction of the Department.

Under date of March 12, 1943, the Office of Land Utilization was charged with the additional responsibility of representing the Department in all matters pertaining to the operation of work camps for conscientious objectors which operated on lands under its jurisdiction. At the end of the fiscal year there were 10 camps assigned to the National Park Service, the Fish and Wildlife Service, the General Land Office, and the Bureau of Reclamation. The work of these camps was revised during the year with a view to placing more emphasis on forest and range protection, thus materially strengthening the protection organizations of the Department.

## THE GRAZING SERVICE

The conservation principles which are fostered under the Taylor Grazing Act of 1934 paid a dividend in 1943 amounting to 85 million more pounds of meat than was produced on the Federal range during the previous year. In reaching this new high figure, totaling nearly 900 million pounds of beef and mutton, the "free range" of earlier



days became an important cog in the Nation's war machine. In addition, several million acres of public land were used by the armed forces for training in aviation, bombing, chemical warfare, and as proving grounds.

In giving priority to war activities, the Grazing Service constructed 782 miles of access roads leading to 30 different types of strategic war minerals. As a result, thousands of additional tons of war materials were delivered to production lines on time. One road in Colorado made possible a tenfold increase in the delivery of vanadium ore to reduction plants.

One thousand, six hundred and fifty-five war emergency licenses were granted for 271,245 livestock, enabling producers to put more meat on the market. A total of 10,777,793 livestock, owned by 22,019 stockmen in 10 States, used the range under regular licenses and permits. The labor and other war conditions influenced a trend toward more cattle and less sheep. This change influenced the increased tonnage of livestock products that reached trade channels during the year.

### THE NATIONAL PARK SERVICE

The National Park Service, reduced to a wartime staff, devoted itself to its primary function of protecting and maintaining the national parks and monuments, and at the same time made definite contributions to the war program.

Threats to invade the National Park System for logging, mining, and grazing purposes grew imminent during the year. Several concessions were made to further the prosecution of the war, but the basic policy that all reasonable alternatives must be exhausted, and that the demand must be based upon critical necessity rather than upon convenience, was applied in all cases in order to prevent any unnecessary sacrifice of distinctive park values.

On this basis, 403 permits were issued to military and war production agencies for the use of areas and facilities in the National Park System. It is estimated that it would have cost more than \$30,000,000 to have purchased these lands, structures, and services had the National Park Service not been able to make them available. It is impossible, moreover, to evaluate the benefits derived by more than 1,655,720 members of the armed forces who visited the parks during the fiscal year. There is ample justification for keeping the national parks and monuments open to those members of the armed forces who are being given opportunities to visit the inspiring American scenes which symbolize the greatness of the nation which they are fighting to preserve.

Although it was necessary to discourage civilian use of transportation resources involved in long-distance travel, approximately 6,572,500 civilians were able to visit the national parks.

The National Park System involves less than three-fourths of one percent of the total land area of the United States. Yet it is preserving for this and future generations some of the finest aspects of America. Under conditions of total war, this concept of conservation has faced the most critical challenge of its history. We have had to reaffirm basic park principles, and to ward off those who, under the cloak of patriotism, would reopen old issues as to the exploitation of the lands which Congress and the American people have decreed should be held inviolate for the national good. Some sacrifices in the common cause have been necessary, and more may be inevitable. But I believe that we can emerge from the war without departing from the basic idea that the national parks and monuments must be protected as symbols of our national greatness.

### THE FISH AND WILDLIFE SERVICE

For an organization whose activities ordinarily are geared to the ways of peace, the Fish and Wildlife Service is very much in the war. The largest of all the National wildlife refuges under its administration, the Aleutian Island chain, was the scene of hostilities. The Pribilof Islands, to the northward, summer home of the famous and valuable fur seal herd, which for years has been so successfully managed by the Service, were evacuated at the request of the military authorities, and the native populations and administrative personnel are maintaining themselves in leased quarters on the mainland. Requested photographs, and information on the meteorology and typography of Alaskan and Siberian areas were furnished to war agencies. Military operations and other factors incident to the war in the region prevented full scale fishing. Consequently there was a considerable decrease in the halibut, herring, and salmon catches, despite every effort to achieve the maximum utilization that would be consistent with the conservation of the fisheries resource.

More than one and three-quarter million acres on 35 Federal wildlife refuges in the United States have been assigned to the military forces for training areas. Eleven of the larger vessels in the Service's fleet were transferred for war purposes.

Service personnel assisted the War and Navy Departments in patrol operations for the security of Alaska, in the detection of subversive activities, in the appraisal and acquisition of lands, and in the search for warmth-conserving and windproof furs and fabrics. We helped

to salvage the hides of deer and elk that were killed by hunters, and to control rats which destroy clothing and food supplies. We have worked to suppress plague-carrying field rodents, a menace to the health of troops, and to eliminate burrowing species that create hazards on air fields.

Food and fur production was intensified on wildlife refuges and on Indian lands. Fish propagation was directed toward the multiplication of the more valuable food species and toward increased cooperation in the farm fish-pond program. Campaigns to establish fisheries and to increase the catch were carried on in the Caribbean area and in the South Pacific. The utilization of previously little exploited fishes and other aquatic food animals was developed. Additional sources of vitamin oils and of seaweed gums that could be substituted for agar were investigated. We helped to increase the production of domestic rabbit meat for human food by amassing information on rabbit raising that reached every State.

To conserve tin, the use of nonmetallic containers for fisheries products and increased employment of dehydration and salting were recommended. To overcome a fiber shortage, substitutes for manila were brought to the attention of the fisheries industry.

Predator and rodent control was vigorously prosecuted to safeguard essential food and fiber resources by protecting sheep, goats, calves, and poultry from the onslaughts of predatory animals and by protecting growing crops, stored agricultural products and processed foodstuffs from destruction by field rodents and rats.

Law enforcement activities for the protection of both terrestrial and aquatic wildlife were continued with good results. Research, though carried on at a reduced rate, was never more important to the proper functioning of the administrative and regulatory operations of the Service.

## THE OFFICE OF THE COORDINATOR OF FISHERIES

The Office of the Coordinator of Fisheries was established by Executive order on July 21, 1942, to meet a critical situation which had been created by the impact of war upon the fishing industry. Although fishery products—high-protein foods, industrial and therapeutic oils, and animal feeding meals—were needed more urgently than ever before, the industry had been so hampered by the requisitioning of vessels, the loss of men, shortages of gear, and by security regulations in coastal waters so that the catch of fish and shellfish in 1942 declined about a billion pounds as compared with 1941.



To the Coordinator of Fisheries was assigned the task of giving the industry direct and immediate assistance in its problems of manpower, equipment, and operation. Our goal was to increase the yield of urgently needed fishery products and to eliminate waste and inefficiency in the utilization of these essentials.

After a year of effort, marked by notable cooperation from the industry, we are able to record definite progress. For example, the pack of salmon in western Alaska this season is running ahead of last year's by about a million cases. A considerable number of boats, no longer urgently needed by the military services, have been returned for use in fishing, and still more are coming back. Comprehensive programs of operation, designed to make the best possible use of available materials and manpower, have been adopted for two of the major fisheries—salmon and pilchard. New products have been developed for civilian consumption or Government purchase by means of utilizing species formerly neglected.

The condition of the fishing industry is definitely improved as compared with last year. We are confident that the coming months will bring a further advance.

## THE OFFICE OF INDIAN AFFAIRS

Eighteen thousand Indians are in the armed forces. They serve with distinction on every front where our Army and Navy are engaged. These Indian warriors come from families comprising fewer than a half million men, women, and children of aboriginal descent in all of the United States and Alaska.

Considering their small numbers, I think that equally significant are the Indians' contributions at home. The Indians are mainly direct war producers, either as the owners of large herds of cattle, as owners of land which grows food crops, as owners of forests and vital mineral deposits, or as a ready source of labor in our less populous West. Few Indians work solely for civilians.

In 1942, the Indians produced and sold food enough to sustain for 1 year 200,000 of the best-fed soldiers in the world, or an army of 6 million men for 1 week. Notable was their production of beef cattle and sheep, totaling almost \$13,000,000 in 1942 as compared with top livestock sales of \$4,000,000 during the last war. I am unable to measure the Indians' production as wage workers off of the reservations, but I am glad to report that employers who have employed Indians for the first time during this war have combed the reservations seeking additional Indian labor.

It would not have been possible to maintain production on Indian lands in the fall of 1942 and in the spring of 1943, if Indian women and children had not willingly replaced men. Indian women are cooking in lumber camps and assisting in cattle round-ups. They dip sheep on the Navajo Reservation, drive trucks, repair heavy machinery, and at the Menominee Indian Mills, Wisconsin, women are working in the sawmills and in the forests for the first time in Menominee history.

We are indebted to an 89-year-old Navaja woman, Mrs. Rose Daniels, for a new variety of lima bean which is on the market for the first time this year. In her odd little seed house on a Utah Reservation, Mrs. Daniels had carefully saved from her garden years ago three lima beans. Horticulturists have developed from her beans a new seed especially suited to a short growing season of a high dry country such as eastern Utah, Wyoming, and South Dakota.

Although ministering to the needs of only a small segment of our population, the Indian Service occupies a unique position among Federal agencies in that it is concerned with all the problems of a community. Its progress in helping a native people to rehabilitate themselves is becoming known abroad. King Ibn Saud, who is anxious to improve the economic lot of his people, invited the Chief Engineer of the Indian Service and a representative of the Department of Agriculture who had worked on soil problems on the Navajo Reservation to comprise a U. S. Agricultural Mission to Saudi Arabia. This mission was completed this year and its recommendations were published by the State Department in English and in Arabic for the use of the King and his advisers.

South American countries have large Indian populations, and 11 distinguished Latin-American educators and soil technicians representing 8 countries spent from 3 weeks to 4 months studying administration on U. S. Indian Reservations this year.

## CONCLUSION

That is our record in brief. It reveals that our performance has been imperfect as all things human are. But I am proud enough of it to let it stand without a word of special pleading. I prefer to discuss instead a topic that is not dwelt upon enough: the source from which we derive such strength and wisdom as this report may show us to possess. We derive it from the nation—from the whole people.

The Senators and Representatives who speak for the people whose resources we marshal speak directly to me. The record of congressional inquiries into our performance and our intentions fill a book or several books each year.

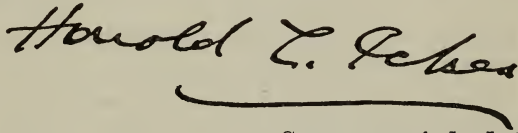
Of the forty-odd thousand employees of the Department, fewer than 5,000 are here in Washington. The others are in the field and are in touch constantly with the people whose resources we manage.

Our bureaus and offices habitually formulate policy in consultation with spokesmen for the people who are affected by our policies, and many policies are also carried out in cooperation with representatives of the people.

We are not remote from the working and fighting fronts of this world. Our key men are on the scene of action in all the fields into which our jurisdiction extends. Our geologists work beside officers of the armed forces day after day to guide the high command at the front in taking military advantage of the geological peculiarities beneath the ground on which battles are about to be fought. Our water specialists work with other officers to reveal the secrets of water resources in countries that are marked for occupation. Some of our scientists go directly to the front in the course of this work.

In a word, so many of us are in such close and constant touch with other persons who work and fight for this Nation; we draw so much of our strength from them, and we are so conditioned by their thinking, that I hesitate to set it down unqualifiedly that we regulate anything. If we do, then it is certain that in doing so we discharge our part of this Government's obligation to govern with the consent of the governed. We regulate with the consent of the regulated. I am as proud of that as I am of all the accomplishment that is vouched for in this Report.

Sincerely yours,

A handwritten signature in cursive script that reads "Harold L. Ickes". The signature is written in dark ink and is positioned above a horizontal line.

*Secretary of the Interior.*





# Bureau of Mines

R. R. SAYERS, Director

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## FOREWORD

THE Bureau of Mines in 1943 geared every activity to help supply the United States and her Allies with the mineral commodities essential to victory on all fronts.

Constant modification in the Nation's production schedule, arising from alterations in military logistics and strategy and from other war developments, called for frequent variations in planning and performance by the Bureau and the other war agencies of the Government. As the relative criticalness of the various metals and minerals changed, the Bureau shifted the emphasis of its research and exploratory work rapidly to meet each new challenge.

Coincident with its intensive and far-flung search for deposits of unexploited mineral ores within the United States, the Bureau directed all efforts in its metallurgical laboratories and testing plants toward finding means and processes for utilizing such domestic ores and for developing wider uses of known raw materials in war industries. As a result, hitherto unknown deposits of critical and essential minerals were brought into production, many abandoned mines were enabled to resume operations, and the way was cleared for considerable expansion by a number of going operations. The urgent necessity of carrying out the program with maximum speed made more apparent the lack of an inventory of the Nation's mineral resources at the outbreak of the war.

The exploratory program of the Bureau, conducted in part in cooperation with the Geological Survey, made known substantial additional reserves of bauxite, alumina-bearing clays, and the ores of zinc, iron, copper, vanadium, tungsten, mercury, and other critical and essential minerals, as well as ores of tantalum, magnesia, fluorspar, graphite, celestite, and corundum.

Thousands of samples of ore from deposits explored by the Bureau, and specimens submitted by prospectors, geologists, mining engineers, and property owners were analyzed by the Bureau, and many of these were subjected to beneficiation tests to determine their possibilities for use in the war. The Bureau's engineers and metallurgists successfully completed ore-dressing tests on various ores including several of copper, zinc, and beryllium, demonstrated practical methods for mining and recovering manganese-bearing nodules from the extensive manganese deposits of South Dakota, developed a process for treating complex lead-copper-cobalt-nickel ore, advanced the Bureau's pioneering studies in the production of high-purity chromium metal by electrolysis, and carried on, among many other experiments, production of sponge iron from various ferrous ores.

On the basis of the results from its extensive laboratory and field work, the Bureau presented to war-production officials several suggested development programs for aluminum, zinc, lead, copper, manganese, mercury, fluorspar, magnesium, tungsten, and other necessary materials. The difficulty and necessary delay in obtaining essential equipment for its laboratories and pilot plants prevented the Bureau from pursuing its research, testing, and development work with the speed it had set as desirable. Such problems were particularly acute in connection with the projects on sponge iron, alumina, zinc, and electrolytic manganese and various other electrometallurgical processes. The Bureau made available the results of its investigative and research work to the other war agencies of the Government and to private industries with which it had worked cooperatively on numerous projects. The integration of research work was expedited by the establishment during the year of the Interdepartmental Mineral Resources Operating Committee in which the Bureau of Mines represented the Department of the Interior.

The Bureau's knowledge and long experience in fuel testing and research enabled it to make valuable contributions to the war program. As industry pushed to new production levels coincidental with the temporary curtailments of coal output and increasing transportation difficulties, the Bureau was called upon to advise on the substitution of available coals near their points of consumption and on the substitution of coals more suitable to the needs of the particular consumer. Technical advice also was furnished to facilitate production of high-quality metallurgical coke of uniform grade for the steel industry. The Bureau's sampling and testing of millions of tons of coal purchased by the Army and Navy and by other Government agencies, as well as its testing and analysis of boiler water samples, increased the efficiency and power of federally operated plants and at the same time saved the taxpayers many thousands of



dollars. To demonstrate possible saving of fuel oil by industry, particularly in the critical-shortage area of the East, Bureau engineers, in cooperation with private industry, successfully demonstrated the use of colloidal fuel (a mixture of pulverized coal and petroleum) in a commercial boiler. In solving many problems involving the storage of coal and suitability of various different types of equipment, the Bureau worked in close cooperation with the Solid Fuels Administration for War.

The Bureau's long-range studies in petroleum and natural gas proved helpful to industries seeking new production records in special lubricants, high-octane aviation gasoline, materials for synthetic rubber, and similar essential byproducts. Petroleum engineers undertook special tasks at the request of the Petroleum Administration for War and provided data which aided production programs. The Bureau's new petroleum field office at Franklin, Pa., completed nine projects destined to aid the output of aircraft lubricants from the Appalachian region. Production of helium continued upward as the Bureau began operation of a new plant and speeded the construction of several others to assure sufficient supplies of the non-inflammable gas for the Army and Navy and for essential civilian uses.

The Bureau's research on explosives, begun a number of years ago in order to promote the development of safer blasting materials and methods for the mineral industries, increased in volume and in range in response to the call from war agencies for information regarding the characteristics of various explosives. The Bureau's work included examination of high explosives, analyses of seized military devices, studies of the ingredients of Army ammunition, and development of methods of handling explosives and pyrotechnics. In connection with its studies on nonmilitary explosives for use by industry, the Bureau made hundreds of gallery and control tests as well as chemical examinations and brought the total of permissible explosives on its list to 180.

Health, safety, and plant-security programs of the Bureau became more significant during the year as the problem of industry in protecting life and property in the face of accelerated production, longer hours, and labor and equipment shortages became acute. Trained engineers inspected nearly 2,000 mines and related plants under the Facility Security Program of the Government and advised operators how to guard against sabotage, subversive activities, accidents, and other occurrences which might interrupt war production. Federal coal-mine inspectors visited mines in virtually all of the coal-mining States and Alaska and reported the adoption of many Federal recom-

commendations resulting in safer working conditions and increased working efficiency. Safety engineers and instructors trained almost 50,000 employees of the mining and affiliated industries in first aid. Bureau personnel participated in mine rescue and recovery work following disasters.

The difficulties in recruiting, for its wartime mine safety and security program, the skilled personnel trained along the high standards fixed by the Bureau handicapped the regular mine safety program inasmuch as the safety engineers experienced in Bureau methods and procedure had to be recalled from their established duties to train the new inspectors and investigators and to form the nucleus for the emergency services.

The Bureau's staff, nevertheless, was successful in conveying to mine operators and to the State departments of mining the Bureau's policies of service and helpfulness to industry and succeeded surprisingly well in obtaining industry's cooperation. The few criticisms were far outnumbered by commendations.

In administering the Federal Explosives Act to prevent sabotage and other unlawful use of explosives, the Bureau authorized the granting of more than 350,000 Federal explosive licenses to reliable persons and firms. Special investigators of the Bureau, working closely with Army and Navy representatives and other war agencies, inspected and issued reports on more than 9,000 stores of explosives.

Facts provided by the Bureau regarding the domestic and foreign production, consumption, and uses of minerals helped the war agencies in their allocation, financing, production, and procurement programs. Almost daily, special studies were undertaken by commodity experts to provide special economic and statistical information sought by such agencies as the Army, the Navy, the Metals Reserve Co., the War Production Board, the Defense Plant Corporation, the Office of Price Administration, the Petroleum Administration for War, the Solid Fuels Administration for War, and the Board of Economic Warfare.

The Bureau's services in this respect included the collection, analysis, and publication of current and periodical data on all mineral commodities, studies of special economic phases growing out of the war, information on some foreign developments, and general over-all studies of the mineral situation.

Bulletins, technical papers, Minerals Yearbook chapters, and handbooks, all concerned with some phase of the war program, were published by the Bureau, but some curtailment in the printing of useful information was necessitated because of the lack of funds. Seven new film subjects were added by private industry to the Bureau's library

of free educational motion pictures. These films were shown on hundreds of occasions to classes of the Army, and Navy, and in the civilian industrial training program.

To assure more effective handling of local problems of the mineral industries and to coordinate all phases of the mineral exploration and metallurgical work in the field, the Bureau established, at the close of the previous fiscal year, three regional offices: A Western Region with headquarters at Salt Lake City, Utah, a Central Region with headquarters at Rolla, Mo., and an Eastern Region at College Park, Md., with a regional engineer in charge of each.

In each of the principal mining States or groups of States, an examination office with an engineer in charge was established under the supervision of the regional engineers. Such further decentralization by the Bureau has given it a better understanding of the problems of mining interests in all parts of the Nation, and has encouraged local initiative in mineral development.

### FUTURE WORK

Realizing that the United States, despite the United Nations' repeated victories over Axis forces, must be equipped for a war of indefinite duration, the Bureau of Mines rounded out the 1943 fiscal year by planning an even more intensified program to help speed the domestic production of war minerals.

The Bureau received from the Congress approval for the most extensive exploratory program ever attempted—a Nation-wide search for coking coal, quartz crystals, copper, asbestos, zinc, mercury, tungsten, vanadium, beryllium and other pegmatite minerals, corundum, molybdenum, manganese, tin, iron, chromium, bismuth, and nickel and other minerals for which a critical need may arise.

The Bureau's chemists, metallurgists, engineers, and other technologists will continue to seek and devise the best methods of utilizing known and newly proved reserves of minerals, including those which prove too complex or low grade to exploit by the usual methods.

As in the past year, all work of the Bureau will continue on a war footing. Projects which do not directly or indirectly assist the output of war materials or the security of production facilities and manpower have not been considered in the Bureau's program for the 1944 fiscal year.

Included in the Bureau's wartime schedule for the coming months are the following major activities:

A large-scale pilot plant at Laramie, Wyo., is to be completed and studies are to begin in the solid-fuel reduction method of making



sponge iron which can be utilized to supplement the steel scrap necessary for the operation of steel mills.

Exploratory programs and metallurgical research are to be intensified to help increase the production of alumina for aluminum from domestic materials, including low-grade bauxite, clays, alunite, and other alumina-bearing minerals.

Research in reduction of zinc ores by the use of methane gas will be carried out in a pilot plant nearing completion at Rolla, Mo.

Three new plants will be completed in the Southwest to increase the supply of helium by producing each month many additional millions of cubic feet of this essential gas for war purposes.

New and expanded research involving petroleum, natural gas, and various types of coal will be undertaken for the twofold purpose of facilitating production and conserving the Nation's wealth of liquid, solid, and gaseous fuels. The Bureau also will explore methods for recovering and utilizing anthracite "fines" and will organize a Nation-wide campaign to promote more efficient industrial uses of fuels.

The highly successful cooperative campaign carried on with the coke and steel industries to increase pig-iron production for war by improving the quality of coke is to be continued.

Various suggested research programs to assist the anthracite industry will be investigated, such as the prevention of floods, increased production by mechanical mining, industrial fuel oil and oil from anthracite, prevention of fires, protection of equipment from acid mine waters, and the use of anthracite as a fuel for portable gas producers.

The Bureau's long-established policy of gathering and maintaining up-to-date information regarding all phases of domestic mineral production and many of the activities in the foreign minerals field will go forward on a broader basis to serve war agencies relying on this important service.

## SUMMARY OF ACTIVITIES

### TECHNOLOGICAL WORK

#### Exploration and Metallurgical Research

Industries of the United Nations called for unprecedented quantities of war materials, and the Bureau of Mines quickened and broadened its search for metals and mineral products, sending its exploratory crews into new areas and maintaining day-and-night schedules in pilot plants and laboratories. Technical information was provided for field crews, the mining and metallurgical industries,

and others vitally concerned with production. To hasten the movement of raw materials from the ground to production lines, the Bureau's three regional engineers maintained close contact with and directed the work of district and project engineers assigned to mineral-rich areas of the United States and Alaska.

Because of the constantly changing economic situation in the mineral commodity field, the Bureau adapted its exploratory work and metallurgical research to increase the domestic output of the most-needed materials in the shortest possible time.

Beneficiation methods were worked out for ore samples submitted by the Bureau's own exploratory crews and by individuals and other Government agencies. Large-scale process projects were undertaken in sponge iron, magnesium, manganese, and alumina under special appropriations from Congress.

During the fiscal year, the Geophysical Division of the Geological Survey was transferred to the Bureau of Mines to aid in the exploratory work. One-third of the division's activities was devoted to a special project for the Navy.

The advancements made by the Bureau in the field of war minerals are reflected in its progress reports for various commodities.

*Iron and steel.*—The 1943 program to help the Nation maintain its steel-production schedules included continued exploration of the iron ore deposits of the West to serve the newly established steel industry of the Pacific coast, expanded research in sponge iron, laboratory tests of the amenability of ores to concentration, and assisting in the recovery of ore pillars in a New York iron mine by employing Bureau-developed seismic instruments. Major explorations for iron ores were carried on in Utah, Arizona, Oregon, Nevada, New Mexico, Missouri, Iowa, and Alaska. Attention also was directed toward increasing the output of iron ore easily available to eastern blast furnaces.

Small deposits of iron ore, suitable for the production of sponge iron, have been located in 20 States, and during the fiscal year the Bureau's experiments in sponge iron emphasized the possibility of using idle commercial facilities, such as brick kilns, for the production of sponge iron to supplement steel scrap. Sponge iron research progressed at brick kilns in Binghamton, N. Y., and Canton, Ohio.

Preliminary to the operation of its large-scale rotary-kiln pilot plant at Laramie, Wyo., the Bureau produced sponge iron in a rotary kiln at its Boulder City (Nev.) Experiment Station and also in cooperation with a Pennsylvania iron company. Studies in the natural-gas reduction method for making sponge iron continued at a plant in Texas.

To increase the domestic production of fluorspar for steel-furnace flux, extensive dewatering and exploratory work was carried on in the Illinois-Kentucky field, leading producer of fluorspar for the eastern steel industry, and an important potential producer of fluorspar was established by Bureau drilling in Utah to serve the western steel industry. Meanwhile, the Bureau carried on its laboratory work in the concentration of fluorspar, having pioneered and developed improved techniques for the use of concentrates in steel furnaces.

*Ferro-alloys.*—The increased use of ferro-alloys by industries turning out war equipment prompted the Bureau to carry out exploratory and metallurgical work on chrome, manganese, cobalt, molybdenum, nickel, tungsten, and vanadium.

Exploration was completed on the Bureau's outstanding chrome project in Montana in which several million tons of concentratable ore were charted. This ore now is being mined on a large scale. Several other projects in California, Montana, Oregon, and Alaska resulted in commercial operation. The Bureau's laboratories developed methods for the concentration of some chrome ores, including the chromite beach sands of Oregon. Research disclosed that off-grade chrome concentrates can become high-grade metallurgical products by chemical treatment and pilot-plant work indicated the commercial practicability of the process. Further strides also were made in the Bureau's process for producing high-purity chromium metal from low-grade chromite by electrolysis, the consumption of electricity per pound of metal being much lower than that of ordinary chromium plating.

A substantial tonnage of cobalt-copper ore in Idaho was indicated by the Bureau. The metallurgists developed a suitable method for recovering both cobalt and copper in separate concentrates and worked out a process for recovering lead, copper, nickel, and cobalt in three concentrates from a complex lead-copper-nickel-cobalt ore of Missouri.

Investigating further the production of electrolytic manganese by a Bureau-perfected method, the technologists learned that cobalt, a minor constituent of manganese ores, can be removed effectively from the manganese electrolyte. Small pilot-plant investigations, looking to the utilization of cheap hydroelectric power of the West, were conducted on the separation and recovery of cobalt and nickel from complex ores by employing electrodeposition.

The domestic manganese potential was improved when the Bureau demonstrated practical methods for mining and recovering manganese-bearing nodules from the 10,000,000 long tons of readily minable shale which have been delineated in the Chamberlain area of



South Dakota. Simultaneously, larger-scale tests continued in the matte smelting of nodules to recover manganese, and plans were prepared for exploiting the ore by employing the Bureau's smelting process.

Several millions tons of low-grade nickel ore were indicated by exploration in Colorado, Montana, Oregon, Washington, and Alaska. While nickel cannot be produced economically from these ores by standard methods, it could be extracted at a higher cost should the need for the metal become more acute.

In the Cle Elum-Blewett Pass region of Washington there are indications that a large tonnage of ore containing 0.75 to 1 percent nickel may be developed. While the Bureau continued exploration of this area, a process was developed whereby the ore, containing iron, nickel, and chromium, can be smelted in an electric furnace to produce a nickel-iron alloy having 13 percent or more nickel with virtually complete recovery of the nickel, thus yielding an immediately useful melting stock directly from the ore.

The widespread use of tungsten for special steels in armor plate, guns, and projectiles and other war equipment prompted the Bureau to place still greater emphasis on methods for increasing the Nation's output of this material. During the year more than 100 tungsten properties were examined, 10 exploratory projects were begun and 7 of these—in Idaho, Colorado, Nevada, Wyoming, New Mexico, and Alaska—were completed, and more than 500,000 tons of low-grade ore were indicated. Two projects were outstanding. In Lincoln County, Nev., several hundred thousand tons of tungsten ore were indicated, and in Lemhi County, Idaho, sufficient reserves were charted to supply a 200-ton-a-day mill.

The Bureau's exploratory work in vanadium included projects in the active Colorado-Utah field and the potentially important western Wyoming area. The Bureau conducted laboratory studies of the recovery of vanadium from the Wyoming ore.

*Nonferrous metals.*—Although the United States is the world's largest producer of zinc and copper, mine output has failed to keep pace with requirements. The Bureau made consistent gains in helping increase their production.

In copper alone 17 exploratory projects were undertaken and 872,000 tons of copper ore containing 33,000,000 pounds of copper were discovered. In Vermont, sufficient reserves of ore were indicated to merit construction of a mill, and this plant went into production in March 1943. In Idaho, 75,000 tons of ore assaying 2 percent copper and 0.3 percent cobalt were indicated. In a southwestern mine, the finding of additional ore justified the expansion of mining operations. An idle

western mine resumed operations after the Bureau's field crews discovered high-grade copper.

To speed the conversion of ore to metal, the Bureau conducted successful ore-dressing tests on materials from three deposits. These tests were (a) for the separation of tungsten from copper minerals; (b) for the selective flotation of copper and cobalt minerals; and (c) for the leaching of copper.

Equally impressive were the gains made in zinc. The Bureau's 20 exploratory projects conducted in 14 States revealed 8,000,000 tons of zinc and zinc-lead ores. Programs now are under way for mining and milling 7,000,000 tons of the newly found reserves. Correlated laboratory tests established ore-dressing methods both for reserves discovered by the Bureau's crews and for a wide range of other ores. As another aid to the zinc industry, the Bureau began construction of a pilot plant at Rolla, Mo., to study the reduction of zinc ores with methane gas.

Seven exploratory projects for mercury were active through the year, and the known reserves of ore were increased by 600,000 tons. This ore averages 4.7 pounds of mercury per ton. In Valley County, Idaho, an exploratory project was completed after 133,500 tons of mercury ore had been indicated. As a result, the output of a mine was doubled. In southwestern Alaska, an exploratory crew charted 115,000 tons of ore containing 9 pounds of mercury per ton. Other work in mercury included the preliminary sampling of 11 deposits in Nevada.

An initial shipment of high-grade tantalum ore from a deposit in New Mexico was concentrated in the Bureau's pilot mill at Rolla, Mo., and exploratory drilling by Bureau engineers revealed the most extensive source now known in the United States. Tantalum is in heavy demand for special war uses, particularly in vacuum tubes for radios and surgical and dental instruments.

Other activities in the nonferrous metals field concerned beryllium and tin. Exploratory work was conducted on beryl-bearing pegmatites in New England, and a drilling crew was sent to the rare helvite deposit at Iron Mountain, N. Mex. Ore from Iron Mountain was tested to ascertain the most feasible method of extracting the beryllium, and new ore-dressing processes were developed to separate beryl from its ores.

Despite adverse weather and difficult terrain, the Bureau's exploratory crews continued their search for tin in Alaska and reported that, although domestic tin reserves are small as compared with foreign resources, the most extensive known sources of tin possessed by the United States are on the Seward Peninsula. Meanwhile, other exploratory work for tin was carried on in Nevada and New Mexico, and

additional deposits in South Dakota, Montana, Idaho, California, and Texas were sampled.

*Light metals.*—Anticipating the Nation's demands for more aluminum and magnesium for airplanes and other war equipment, the Bureau continued on a larger scale its correlative exploratory, laboratory, and pilot-plant projects for increasing the domestic output of these metals.

Exploratory crews increased the known reserves of bauxite by more than 10,000,000 tons, although much of it proved too low grade for existing plants, which are geared to high-grade imported bauxite and the limited amounts of best-grade domestic bauxite. The Bureau ascertained that much of the low-grade bauxite can be concentrated to produce a suitable feed for the alumina-producing plants (Bayer plants) and proposed to the War Production Board that a mill be constructed in Arkansas to beneficiate the large reserves of low-grade material. By so doing, Bureau engineers ascertained, the low-grade material could be utilized quickly without new facilities other than a mill.

Other exploratory crews established additional reserves of alunite, another alumina-bearing material, which will be mined for alumina plants authorized in Utah by the War Production Board. At the same time, Bureau crews drilled clay deposits in various parts of the Nation and reported that large quantities of aluminous clay are available. In a 12-month period the exploratory crews charted 100,000,000 tons of alumina-bearing clays, and the Bureau's chemists and metallurgists worked unceasingly on methods of utilizing these clays and other low-grade aluminiferous materials, including alunite, to produce alumina. Partly as a result of these studies and the efforts of the Department of the Interior to demonstrate the need for using the Nation's extensive reserves of clay for aluminum production, the War Production Board approved the construction of five plants in Utah, South Carolina, and the Pacific Northwest, each with 50 tons daily output of alumina from materials other than bauxite.

Many months of study in the Bureau's laboratories and pilot plants at Boulder City, Nev., resulted in the development of a process to produce magnesia from a 400,000,000-ton dolomite deposit near Las Vegas, Nev., in the Boulder Dam area. The dolomite deposit is in the vicinity of the Basic Magnesium, Inc., plant, and utilization of the Bureau's process could eliminate a difficult transportation problem because material now used for the plant is transported more than 1,000 miles by rail. In addition to the process worked out for Sloan dolomite, the Bureau advanced in its studies in producing magnesia from impure magnesite by the acid-leaching process. At the same



time, small-scale pilot-plant work was completed on the Bureau's newly developed method of producing magnesium metal directly from magnesia made either from the dolomite or from impure magnesite. Other research by the Bureau in the carbothermic reduction process for producing magnesium from magnesia is continuing.

Large quantities of iron-free alum are needed urgently in the war program for use as a catalytic agent, and the Bureau's chemists developed a process for obtaining this product from domestic clays.

*Nonmetallic minerals.*—Largely because of the Bureau of Mines' work, the United States was freed from dependence upon imported talc suitable for high-frequency insulators in military radio equipment. Prior to the war only one mine in the United States produced a satisfactory-grade talc for this purpose, but examination, testing, and processing of talc deposits by the Bureau revealed that sufficient supplies are available from domestic sources. Millions of radio insulators for planes, tanks, and ships were processed in a Bureau laboratory.

Since more flake graphite is needed for war uses—as a lubricant, for foundry facing, and in the manufacture of crucibles, stoppers for steel ladles, and core washers—The Bureau explored two groups of flake graphite deposits in Alabama and proved the existence of 1,174,000 tons of measured ore. Following the Bureau's work, three graphite mills, under the WPB program, were constructed or rehabilitated and put into operation in the Alabama field. Graphite prospects also were examined by the Bureau in Pennsylvania, New York, and Texas.

Exploration of Texas celestite (strontium) established 130,000 tons of celestite which can, if necessary, be concentrated to meet the requirements for military pyrotechnics. Strontium minerals are used chiefly for tracer bullets and flares, military experts looking upon strontium as the best all-around tracer for both day and night use.

Activity increased in the examination of domestic deposits containing abrasive-grade corundum for grinding optical glass. Five former corundum mines were visited by the Bureau, and four were recommended for exploratory projects.

Research workers in nonmetallics prepared a syllabus for the qualitative testing of domestic clays to ascertain their adaptability to specific uses in place of clays formerly imported.

### Coal and Coal Products

Increased production of high-quality coke of uniform grade, testing of thousands of coal samples, efficient storage of millions of tons of coal, production of synthetic liquid fuels from coal, conditioning of water fed to Government boilers, and conversion of heating systems

from oil to coal headed the many war problems studied by the Bureau of Mines as the Nation leaned more heavily on solid fuels.

In a 12-month period nearly 23,000 samples of coal were analyzed in connection with fuel purchases by Government agencies, particularly the millions of tons used by the Army and Navy. Testing all coal purchased by the Army, the Bureau's coal-sampling trucks visited 500 mines in 18 States and obtained 1,500 specimens. The volume of work in the testing of water fed to boilers was doubled, lengthening the life and increasing the efficiency of Army boiler plants.

*Coal analysis.*—While coal sampling for Government purchases continued on an expanded scale, the Bureau's work in coal analysis likewise increased tremendously because of the coal-dust samples submitted by coal-mine inspectors in their work of promoting health and safety in the Nation's mines. More than 10,000 of these samples were analyzed.

*Coke studies.*—With the Nation's wartime steel-production schedules calling for more metallurgical-grade coke, the Bureau sent a mobile laboratory into the beehive field to provide operators with technical data that were essential in the production of better-grade coke of uniform quality. The Bureau's work in fostering the output of cleaner coal and adoption of improved coke-plant practices probably helped prevent the closing of some war plants running short of suitable metallurgical coke. A scarcity of petroleum coke led the Bureau to develop a method for producing, from low-ash coals, electrode carbon suitable for use in aluminum plants.

*Coal storage.*—To insure sufficient supplies of coal, industry began storing larger amounts in off-peak periods. Many of the storage and procurement problems that arose were solved through the help of the Bureau. Information was supplied regarding the best methods of storing particular coals to avoid spontaneous combustion and other hazards which cause loss. Special assistance was provided operators of docks in the Great Lakes area in preventing deterioration and possible loss in more than 50,000,000 tons of stored coal. Other Bureau experts tested the efficiency of various materials for excluding air from subbituminous coal stored for use by the Army and Navy.

*Colloidal fuel.*—In cooperation with an oil company, a method was developed for making colloidal fuel—a mixture of pulverized coal and oil—to relieve fuel-oil shortages created by the war. Tests in commercial plants proved this fuel can be employed satisfactorily with reasonable attention to maintenance of proper conditions.

*Liquid fuels from coal.*—The continuing decline in the discovery of new oil pools in the United States, heavier wartime consumption of natural petroleum, and transportation difficulties threw greater



emphasis on the Bureau's research in producing synthetic liquid fuels from coal. Earlier tests on 14 American coals, including lignite, subbituminous, and high-volatile bituminous types, proved that fuel oil, Diesel oil, motor gasoline, and aviation gasoline can be obtained from them by hydrogenation.

Experiments progressed in the operation of the laboratory-scale pilot plant for the direct hydrogenation of coal, and laboratory-scale investigations were begun on the indirect process for making synthetic gasoline from water gas derived from coal. While two members of the Bureau's staff visited coal-liquefaction plants and research laboratories in England, a measure was introduced in Congress proposing the construction and operation of demonstration-size plants by the Bureau to pave the way for ultimate commercial production by private industry of liquid fuels from coal, oil shales, and other materials.

*Fuel conservation.*—The progress made in determining the causes of corrosion of boiler-furnace wall tubes resulted in means of preventing further loss of steaming capacities in electric power plants. Cooperating with the Solid Fuels Administration for War, municipal authorities, trade and manufacturing associations, engineering societies, real estate boards, publishers, and other interested groups, the Bureau of Mines participated in a fuel efficiency campaign to conserve supplies of gaseous, liquid, and solid fuels for the war. Programs of this nature in certain Government plants already have resulted in fuel savings ranging from 9 to 20 percent.

*Safety and efficiency.*—To conserve electricity, Bureau engineers issued findings describing how the use of electricity can be cut down in coal mines. Other tests indicated that rock dust, used to minimize explosion hazards in coal mines, does not hasten the decay of mine timbers. In minimizing hazards in war industries, research workers determined the explosibility of various dusts and safer methods for their control.

### Petroleum and Natural Gas

As the growing power of the United Nations' fighting strength increased the demands for special lubricants, liquid fuels, and the wide variety of petroleum byproducts necessary for maintaining supremacy of the land, sea, and air, the Bureau of Mines enlarged its schedule of technical research to assist the petroleum and natural-gas industries in meeting wartime production goals.

Special projects were begun to inventory crude oil for war needs, to apply improved methods for producing petroleum, and to determine new and additional sources of petroleum products. Throughout the year, war agencies and industry drew heavily from the



Bureau's fund of technical information on various crude oils, condensates, and natural gasoline, making possible the more efficient blending of aviation gasoline and the manufacture of toluene and benzine from petroleum in large quantities.

The engineers studied deep, high-pressure fields of the condensate type and prepared reports on four important fields in the Gulf coast for the Petroleum Administration for War which permitted PAW and the operators to develop programs for producing the optimum amounts of liquid hydrocarbons and at the same time prolonging the life of the fields.

A mobile field laboratory was built by the Bureau to determine the composition and phase relations of reservoir fluids—information which was necessary in developing operating plans which will leave minimum quantities of liquefiable products in the sands. Several months of field testing and study were devoted to a complicated natural-gas reservoir in Oklahoma supplying war industries. The Bureau's continuing study of the effect of well spacing on the quantity of extractable oil grew in importance because of the scarcity of steel for drilling new wells.

Engineering reports were prepared on an analysis of the oil-producing history of the Mexia-Powell fault-line fields of Texas, studies of Rodessa field in Louisiana, Texas, and Arkansas, and reservoir conditions of the Magnolia field in Arkansas. Reservoir fluids were analyzed to assist operators in the Cut Bank field of Montana in determining optimum production rates.

Water flooding and air- and gas-repressuring methods, employed to increase the extractable oil with a minimum use of material and labor, were studied and reports were issued on water flooding in Oklahoma and on brine-disposal systems in western Kansas. Bureau technicians ascertained that salt water produced with oil can be conditioned and used as a repressuring medium in several areas.

To assist the 15,000 oil producers in the Appalachian region, the Bureau established a petroleum field office at Franklin, Pa., in April 1942, and this office reported during the fiscal year on nine air- and gas-injection projects in widely separated parts of the Appalachian region and on the cost of reconditioning wells to guide further efforts in stimulating the production of paraffinic oils needed for aircraft lubricants.

A chemical engineering study of the proper blending of oil-base drilling fluids suggested that they may prove extremely valuable in increasing the supplies of recoverable crude oil. The Bureau also published a report on the tools and techniques employed in rehabili-

tating wells which require the removal of sand, mud, and other obstructions.

Research work on aviation gasoline was expanded to include both natural and synthetic components, and exacting analyses were made on crude oils, condensates, and natural gasolines to find new sources of aviation gasoline, toluene, and benzine. Several crude oils were analyzed by superfractionation and 17 naphthas from high-sulfur crude oils were desulfurized and tested for octane rating and tetraethyl lead response. Other research continued in the analysis of asphaltic materials, and plans were laid for constructing an experimental plant to recover microcrystalline wax from waste for munitions and other war uses.

During the year 132 special reports were prepared on properties of materials available from particular crude oils and distillates for war uses. The Bureau also resumed its semiannual survey of motor gasoline. At the request of the PAW, work was begun on the thermodynamics of hydrocarbons and derivatives primarily as an aid to the synthetic rubber program.

### Helium

Meeting greatly increased demands for helium for the Navy's anti-submarine blimps, for meteorological balloons of the Army, Navy, and Weather Bureau, and for Army barrage balloons, the Bureau of Mines completed its new helium plant in Texas, modified and supplemented the equipment of its Amarillo plant in Texas and rushed construction of three other helium plants. Production of this lightweight, noninflammable gas was increased to about 25 times that of pre-war days and was meeting the current requirements for military and civilian uses. Additional wells were drilled in the famed Cliffside helium-bearing gas field of Texas. While the armed services used most of the helium, considerable quantities also were employed for medical purposes, in diving and caisson work, and in the welding of magnesium airplane parts.

### Explosives

The experience of the Bureau of Mines in handling and testing explosive and inflammable materials used by the mineral industries provided an ideal background for the successful completion of important research for the War and Navy Department and other war agencies. While continuing their normal research in the causes and prevention of industrial fires and explosions, experts carried on investigative work under the Bureau-administered Federal Explosives Act, working

closely with representatives of the armed forces, particularly the Safety and Security Branch of Army Ordnance, which named several Bureau men to technical boards and committees.

Certain new types of ammunition were analyzed for the Ammunition Development Branch of Army Ordnance, and other studies were made in the handling of explosives and pyrotechnics. At the request of the Army Engineer Board, all available military high explosives were examined to determine physical characteristics important to demolition work. Such tests included rates of detonation and the action of humidity and subsurface moisture at extreme ranges of temperature. Other studies involving explosives were conducted for the Navy Department, the Bureau of Standards, and the Board of Economic Warfare.

Typical problems of a confidential nature concerned the action and construction of seized enemy military devices and the clearing of land mine areas. New methods for testing explosives were devised at the request of military authorities.

Despite the increased volume of war work, technical experts made consistent gains in obtaining data regarding commercial explosives. In this field of activity 149 chemical analyses were made, 967 gallery tests were completed, and 2,248 control tests of a physical nature were conducted. At the close of the fiscal year, 180 explosives were on the Bureau's permissible list as being safer to use in mines. Also specifications were developed for Diesel engines that may be operated safely in mines and in other confined spaces, such as ordnance plants and synthetic rubber plants where inflammable atmospheres may be encountered.

*Gas- and dust-explosion research.*—Other services for war industries and agencies included determinations of the inflammability characteristics of gases and metallic and nonmetallic dusts. Considerable study was devoted to the prevention of explosions involving butadiene, a principal constituent in the manufacture of synthetic rubber. The dusts of aluminum, antimony, cadmium, chromium, copper, magnesium, tin, zinc, and other war metals were tested and industries were advised regarding precautionary measures which should govern their handling.

#### SAFETY, PLANT PROTECTION, AND HEALTH ACTIVITIES

Loss of skilled manpower in the mineral industries, equipment shortages, and the plea by war agencies for increased production formed the backdrop for greatly expanded safety and security programs executed by the Bureau of Mines. Safety education, accident-prevention work, investigative activities, and testing of materials



were aimed at the conservation of men and machinery. Despite increased production, additional man-hours of labor, and the employment of many inexperienced workers, the anticipated upward trend of accidents in the mineral industries was relatively small.

Under the Federal Coal Mine Inspection Act of 1941, inspectors visited a larger number of coal mines during the fiscal year in their duties of furthering health and safety in this vital field of production. Safer storage, handling, transportation and use of commercial explosives resulted from the Bureau's administration of the wartime Federal Explosives Act. Public and industrial security was enhanced as operators of mines, metallurgical plants, quarries, and similar plants responded to Bureau recommendations for means of preventing sabotage and subversive activities.

### Safety Work

The experienced safety engineers of the Bureau performed valuable service in directing and assisting in the administration and field activities of coal-mine inspection, the explosives control program, and mineral production security activities. During 1943, engineers and safety instructors trained 45,952 employees of the mining and affiliated industries in first aid, and the total completing such courses under the Bureau's sponsorship reached 1,584,774. About 675 persons qualified as first-aid instructors, swelling the ranks of persons so trained to 16,500—a vital link in the program of civilian defense training. Forty-nine plants received certificates attesting to the training of all employees in first aid. Certificates were awarded 72 persons as qualified first-aid judges, and Bureau workers aided in conducting 42 first-aid contests in 8 States.

Basic mine rescue training, which has saved the lives of many industrial workers, was given to 2,498 mine workers; and 154 persons completed the advanced course. Because of their ability to use rescue equipment and their knowledge of rescue and recovery procedures in connection with fires, floods, and other disasters, these men can serve effectively in civilian defense work.

Bureau engineers investigated 41 mine explosions in 14 States, 30 mine fires in 16 States and Alaska, and 97 miscellaneous accidents in 26 States during 1943. They participated, in many instances with hazard to themselves, in rescue and recovery operations involving explosions, fires, and floods, and helped fight numerous mine fires.

At the request of the owners, careful inspections were made of 63 privately owned mine rescue stations. Meanwhile, accident-prevention training continued to grow in popularity, 566 persons enrolling

in these courses and bringing the number completing such instruction to 10,865 and those receiving partial training to 6,450.

Motion pictures, slides, exhibits, testing galleries, and other mediums were employed in the safety education program. Sound motion pictures on safety subjects were shown 208 times. Bureau representatives participated in 547 safety meetings in 33 States.

To determine the degree of safety afforded by electrical machinery and equipment for use in mines, the Bureau continued its special testing work on devices submitted by manufacturers. Formal approvals covering 35 complete machines were issued and 19 formal letters of suitability were granted covering individual parts, together with 48 extensions of letters of suitability for safe use against gas and dust ignitions. The Bureau also made 589 explosion tests for the Navy of explosion-proof enclosures intended for ships.

### Coal-Mine Inspection

The numerous safety improvements made voluntarily by officials and workers in coal mines were among the concrete results of the Federal coal-mine inspection program. Lower accident rates in many mines in spite of increased output due to the war and the receipt of many letters from both company spokesmen and workers' organizations commending the manner in which Bureau of Mines representatives conducted the investigations attested to the success of the inspection work.

During the fiscal year, Federal inspectors visited 1,149 coal mines in 22 States and Alaska, representing a combined annual production of 293,218,266 tons, or 46 percent of the total annual 1942 coal production. These mines employed a total of 233,160 men. Since Federal inspections began on December 1, 1941, 62 percent of the coal mines employing more than 25 persons each have been inspected; these mines employ 66 percent of the workers.

Recommendations designed to increase safety and promote healthful conditions were made by the Federal representatives and mines were credited for existing safeguards and for improvements effected subsequent to the inspector's visits. State mine-inspection departments cooperated with the Bureau by requiring compliance with State mining regulations and urging adoption of many suggested safety measures not included in State statutes, but recommended in Federal inspection reports.

Ventilating improvements made as a result of Bureau of Mines inspections have, the Bureau believes, prevented some mine explosions. Very few companies disregarded the Federal recommendations or

deliberately delayed in carrying out certain improvements; there were several mine explosions and other accidents in mines which, in the opinion of the Bureau, would not have occurred had Federal suggestion been followed.

Special investigations regarding explosives and electrical equipment in mines were made by mining-explosives engineers and mining-electrical engineers of the inspection staff and other special studies of mine hazards and problems were undertaken by coal-mine inspectors.

### Explosives Regulation

Guarding against sabotage and misuse of the hundreds of millions of pounds of explosives used annually in the United States in commercial operations, the Bureau of Mines tightened its surveillance over the manufacture, purchase, sale, storage, use, and possession of non-military explosives and their ingredients as authorized under the Federal Explosives Act. By a system of licensing, Federal control of explosives was maintained from the manufacturer to the lawful consumer. Fifty-two explosives investigators were stationed in various States and Alaska to supervise and guide the 4,500 Federal licensing agents and to investigate the handling, storage, and use of explosives. The licensing agents, who serve without pay except for the 25-cent fee they are entitled to collect from each person to whom they deliver a license, issued about 350,000 licenses to vendors, purchasers, and foremen during the year. The Bureau examined and acted upon 4,000 additional applications from manufacturers, schools and colleges, and laboratories.

Investigative work under the Federal Explosives Act was woven closely with the safety and security programs of the Bureau. Investigators made reports on more than 9,000 stores of explosives and were assisted by other engineers and technicians of the Bureau of investigating fires and explosions in mines, quarries, munitions plants, and factories manufacturing fireworks for military and industrial purposes.

In carrying out its duties under the Federal Explosives Act, the Bureau maintained liaison with the Army and Navy Intelligence services, the Office of Civilian Defense, and the Office of the Chief of Ordnance of the Provost Marshal General.

### Antisabotage

Strengthening home-front production and supply plants against losses due to sabotage, subversive activities, injuries to workers, fires, floods, and other eventualities, the Bureau of Mines sent a corps



of specially trained engineers into 1,968 mines and related facilities during 1943 under the facility security program.

At the request of the Provost Marshal General's office, the Bureau of Mines assisted in the inspection of mineral facilities and undertook inspections for the security status of surface and underground workings of all mines, including those on the Army's master responsibility list. Joint inspections were made by Army officials and Bureau engineers, and recommendations were jointly approved by the War Department and the Bureau before they were transmitted to the operators. Bureau engineers acted for the War Department in making recurring inspections of mines and related facilities on the Army's list and submitted reinspection reports to Service Command headquarters.

In addition to the many original inspections made during the year, the Bureau's small field staff of 65 engineers assigned to mineral-production security work made 132 reinspections to check improvements made since the initial inspections. Reports received by the Bureau indicate that these inspections resulted in the adoption of many precautionary measures to prevent sabotage and subversive activities and curb accidents.

Mineral-production security inspectors, as well as Federal coal-mine inspectors and other field workers of the Bureau, because of their familiarity with mines in all parts of the country, assisted in the scrap-metal drive by locating scrap material in abandoned and active mines and by helping in its recovery or rehabilitation.

### Health in the Mineral Industries

Increased production of essential war materials by preventing occupational diseases and improving the efficiency and morale of the workers through better environment was emphasized by the Bureau during the year.

Inspections were made of the hygienic aspects of working conditions in anthracite mines and zinc, manganese, and ordnance plants, and suggestions were made for eliminating or controlling hazards. Several investigations were made at the request of the Navy Department regarding health and safety aspects connected with certain of its operations.

The field investigations and studies made by other Bureau engineers required the analysis of approximately 12,000 air samples, compared with 5,300 in 1942. About 400 dust samples also were tested. Approximately 10,000 air samples were analyzed for Federal coal-mine inspectors and other field workers. Five hundred air samples were analyzed for the Army and Navy, and 1,500 samples were tested

as part of the research work regarding the safety of electrical mining equipment, respiratory protective devices, and similar equipment. Dust samples were tested as part of the health and safety surveys in mines, studies in explosives and coal hydrogenation, and in aiding research work conducted by the Army.

The protection of workers against noxious gases, fumes, and dust grew increasingly important as a wartime health measure, and demands for Bureau-approved respirators increased along with requests for suggestions regarding their correct use and care. Such requests came from various mines, labor organizations, ordnance plants, the Maritime Commission, and others concerned with war production. Special tests also were made by the Bureau for the armed forces and the Maritime Commission to obtain certain information regarding respirators.

### ECONOMICS OF MINERAL INDUSTRIES

Since dwindling margins between wartime requirements and domestic production of many of the leading mineral commodities during 1943 required closer control of their distribution and uses, there were steadily increasing demands on the Bureau of Mines for comprehensive statistical and economic information to guide those charged with maintaining adequate supplies of mineral products.

Both the volume and frequency of the information surveys handled by Bureau experts climbed to new levels, many special studies were undertaken, new services were inaugurated, and scores of conferences were held to provide executive legislative branches of the Federal Government with factual data.

Partly because of the unusually heavy pressure of war activities and the necessity of maintaining secrecy regarding sources, production, reserves, and uses of many commodities, publication of the 1941 Minerals Yearbook was delayed. This authoritative publication included 14 chapters on critical and essential minerals which could not be released for general distribution and the Yearbook thus was issued as a confidential document for the use of a limited number of Federal officials. Certain other chapters containing important data, but not considered in the category of being of "aid and comfort to the enemy," were distributed after deletion of certain tables and other confidential material.

### Metals

Continued expansion of plant facilities and the resulting accelerated tempo of production placed a heavy strain on the Nation's supply of metals. The supply of such metals as aluminum, cadmium,

tin, magnesium, copper, zinc, molybdenum, nickel, vanadium, tungsten, and chromium was insufficient for both war and civilian demands. The Bureau conducted monthly or quarterly surveys of these materials and more than a score of other commodities, and in many instances this information was utilized by the War Production Board in determining its allocation systems.

In 1942 many additional studies in metal production and consumption were undertaken, and this trend continued upward during 1943 as war agencies, particularly the WPB, called for up-to-date confidential data on a larger scale.

During the year, 415 confidential reports were distributed to war agencies and 35 nonconfidential reports were released to industry. New monthly or quarterly reports were undertaken on cobalt, iron ore, selenium, tellurium, vanadium, zirconium, lead and tin scrap, and zinc scrap. In addition, 26 chapters were prepared for the Minerals Yearbook.

Monthly reports giving the mine production of copper, lead, and zinc by individual workings were employed by the joint War Production Board-Office of Price Administration Quota Committee in forming bases for control and were used extensively by other war agencies. In conjunction with Bureau of Labor Statistics reports on mine employment, the Bureau of Mines information was used by the War Manpower Commission and other agencies in mine labor and productivity problems. The series of monthly reports for the production of copper, lead, and zinc by States was extended to include gold and silver. Field offices of the Bureau assigned to the compilation and interpretation of mineral production information served in an advisory capacity to other Federal agencies concerned with mining problems, particularly in the Central and Western States. In addition, Minerals Yearbook chapters on the production of gold, silver, copper, lead, and zinc were prepared.

### Accident and Health Data

Requests from agencies of the Federal Government and various non-Federal offices for facts regarding accidents and production in mines were used in programs involving the protection of plant facilities, the placement of prisoners of war, and the distribution and utilization of manpower for maximum benefit to war-production schedules.

To reduce the number of reports from industry and to promote uniformity of basic information concerning accidents in coal mines, conferences were held with State mining officials and State compen-



sation and industrial commissions regarding the merits of a standard report form. This form was suggested for companies providing accident information to States and to the Bureau of Mines. Through the cooperation of the National Coal Association and State associations of coal companies, the conference resulted in the adoption of a single standard report form by States producing 85 percent of the Nation's coal. The Bureau began a preliminary survey to obtain accident data in the petroleum industry. Other informational services included the annual production, consumption, and distribution of commercial explosives and the estimated quantities of nitroglycerin and other ingredients used in the manufacture of blasting materials.

### NONMETALLICS

The Bureau of Mines conducted 18 surveys in the nonmetallic industries during 1943, many of them being undertaken at the specific request of officials in other agencies of the Government. Typical of these were facts regarding the availability of mica for airplane spark plugs, asbestos for fireproof wire coverings, magnesia for refractories, cement for airfield runways, gypsum for military housing, mineral pigments for camouflage paints, and celestite for tracer bullets and flares.

From the Bureau's storehouse of information came answers to the approximately 500 inquiries received each month. Data files, started a quarter of a century ago and augmented each year by the addition of from 4,000 to 5,000 new items, supplied basic information which led to the solution of many war problems.

Research workers prepared 21 chapters for the Minerals Yearbook and compiled 48 other publications regarding nonmetallics, 10 of which concerned such vital subjects as furnace refractories, strategic mica, kyanite, lithium, mineral pigments, olivine, a review of mineral progress, and home insulation with minerals to promote the conservation of fuels. Studies were begun regarding cement developments in Latin America and the functions of corundum, vermiculite, and minor fertilizer materials in the military program.

Mineral Trade Notes, comprising abstracts of consular reports and special contributions primarily concerning foreign mineral developments, was prepared monthly for the confidential use of certain war agencies.

### Petroleum and Natural Gas

Gasoline and fuel-oil rationing, transportation changes, and ever-rising war needs for petroleum products multiplied the difficulties

of the Bureau of Mines in forecasting demands for motor fuel and crude petroleum, but monthly reports were continued successfully and the cumulative forecasts showed an approximate divergence of only 1 percent from actual demand.

While the preparation of regularly supplied information proved extremely useful to war agencies, special studies also were requested for certain supplemental material regarding petroleum and natural gas and these surveys were undertaken immediately by the Bureau. Outstanding among the regular services was the survey on the production, stocks, and demand for aviation gasoline. Bureau statistics were combined with those from other sources to maintain a complete check on the trends of supply and consumption in the critical Atlantic and Pacific coast areas. Information was obtained in the field of international petroleum trade for agencies concerned with export control and demand.

### Anthracite and Coke

Expanding its work in collecting facts regarding the anthracite and coke industries, the Bureau of Mines provided currently an over-all picture which enabled war agencies to keep abreast of economic and technical developments in the solid fuels field, to control prices, and to manage efficiently the distribution of supplies to war plants and civilian users. Information was provided the War and Navy Departments on international fuel, power resources, and production.

Surveys covering the consumption of foundry coke, classification of contract tonnages of merchant byproduct-coke plants, production of coke and byproducts at coal-gas retort plants, and sources of coking coal for byproduct and beehive plants were completed at the request of the Solid Fuels Administration for War and the Bureau began a study of the distribution of Pennsylvania anthracite at the retail dealer level for the 1942-43 coal year. Confidential industry surveys for coke, coke byproducts, and Pennsylvania anthracite were compiled monthly. Annual reviews covering developments in the byproduct and beehive coke, Pennsylvania anthracite, lignite, peat, fuel briquets and packaged-fuel industries were prepared for the Minerals Yearbook and summaries of these chapters, with confidential material deleted, were issued for general distribution.

### Data on Foreign Minerals

Through arrangements with the Department of State and the Board of Economic Warfare the Bureau of Mines was given the responsi-

bility of the technical direction of mineral attachés and the publication for Government use only of economic facts regarding mining conditions in foreign countries. On recommendations of the Bureau, mineral attachés were appointed to American embassies in Cuba, Mexico, Peru, and Bolivia. Similar assignments are contemplated for Brazil, Argentina, Chile, and certain countries outside the Western Hemisphere. During the year, detailed reports were prepared by the Bureau regarding mineral resources of Peru, North Africa, and Turkey and similar information was assembled regarding British West Africa and French West Africa.

### PUBLIC REPORTS

All publications not compatible with the prosecution of the war were eliminated during the fiscal year and general distribution of the Minerals Yearbook was discontinued. Economies also were effected by distributing abstracts of many reports in place of the full publication. Few press releases were distributed.

Because of the heavy demand for statistical data and other informative material regarding all phases of the mineral industries, the Bureau issued a series of confidential reports for restricted distribution among war agencies and certain producers of war minerals. Some chapters of the Minerals Yearbook—with all confidential information deleted—were released to persons and industries requesting such publications.

In all, 551 bulletins, technical papers, handbooks, Minerals Yearbook chapters, and contributions to technical journals were prepared.

The Bureau's Washington library of selected reference material was increased by 2,732 books; 247 periodicals, many on an exchange basis, were received regularly, and 24,471 publications were circulated for use outside the library. Many thousands of letters were written in response to requests from the public for information concerning the mineral industries.

The Bureau's free educational motion pictures, produced in cooperation with industry with production costs paid for by private industry, were in constant demand by the Army, the Navy, and the Office of Civilian Defense for use in war-training programs. They also were shown in South American republics, Canada, China, South Africa, and Great Britain. During 1943 the Bureau's films were shown on 95,876 occasions to audiences totaling 7,928,201 persons. Since 1922, the Bureau's films have been shown on 957,936 occasions and the audiences have totaled 103,584,650.



## ADMINISTRATION

To handle more effectively the larger volume of administrative work, the Bureau reorganized its administrative branch, establishing an administrative officer and two assistants, one in charge of an Office of Business Management and the other in charge of budgetary matters. As in past years, the Bureau's activities were administered from Washington, D. C., but were carried on mainly in the field offices, laboratories, and pilot plants.

### Personnel

On June 30, 1943, there were 3,851 full-time employees of the Bureau of Mines, distributed as follows:

	Dept.	Field	Total
General administration.....	191	56	247
Operating services.....	181	1 3, 119	3, 300
Economics and statistics service.....	129	175	304
Total.....	501	3, 350	3, 851

<sup>1</sup> Including field employees as follows: Helium plants 269; Eastern Region, 519; Central Region, 386; Western Region, 962.

### Property

The records as of June 30, 1943, show that the property of the Bureau had a total valuation of \$6,908,426.77, of which \$2,531,187.35 was for land, buildings, and improvements; \$1,242,280.85 for laboratory equipment; \$901,597.44 for machinery and power-plant equipment; and the remainder for certain helium properties, office furniture, automobiles, and other goods. The property of former Albany College, at Albany, Oreg., was purchased, under congressional authorization, for the establishment of a Northwest Electrodevelopment Laboratory.

### Finance

The total funds available to the Bureau of Mines for the fiscal year ended June 30, 1943, including direct appropriations, departmental allotments, reappropriated balances, and sums transferred from other departments for service work, were \$32,178,548.44. Of this amount \$26,034,197.82 was spent, leaving an unexpended balance of \$6,144,350.62. On the regular work of the Bureau, \$24,708,880.38 was expended. 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 ended June 30, 1941-44.

Table 2 gives a statement of the distribution of congressional appropriations to the branches and divisions and the expenditure of these funds in 1943 by Bureau divisions.

TABLE 1.—Bureau of Mines appropriations and expenditures, fiscal years ended June 30, 1941-44

Fiscal year	Appropriated to Bureau of Mines	Departmental allotments <sup>1</sup>	Funds transferred from other departments <sup>2</sup>	Total funds available for expenditure	Unexpended balances	Total expenditures	Expenditures, exclusive of service items <sup>3</sup>
1941.....	\$3,944,400.95	\$91,790.00	\$2,225,939.10	<sup>4</sup> \$6,262,130.05	<sup>5</sup> \$1,069,298.98	\$5,192,831.07	\$4,934,951.05
1942.....	8,910,388.68	97,490.00	2,223,026.41	<sup>5</sup> 11,230,905.09	<sup>6</sup> 1,821,358.28	9,409,546.81	8,749,668.24
1943.....	28,707,630.94	106,450.00	3,364,467.50	<sup>6</sup> 32,178,548.44	<sup>7</sup> 6,144,350.62	25,034,197.82	24,708,880.38
1944.....	20,693,252.56	89,500.00	2,740,770.00	<sup>7</sup> 23,523,522.56	-----	-----	-----

<sup>1</sup> Includes printing and binding, stationery, and contingent funds.

<sup>2</sup> Includes proceeds from sales of residue gas.

<sup>3</sup> Service items include Government fuel yards, helium, and other investigations and services for other departments.

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

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

<sup>6</sup> Includes \$372,486.29 unexpended balance reappropriated, and balance of \$128,018.51 receipts from sale of helium and other products.

<sup>7</sup> Includes \$4,523,377.56 unexpended balance reappropriated, and balance of \$202,723.66 receipts from sale of helium and other products.

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

Branch or division	General expenses	Operating rescue cars and stations and investigation of accidents	Coal-mine inspections and investigations	Testing fuel	Experimental plant for synthesis of motor fuel, Pittsburgh, Pa.	Mineral mining investigations	Oil and gas investigations	Expenses mining experiment stations	Care, etc., buildings and grounds, Pittsburgh, Pa.	Economics of mineral industries	Investigation of domestic sources of mineral supply	Investigation of raw material resources for western steel production	Construction and equipment of electro-develop-ment laboratory
Office of the Director.....	\$23,960	\$214				\$577		\$1,183		\$396			
Office of Minerals Reports.....	240	9,586	\$21,446	\$14,422		13,029	\$349	12,170		\$12,806		\$74	
Total.....	24,200	9,800	21,446	14,422		13,606	349	13,353		396	12,806	74	
Administrative Service.....	41,056	19,100	14,788	333		132	5,891	4,033		17,253	6,892	11,067	\$1,255
Resources and Planning Service.....						29,598		12,416		33,358	33,358	2,393	
Central Region.....						9,954		46,468			72,566		
Eastern Region.....		38,907	10,088	16,436		107,779		260,884	\$112,086		105,435	78,202	
Western Region.....						189,971		200,122			392,667	206,702	
Fuels and Explosives Service:													
Fuels Division.....		111,224	14,049	319,319		\$83,973			5,632			2,907	
Explosives Division.....		72,325											
Petroleum and Natural Gas Division.....				319,319			437,896						
Total.....		183,549	14,049	319,319			437,896		5,632			2,907	
Economics and Statistics Service:													
Coal Economics Division.....										41,821			
Foreign Minerals Division.....										16,071			
Metal Economics Division.....										101,390			
Mineral Production and Statistics Division.....			17,322							135,238			
Nonmetals Economics Division.....										76,822			
Petroleum Economics Division.....										63,019			
Total.....			17,322							434,361			
Health and Safety Service:													
Coal-Mine Inspection Division.....			577,325										
Safety Division.....		390,824	5,938										
Health Division.....		55,631	51,846										
Mineral Protection Division.....													
Explosives Control Division.....		446,455	635,109										
Total.....		709,940	768,000	356,205		390,745	449,100	571,795	125,300	455,330	681,265	349,325	500,000
Total expenditures.....	65,256	697,811	712,802	350,510	83,973	351,040	444,136	537,276	117,718	452,010	623,724	301,345	137,836
Balances.....	3,509	12,129	55,198	5,695	1,027	39,705	4,964	34,519	7,582	3,320	57,541	47,980	342,104



TABLE 2. — Bureau of Mines expenditures, fiscal year 1943—Continued

Branch or division	Gaseous and solid fuel reduction of iron ores	Construction and equipment of helium plants	Manganese beneficiation plants	Production of alumina from low-grade bauxite and aluminate	Investigation of bauxite and aluminic and aluminum clay deposits	Beneficiation of chromite and production of electrolytic chromium	Magnetite plants and research	Investigation of deposits of critical and essential minerals in the U. S. and its possessions	Helium production	Reduction of zinc concentrates with methane gas	Salaries and expenses, enforcement of Federal Explosives Act	Development and operation of helium properties (special fund)
Office of the Director	\$231				\$1,707			\$4,907				
Office of Minerals Reports	227	\$324	\$4,182	\$1,073	7,850		\$159	12,276		\$25	\$10,063	
Total	458	324	4,182	1,073	9,557		159	17,183		25	10,063	
Administrative Service	7,393	30,337	19,803	20,839	12,054	\$1,526	12,313	46,049	\$5,962	5,545	46,446	\$48
Resources and Planning Service	412		15,375	5,538	5,538			69,503		3,089		
Central Region	55,187			79,792	662,896		132,168	421,762		98,941		
Eastern Region	79,606			491,315	241,074			533,694			1,944	
Western Region	424,481		1,469,990	125,390	148,330	64,230	393,941	982,885				
Fuels and Explosives Service:												
Explosives Division											74,673	
Petroleum and Natural Gas Division		11,735,505							366,575			
Total		11,735,505							366,575		74,673	12,886
Economics and Statistics Service:												
Coal Economics Division												
Foreign Minerals Division												
Metal Economics Division												
Mineral Production and Statistics Division												
Nonmetals Economics Division											242	
Petroleum Economics Division												
Total											242	
Health and Safety Service:												
Coal-Mine Inspection Division												
Safety Division												
Health Division												
Mineral Protection Division											916	
Explosives Control Division											353,678	
Total											354,594	
Total appropriations	600,000	15,160,000	1,577,570	742,875	1,101,404	75,000	609,825	2,167,500	1,502,081	350,000	540,000	215,658
Total expenditures	567,537	11,766,166	1,509,350	718,409	1,079,449	65,756	538,581	2,071,076	372,537	107,600	487,962	12,934
Balances	32,463	13,393,834	68,220	24,466	21,955	9,244	71,244	96,424	1,129,544	242,400	52,038	1,202,724

Branch or division	Investigations and research on processes for production of potassium carbonate and sodium carbonate from trona and wyomingite rock	Maintenance Bureau of Ships	Cooperation with the American public	Salaries and expenses, Office for Management (transfer)	Protection of mineral resources and facilities, including petroleum	Geological Survey	Salaries and expenses, Solid Fuels Administrator for War	Emergency fund for the President, Bureau of Mines	Emergency fund for the President, national defense (allotment to Interior, Office of Secretary)	Working funds	Printing and binding	Contingent	Total
Office of the Director	\$1,578				\$16,662		\$219				\$338		\$33,117
Office of Mineral Reports	1,578				16,662		219				5,431		144,687
Total	2,395				4,485						8,107	\$6,432	351,694
Administrative Service						\$36,882							208,564
Resources and Planning Service													1,580,932
Central Region													2,137,898
Eastern Region	51,909				6,174								5,060,099
Western Region				\$298,938									
Fuels and Explosives Service:													
Fuels Division							101,757		\$20,275				674,012
Explosives Division									399,750				547,460
Petroleum and Natural Gas Division									205,500				2,761,077
Total							101,757		625,525				13,982,549
Economics and Statistics Service:													
Coal Economics Division							10,264				367		52,452
Foreign Minerals Division													24,400
Metal Economics Division			\$8,296										33
Mineral Production and Statistics Division										114,970			216,497
Nonmetals Economics Division													
Petroleum Economics Division													192,297
Total			8,296				10,264						77,577
Health and Safety Service:													
Coal-Mine Inspection Division													64,227
Safety Division													627,450
Health Division	\$4,404												
Mineral Protection Division													
Explosives Control Division													
Total	4,404		8,296										587,162
Total appropriations	57,029	58,000	58,000	340,125	485,889	39,860	115,500	\$15,180					368,858
Total expenditures	55,882	4,404	8,296	298,938	462,046	36,882	112,240	15,180	6,500	786,852	100,000	6,450	32,178,548
Balances	1,147	796	49,704	50,187	23,843	2,978	3,260	280	6,392	740,495	94,217	6,432	25,034,198
									108	1,46,357	5,783	18	6,144,350

Available for expenditure in fiscal year 1944.

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# Geological Survey

W. E. WRATHER, Director

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**S**UCCESSFUL conduct of the war is today the first duty of this Nation. American soil must be guarded against further conflict, and victory on foreign shores must and will be won.

For these purposes, our armed forces must have a ceaseless supply of weapons, munitions, and fighting and transport vehicles—a supply that can be kept up only by adequate sources and production of many metals and minerals. Furthermore, they must have ample supplies of water for all plants that are making war implements or furnishing power for their production, for military and naval installations, and for troops at the front. Finally, military leaders must have accurate maps and other information about the lands in which fighting is or will be in progress.

The Geological Survey is devoting its every effort toward meeting those imperative needs. Its trained personnel, its techniques, and its 60-year store of information are directed intensively to war problems. By investigating and reporting on ore deposits in this country and Latin America it contributes largely to an adequate supply of minerals for war purposes. By many special studies, supplementing its accumulated information on the surface and underground water resources of this country, it is rendering to the armed forces and to war industries thousands of helpful reports on available water supplies. It is preparing maps of great areas of strategic importance in this country and abroad and is making for the armed forces many special reports on foreign lands—their terrain, water supplies, building materials, and other features affecting military operations. During the fiscal year ended June 30, 1943, with augmented funds and personnel, all these tasks were carried forward with intensified vigor; the work accomplished is set forth in detail in the pages that follow.

Despite its concentration on wartime tasks, the Geological Survey has not lost sight of the fact that the results being obtained will be

invaluable also for many peacetime uses. Great tasks lie ahead. Under the dire necessities of war and the will to win, this Nation is pouring out its wealth of manpower and resources without stint or hesitation. When victory is won and this country must undertake its share in rebuilding a war-torn world, it will face problems no less grave and baffling than those of armed struggle. It will face them shorn of much of its choicer mineral resources and must thereafter increasingly rely on inferior grades or on foreign supplies. To meet those aspects of the problem, the Nation must call upon the zeal and inspiration of its scientists, its engineers, and its technologists. The Geological Survey must do its part in those future tasks; and it is looking forward and planning ways in which that part can best be accomplished.

### GEOLOGIC BRANCH

The rapidly expanding scale of war production has created an almost insatiable demand for mineral commodities, and this demand has increased until not only those materials hitherto classified as of strategic and critical importance are included but also a great number of other minerals and metals that either have been considered adequate in amount or in the past have been in relatively slight demand. The shortage of shipping tonnage caused attention to be focused more sharply than ever on domestic sources of these materials and on sources in the other American Republics. The Geologic Branch, with its experienced professional staff, was especially qualified to evaluate these sources and directed its activities almost exclusively to that task. Cooperation was carried on with several States and with Federal organizations, many of which transferred funds to the Survey for the undertaking of particular tasks. The Geologic Branch was thus placed fully on a war footing, acting as a fact-finding organization and as an adviser on mineral-production policies and on reserve problems. More than 700 reports on field examination of mineral deposits were made to the various Federal agencies, many of them at the direct request of those agencies.

### WAR MINERALS

As the civilian economy of the country became more restricted during the year and a greater proportion of industry was converted to war work, practically all metals and minerals became war materials, and increased quantities of most of them were demanded. In order to coordinate the work of the Survey with that of the Bureau of Mines, regional offices were established in Salt Lake City, Utah, Spokane,

Wash., Rolla, Mo., and College Park, Md. Recommendations were made to the Bureau of Mines for exploration of many deposits, and necessary geologic information was provided for most of the projects actually undertaken by the Bureau. Although confidential reports for use by the war agencies and the Bureau of Mines constituted the bulk of the Survey's output during the year, 24 Strategic Minerals bulletins and 55 press memoranda were published making detailed mine maps available to interested operators.

Detailed records of the history, geology, mineralogy, reserves, and economic possibilities of essentially all known manganese deposits, mines, and prospects in the United States were completed. Studies of manganese were completed in California, eastern Tennessee, and the Batesville district, Arkansas, but were continued in active areas in 18 other States.

Studies of copper, lead, and zinc deposits were greatly expanded during the year. Attention was given both to minor districts that offered possibilities of increased production and to larger productive districts.

More than 100 chromite deposits in California, Montana, Oregon, and Georgia were studied, most of them in cooperation with Bureau of Mines exploratory programs. These studies were important factors in demonstrating the presence of sufficient reserves to justify the erection of mills that are now producing 90 percent or more of the domestic chrome.

More than 100 separate tungsten areas, including more than twice that number of individual deposits, were examined. This work was distributed over all of the Western States. Detailed studies and reviews were made of a number of the more promising districts.

Work was continued on domestic mercury deposits, and by the end of the year most of the important producing areas had been mapped in detail. These studies have already resulted in the discovery of new ore reserves, notably at New Idria, Calif., and they have yielded a working basis for exploration and development elsewhere.

Vanadium investigations were continued, particular attention being paid to the Colorado Plateau and Idaho-Wyoming deposits. Substantial progress was made in the estimation of ore reserves, and specific drilling programs in geologically favorable areas were initiated in cooperation with the Bureau of Mines and the war agencies.

A special survey of possible new sources of molybdenum, nickel, and cobalt was undertaken. Altogether, 40 or more deposits of these metals received some attention in all the Western States, as well as in Wisconsin, New Hampshire, North Carolina, Arkansas, and Maine.



During the year the domestic situation with regard to antimony, bismuth, and arsenic was reviewed, and special studies and examinations were carried out or begun on deposits of these metals.

The search for raw materials from which aluminum and magnesium may be extracted continued during the year. Alunite, magnesite, and dolomite deposits in the Western States, bauxite and high-alumina clays in both the West and East were examined and reserves were estimated. Deposits of talc, graphite, and strontium ores were studied.

General and detailed examinations of pegmatite deposits containing sheet mica, feldspar, beryllium, tantalum, and lithium were made in Maine, New Hampshire, Massachusetts, Connecticut, Virginia, North Carolina, Georgia, Alabama, South Dakota, Colorado, New Mexico, Arizona, Nevada, California, Idaho, and Washington. The pegmatite deposits of New England and the southern Black Hills were studied with a view toward composite mining of the pegmatite minerals.

Quartz crystals have been used for many years in radio communication, but until recently the quantity needed was only a few tons a year, for which the United States was chiefly dependent upon imports from Brazil. In view of the greatly increased demand for radio equipment to meet war requirements, the Geological Survey has undertaken a search for domestic deposits of quartz of oscillator quality in various parts of the country, particularly in Arkansas and in the Southeastern and Western States. Results to date indicate that a modest supply of quartz of fine quality can be developed in Arkansas.

To meet the growing needs of the steel industry, work was focused on projects of special interest to war agencies to help relieve the critical situation in iron-ore supplies, particular attention being paid to finding readily accessible reserves of direct-shipping lump ores of low phosphorus content. Examinations were made of deposits in 22 States throughout the country.

Bauxite districts in Arkansas, Tennessee, Mississippi, Alabama, and Georgia were mapped in detail. Many new deposits were discovered, and recommendations were made by the Geological Survey to the Bureau of Mines for the drilling of selected areas. In the Appalachian region no large deposits of commercial grade were found. In the Gulf Coastal Plain drilling was begun on four projects which, by the end of year, showed about 900,000 tons of new commercial ore. In Arkansas 20 areas were drilled, and it is estimated that at least 3½ million tons of commercial ore has been found in addition to the previously known reserves. Although the current expanded program of exploration and mining is meeting the present demand, it should be

borne in mind that the Nation's reserves of metallurgical bauxite will be exhausted within a few years if the present rate of production is maintained. The Geological Survey is therefore continuing its investigations of high-alumina clays in the hope that a satisfactory process for extracting alumina from them will be perfected. The Survey is also extending its search for bauxite into the West Indies in cooperation with the State Department.

Because of the increased need for fluorspar in the steel, aluminum, and chemical industries, the Geological Survey renewed the search for domestic deposits. Detailed geologic mapping was completed in many localities, and recommendations for drilling and other exploratory work were made to the Bureau of Mines and to owners or lessees of properties. Additional fluorspar reserves have been found in the Kentucky-Illinois field and in Colorado, New Mexico, Utah, and other Western States. The results of a more extensive program of investigation carried on in cooperation with various States, particularly Illinois, Texas, and Idaho, are being made available through the Geological Survey to the several war agencies.

Geologic studies of mineral fuels included the search for additional deposits of coking coal suitable for western steel plants and studies of areas that give promise of promptly yielding additional supplies of oil. At the request of the Petroleum Administrator for War, the oil and gas map of the United States was revised. A survey in cooperation with the Bureau of Mines provided information on additional resources of helium.

Close cooperation was maintained with several States, with the Geological Society of America, the Association of Petroleum Geologists, and the National Research Council on matters of fundamental research that would prove useful to the war program.

The Sections of Chemistry and Physics, Petrology, and Paleontology and Stratigraphy were mainly occupied in analyzing and classifying materials sent in by the field geologists. The chemical laboratory, in addition to identifying or analyzing more than 8,000 samples, developed new methods of analysis for a large number of elements, many of which occur only as minor constituents of the samples. The Section of Petrology gave special study to beryllium, tantalum, magnesium, tin, titanium, chromium, and other ores and minerals.

### MILITARY GEOLOGY

During the year the Military Geology unit was established to meet the increasing demands of the War and Navy Departments for geologic information on strategic foreign areas as related to engineering.

The work was based primarily on bibliographic research, though supplemental sources of information were made available by the agency requesting information. At the close of the year, the Military Geology unit had 30 geologists and operated in part on funds transferred from the Corps of Engineers through an interdepartmental agreement and in part on funds allotted from the appropriation for "Geologic Surveys."

#### AMERICAN REPUBLICS

The work of the Geological Survey in the American Republics during the fiscal year, largely sponsored by the Department of State, was integrated still more closely to war needs. Although the original purpose of promoting cordial relationships between the countries continued to be of first importance, the widening effects of the war upon all nations increased the interest in war resources. Close cooperation was begun between the Board of Economic Warfare and the Geological Survey in work financed by the Board in Colombia, Central America, and Brazil. Work was carried on in Brazil on nickel and mica; in Argentina on tungsten, beryl, and tantalum; in Colombia on quartz, mica, molybdenum, copper, and mercury; in Panama on manganese; in Central America on a large variety of minerals; in Cuba on manganese, chromite, copper, and zinc; in Venezuela on mica, quartz, and nickel; and in Mexico on tungsten, manganese, antimony, fluorspar, mercury, and molybdenum.

Exploration for tungsten in Mexico has already resulted in the discovery of a district that may become an active and significant producer, and an exploration for mercury in Mexico has resulted in a large increase of production in the largest producing district. Considerable reserves of chromite have been discovered in Cuba. Aluminum ores in a novel environment have recently been discovered in the Caribbean area, and a reconnaissance of that region is being vigorously prosecuted in the hope of finding other deposits of similar magnitude and grade.

#### ALASKAN BRANCH

The work of the Alaskan Branch during the past year has necessarily been focused on problems whose solution would contribute most directly to the Nation's supply of war materials. Obviously this aim must be stressed so long as the war lasts, if Alaska is to make its fullest contribution to the country's war needs. Although the particular emphasis to be placed on certain phases of this work may be somewhat altered after victory has been attained, this country must be



alert to prepare so that whether at peace or at war the search for Alaska deposits of the essential mineral commodities shall be carried on intensively.

The development of Alaska is becoming tied in with increasing intimacy to the welfare of the Nation as a whole. Never again can Alaska be left as a vulnerable outpost. To avoid such danger, as well as to derive benefit from this outlying possession, the country must become more thoroughly acquainted with Alaska, its resources must be inventoried and plans must be made to utilize and develop them wisely. Into such a broad forward-looking program the present war projects fit perfectly as an integral part. The current projects are designed to supply certain mineral materials quickly, without regard to the normal requirement of commercial profit. Ultimately the present limited list must be expanded to include all the essential mineral products needed for the support of the military and civilian population in the Territory or that are needed by the Nation as a whole. Scores of mineral commodities now supplied to Alaska only through imports must be developed locally. It is absurd, for instance, for Alaska to depend on securing supplies of cement for use in local construction from points thousands of miles distant when, presumably, equally satisfactory material may be developed much nearer at hand. Coal is another mineral resource that should be developed to supply at least all of Alaska's local needs.

Still more pressing is the need for testing the places in Alaska at which signs of petroleum are known, as waning supplies elsewhere indicate plainly that the known resources of this fuel cannot long withstand the present draft by civilian and military establishments. New reserves of oil must be found and made available—tasks that cannot be accomplished quickly or cheaply, especially in a remote region like Alaska. Scores of other commodities furnish equally impressive examples to prove that delay in finding out about all of our Alaskan mineral resources is unwise and harmful to the national interest. If essential supplies are to be available when needed it is urgent that these investigations be started at once and followed up with increasing diligence and intensity.

The maps now being prepared by the Alaskan Branch mainly for special military use are even more essential for civilian use in solving the countless problems that arise in the development of a pioneer country. Practically the first step in the consideration of any construction project is the close examination of all of the data afforded by adequate topographic maps, such as the Survey has been making in Alaska for the past 45 years. From these maps may be determined the accessibility of a project from nearby or remote settlements and

its general surroundings—streams and water features that may be advantageous or sources of danger, features of relief that may be utilized or may present obstacles to be overcome.

One of the most obvious uses of topographic maps is in planning and laying out a wisely chosen network of routes for travel by air, land, and water—matters that are becoming of prime importance in all military and civilian enterprises. Selection of the sites for reservoirs, ditches, or other means for supplying water to manufacturing centers or settlements requires intensive study of the natural topographic features of the areas to be served, and at least in the initial stages can be best done with the aid of accurate maps. At present less than half of the Territory has been surveyed with the degree of accuracy required for even the most general purposes, and less than one percent has been surveyed with the degree of detail that is considered essential for areas of only moderate development in the United States proper. This condition presents a real challenge to those charged with planning for the future.

The period of readjustment that necessarily ensues between the cessation of hostilities and the Nation's resumption of a peacetime footing is always difficult to bridge unless plans have been made in advance. Even then it is not easy usually to forecast the new trends that such reorganization may take. Little such uncertainty, however, dims the outlook for Alaska. It is a vast domain covering nearly 600,000 square miles—a fifth the size of the United States proper. Its population, aside from the military forces, is only about 70,000. As yet less than 5 percent of the land is privately owned. Under such conditions it seems elementary that the Government, as landlord, should quickly ascertain what it possesses, so that it may wisely administer its holdings for the benefit of all. Such a program would have especial merit if the Government found it necessary to provide employment for idle manpower during the period when peacetime activities are being resumed, as through it the services of many could be directed into useful channels.

Indicative of what the Survey has been doing to supply some of the hitherto lacking information regarding Alaska is the following résumé of the projects in which it recently has been engaged.

During the field season of 1942, which included the latter part of the fiscal year 1942 and the early part of the fiscal year 1943, the Alaskan Branch, through its regularly appropriated funds and a generous grant from the War Production Board, carried on 37 projects concerned with the examination of mineral localities, 2 topographic projects, and 1 general administrative project. Of the mineral investigations 6 were concerned with deposits of antimony ores,

5 with iron, 4 each with chromium, mercury, nickel-copper, and tin, 3 each with copper and molybdenum, 2 with tungsten, and 1 each with zinc and barium. The geographic distribution of these various specific projects by regions was as follows: 16 in southeastern Alaska, 5 in the Prince William Sound-Copper River region, 9 in the Cook Inlet-Alaska Railroad region, 3 in the Kuskokwim region, and 4 in the western Yukon-Seward Peninsula region. The 2 topographic projects that involved field work by the staff were reconnaissance surveys. One of these was the mapping of parts of the area adjacent to the Alaska Railroad west of Talkeetna and east of Seward, and the other was the mapping of parts of the western Yukon Valley that heretofore had not been adequately surveyed.

Although not involving field work by members of the Alaskan Branch, the compilation of aeronautical piloting maps from photographs furnished by the Army Air Forces and largely paid for from funds transferred by them to the Geological Survey became the principal office activity of the Branch, not only during the season of 1942 but throughout the fiscal year 1943 and is being continued at an accelerated rate with a greatly increased force. At the present time the services of more than 250 persons are being utilized in different steps of this project.

Another office task carried on uninterruptedly both in the season of 1942 and throughout the fiscal year 1943 is the collection of statistics regarding the output of all mineral products from Alaskan deposits. In this work a canvass of all the mining operators in the Territory is utilized as well as the services of the field force to contribute current information of value.

During the season of 1943, with the funds directly appropriated to the Geological Survey, as well as with those supplied by the War Production Board that were available up to June 30, 1943, the Branch had under way 6 general supervisory projects and 22 specific projects involving the search for needed war minerals. The 6 supervisory assignments, in addition to the task of maintaining administrative oversight of the various specific projects in the 5 principal Alaska mining regions, are designed to provide for keeping track of all mineral developments in each of the regions, so as to record current conditions and aid in preparing plans for any subsequent investigations that are required. Of the specific mineral projects, 6 are concerned primarily with ore deposits containing mercury, 4 with those containing copper, 3 with chromium or nickel, 2 each with tin, zinc, and tungsten, and 1 each with molybdenum, iron, and coal. The geographic distribution of these projects by regions is as follows: 5 in southeastern Alaska, 4 in the Prince William Sound-Copper River region, 4 in the Cook



Inlet-Alaska Railroad region, 5 in the Kuskokwim region and adjacent parts of southwestern Alaska, and 4 in the western Yukon-Seward Peninsula region. A technical and professional staff of approximately 40 geologists is employed for the field and office work involved in these different projects. During the field season more than a score of temporary helpers, such as cooks, packers, boatmen, or camp hands are hired to assist in the nontechnical but nevertheless essential phases of the work. To help in the office duties involved in maintaining the necessary records, typing reports, and handling correspondence, a staff of 7 clerks is employed.

During the fiscal year 1943, 6 reports with maps, 2 reports without maps, and 6 press releases have been published; 37 brief résumés on strategic and critical minerals investigations have been transmitted to war agencies; 7 reports containing maps and 1 map are in process of publication; 10 reports are in course of preparation; 7 résumés on strategic and critical minerals investigations are in course of preparation for submission to war agencies; and 4 reports prepared by the personnel of the Alaskan Branch were approved for outside publication.

### 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

The bulk of the work of the Topographic Branch consisted in carrying out a War Department program of mapping and producing maps of strategic areas. Necessary office work incidental to the field work was the computation and adjustment of the results of control surveys and the inking and editing of topographic maps prior to their submission for reproduction.

*Section of Computing.*—An unprecedented amount of transit traverse was done during the year in order to establish control for the many new strategic areas assigned by the War Department to the Geological Survey for topographic mapping. Of the total activity of the section the computing of the results of such surveys increased from the normal 12 percent to a little more than 50 percent.

Check computations for geographic positions were completed for 244 astronomic stations where prismatic astrolabe observations had been made by the Army Air Corps.

Bulletins 930-A, 930-B, and 930-C, which are three of the four parts of "Spirit leveling in Illinois," were published during the year. Manuscript for the fourth part, Bulletin 930-D, was prepared and transmitted for publication. Results of leveling, traverse, and triangulation for various quadrangle areas were issued in 176 lithographed lists.

Computation 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.*—Work in this section is performed in Washington and in field offices located in Clarendon, Va., and Chattanooga, Tenn. Photomapping is also carried on in Rolla, Mo., and in Sacramento, Calif., under the immediate direction of the division engineers in charge. The work consists of the production of topographic maps from aerial photographs by stereophotogrammetric methods; production of planimetric maps and planimetric bases for topographic field surveys by both stereophotogrammetric and graphic methods; preparation of designs, specifications, and contracts for photogrammetric equipment; preparation of requisitions and specifications for contracts for aerial photography; and purchase of photographs from other agencies.

By stereophotogrammetric and graphic methods topographic maps covering an area of approximately 5,750 square miles and planimetric maps and bases covering an area of approximately 14,250 square miles have been produced during the year. This does not include the work performed in the Chattanooga office, which is engaged on a cooperative project with the Tennessee Valley Authority and the United States Army. Twenty-four of the Geological Survey personnel are detailed to that office.

The Washington office maintains a general file of aerial photographs utilized in the work of the Geological Survey and of negatives of aerial photographs that have been purchased under contracts for photography negotiated by the Geological Survey since 1938. Through this office contacts have been maintained with other governmental agencies involved in aerial photographic work.

The principal office of the Section of Photomapping is in Clarendon, Va. In that office, in addition to the large production facilities which are being operated 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 stereophotogrammetric work, and a photographic laboratory spe-

cializing on research and precision photography required for all the field offices of the section.

*Section of Cartography.*—The Topographic Branch has cooperated with the Army Air Forces in preparing aeronautical charts, the work on which was executed in the Section of Cartography. Cooperation was also continued with the Public Roads Administration in preparing for publication and in proofreading 68 sheets of the Transportation Map of the United States, and 26 sheets are now in progress.

Work on the International Map of the World on the scale of 1:1,000,000 was continued. Sheet J-18, Chesapeake Bay, was published during the year, sheet K-16 is in course of publication, and sheets I-18, K-10, K-17, and L-10 are in progress.

Numerous miscellaneous jobs were done for other Government agencies.

*Section of Inspection and Editing.*—During the year 13 planimetric maps were prepared for photolithography; 240 new topographic maps were edited for publication, 160 of which were for multicolor photolithography and 80 for engraving; 573 quadrangle maps, 4 State maps, and 3 State index maps were prepared and edited for reprint editions; 29 maps were edited to furnish prints for reproduction by outside contractors; and editing was completed on 178 maps prepared as illustrations for reports. Four hundred and seventy-one proofs of all kinds were read. On June 30, maps in process of reproduction included 117 for engraving and 77 for multicolor photolithography; maps being edited or awaiting editing included 58 maps for engraving and 115 for multicolor photolithography. In Clarendon, Va., a drafting force was maintained for the drafting of maps for the Atlantic Division. •

#### 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. This office maintains extensive card-index and map files and is equipped to furnish data to Federal and State institutions and to an interested public. The war activity has greatly increased the work of this office.

#### FIELD SURVEYS

Topographic mapping was carried on in 30 States, the District of Columbia, and Puerto Rico. Cooperative projects were conducted in 17 of these States, in Puerto Rico, and with the Tennessee Valley Authority.



The mapping of 79 15-minute quadrangles and 149 7½-minute quadrangles was completed; mapping was in progress on 56 15-minute quadrangles and 115 7½-minute quadrangles; and work on 285 quadrangles is progressing in some one of the steps prior to actual mapping. Of the 228 quadrangles mapped and the 456 which are in progress, 582 are within the strategic area designated by the War Department. Of the 241 maps published, 160 are within this area.

Surveys for four special areas for the geologic investigation of strategic and critical minerals were completed, and work was in progress on five similar areas. The survey of the Olympic National Park in the State of Washington was begun, and the resurvey of Washington, D. C., and vicinity was completed.

Of the total area of the United States, 47.1 percent has now been covered by adequate topographic maps produced by the Geological Survey. As the economic use of maps increased, a demand for more detailed maps arose, and, consequently, 196,832 square miles, or 61½ percent of the entire area of the country has been remapped.

*Topographic mapping by the Geological Survey in the United States, Puerto Rico, and Hawaii, to June 30, 1943*

State	Area mapped during fiscal year 1943 for publication on standard scales, contour intervals from 5 to 50 feet (square miles)				Total area mapped to June 30, 1943 (square miles)	Per-centage of total area of State mapped to June 30, 1943	Control, fiscal year 1943		
	Field scale		New survey	Resurvey			Spirit levels (miles)	Trans- it traverse (miles)	Tri- angulation stations estab- lished
	1 to 24,000 or larger	1 to 48,000							
Alabama.....	50	882	633	299	25,842	50.1	103	83	-----
Arizona.....	-----	717	717	-----	33,195	29.1	179	-----	-----
Arkansas.....	392	242	242	392	24,609	46.3	86	27	3
California.....	324	1,594	1,730	188	132,176	83.3	34	-----	-----
Colorado.....	236	233	-----	469	58,156	55.8	-----	-----	-----
Connecticut.....	1,722	-----	-----	1,722	5,009	100.0	350	38	-----
Delaware.....	-----	-----	-----	-----	2,057	100.0	-----	-----	-----
District of Columbia.....	-----	-----	-----	-----	69	100.0	-----	-----	-----
Florida.....	657	-----	657	-----	9,114	15.6	457	116	-----
Georgia.....	271	(1)	-----	271	25,202	42.8	-----	-----	-----
Idaho.....	-----	-----	-----	-----	37,272	44.6	-----	-----	-----
Illinois.....	-----	743	737	6	44,313	78.6	-----	-----	-----
Indiana.....	480	-----	480	-----	7,496	20.7	284	290	-----
Iowa.....	-----	-----	-----	-----	14,233	25.3	-----	-----	-----
Kansas.....	-----	1,409	-----	409	65,852	80.0	323	-----	-----
Kentucky.....	-----	-----	-----	-----	27,559	68.2	-----	-----	-----
Louisiana.....	-----	1,828	1,828	-----	16,395	33.8	840	370	-----
Maine.....	-----	342	-----	342	25,764	77.6	249	911	-----
Maryland.....	-----	-----	-----	-----	10,577	100.0	-----	-----	-----
Massachusetts.....	1,324	-----	-----	1,324	8,257	100.0	186	454	-----
Michigan.....	609	-----	500	109	16,321	28.0	155	119	-----
Minnesota.....	-----	-----	-----	-----	9,542	11.4	-----	-----	-----
Mississippi.....	-----	-----	-----	-----	8,997	18.9	-----	-----	-----
Missouri.....	-----	1,725	1,020	705	59,935	86.0	931	119	-----
Montana.....	-----	76	76	-----	38,904	26.4	-----	-----	-----

*Topographic mapping by the Geological Survey in the United States, Puerto Rico, and Hawaii, to June 30, 1943—Continued*

State	Area mapped during fiscal year 1943 for publication on standard scales, contour intervals from 5 to 50 feet (square miles)				Total area mapped to June 30, 1943 (square miles)	Percentage of total area of State mapped to June 30, 1943	Control, fiscal year 1943		
	Field scale		New survey	Resurvey			Spirit levels (miles)	Transit traverse (miles)	Triangulation stations established
	1 to 24,000 or larger	1 to 48,000							
Nebraska.....					28, 225	36. 5			
Nevada.....					43, 543	39. 4			
New Hampshire.....	40	165		205	9, 304	100. 0			2
New Jersey.....					7, 836	100. 0			
New Mexico.....		504	504		36, 156	29. 7			
New York.....	188	74		262	49, 576	100. 0	3, 225	3, 123	
North Carolina.....					19, 574	37. 1			
North Dakota.....					16, 115	22. 8			
Ohio.....					41, 222	100. 0			
Oklahoma.....		244	244		41, 586	59. 5	148		
Oregon.....		1, 448	820	628	35, 421	36. 5	188		10
Pennsylvania.....	57	221	221	57	42, 302	93. 3	1, 719	818	
Rhode Island.....	516			516	1, 214	100. 0			
South Carolina.....					15, 772	50. 8			
South Dakota.....					20, 750	26. 9			
Tennessee.....					23, 998	56. 8			
Texas.....		464	464		92, 482	34. 6	97		
Utah.....					20, 119	23. 7			
Vermont.....	5	82	82	5	9, 258	96. 3	945	836	
Virginia.....		568		568	38, 097	93. 3	34	183	
Washington.....		1, 060	219	841	43, 726	64. 1	148		31
West Virginia.....					24, 181	100. 0	22	17	
Wisconsin.....		( <sup>1</sup> )			20, 273	36. 1		532	15
Wyoming.....	47		38	9	35, 360	36. 1	62		13
Total.....	6, 918	13, 621	11, 212	9, 327	1, 422, 936	47. 1	10, 765	8, 041	74
Hawaii.....					6, 435	100. 0			
Puerto Rico.....	<sup>2</sup> 956		956		1, 969	57. 3			10

<sup>1</sup> Planimetric maps, not included in total surveys, were compiled from aerial photographs with field examination—Georgia, 525; Kansas, 119; and Wisconsin, 974 square miles.  
<sup>2</sup> Contour interval in meters.

## WATER RESOURCES BRANCH

Water enters in countless ways into man's activities; in all it is important, in some it is controlling. In time of floods, however, it is a source of damage to property and danger to life. Reliable information on water is therefore necessary for the effective adaptation of man's activities to its availability.

The Geological Survey is the Federal agency authorized to collect and publish essential facts about the quantity, chemical quality, availability, and best methods of utilizing the water resources of the Nation. Its reports constitute a great reservoir of reliable information with respect to those resources. They are used by planners in organizing projects; by engineers in evaluating projects and in designing and

building structures; by operators of water-supply, irrigation, power, and other water-using systems; by bankers in financing developments and in protecting the integrity of stocks and bonds and the security of investments; by lawyers in litigating rights and damages; and by courts in arriving at equities. The information contained in the Survey's water reports is, therefore, intimately related to the lives, activities, and security of the general public.

Funds aggregating more than \$3,000,000 were available for water-resources investigations during the fiscal year 1943. Of that amount about 43 percent was appropriated by Congress, about 33 percent was contributed by States and municipalities, and about 24 percent was transferred or reimbursed by other Federal agencies.

### COOPERATION WITH STATES AND MUNICIPALITIES

The appropriation by Congress for studies of water during the fiscal year 1943 was \$1,298,800. Of that appropriation \$975,000 was restricted for use in cooperation with States and municipalities, but the 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:

<i>State</i>	<i>Contribution</i>	<i>State</i>	<i>Contribution</i>	<i>State</i>	<i>Contribution</i>
Alabama.....	\$10,625	Maryland.....	\$11,725	Oregon.....	\$25,725
Arizona.....	21,900	Massachusetts.....	14,250	Pennsylvania.....	23,975
Arkansas.....	10,750	Michigan.....	18,250	Rhode Island.....	1,750
California.....	71,920	Minnesota.....	12,550	South Carolina.....	5,450
Colorado.....	33,300	Mississippi.....	15,000	South Dakota.....	400
Connecticut.....	9,650	Missouri.....	12,120	Tennessee.....	8,600
Delaware.....	300	Montana.....	18,960	Texas.....	74,472
Florida.....	39,225	Nebraska.....	25,000	Utah.....	25,950
Georgia.....	15,000	Nevada.....	1,500	Vermont.....	4,760
Idaho.....	25,725	New Hampshire.....	10,575	Virginia.....	28,616
Illinois.....	15,150	New Jersey.....	21,600	Washington.....	27,203
Indiana.....	14,379	New Mexico.....	38,650	West Virginia.....	8,590
Iowa.....	21,725	New York.....	68,761	Wisconsin.....	8,163
Kansas.....	34,705	North Carolina.....	21,060	Wyoming.....	17,175
Kentucky.....	10,050	North Dakota.....	5,090	Hawaii.....	35,602
Louisiana.....	18,000	Ohio.....	18,480		
Maine.....	7,500	Oklahoma.....	18,030		

### 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 Depart-



ment; 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, Bureau of Mines, Office of Indian Affairs, Office of Land Utilization, and Bonneville Power Administration, Department of the Interior; Department of State; Federal Power Commission; and Federal Works Agency.

### WAR SERVICE

Important as are the Survey activities with respect to water in peacetime, they are even more important in war. Authoritative information on the quantity and quality of available water has been sought during the initial period of planning and construction and is still being sought in connection with the selection of sites for military establishments, the erection of new industrial plants and enlargement of old plants engaged on war contracts, and the operation of all. In addition to the broad general use that has been made of the published reports, the Survey has made during the year more than 4,000 special war reports related to water, about 1,600 in the first 6 months and about 2,400 in the second 6 months. These reports were made to the War and Navy Departments, the War Production Board, industrialists and engineers employed on war contracts, and other miscellaneous Federal, State, municipal, and industrial agencies. They have related to water for cantonments, naval stations, military hospitals, training fields, air fields, munitions industries, manufacturing plants, hydraulic and steam power plants, emergency housing, increased municipal supplies, irrigation expansions for increasing the production of foods, inland-waterway navigation, flood protection, supplemental supplies during droughts, and emergency supplies provided to supplement regular supplies if those should be damaged by bombings. The reports have been concerned with the quantity, chemical quality, and availability of both surface water and ground water. They were based in part on information collected in previous years and in part on the results of special investigations made in regions where information was meager, or where possible deficiencies in quantity or doubtful quality of water appeared to be most threatening, where heavy pumping for war purposes had caused local depletions of ground water, or where there appeared to be danger of salt-water encroachment. They have been made in every State and in the Territories of Alaska and Hawaii, but have been of greatest intensity in the industrial regions of the East, South, and far West.

The speed and effectiveness of this special war service have been greatly promoted by the wide distribution over the country of the Survey's professional personnel, with headquarters in nearly 100 field offices. It has thus been possible in any region to make easily and quickly available the services of specialists on water who are well informed on local conditions and problems. The war services have been promoted also by the cooperation with States and municipalities, whose officials have made freely available the services of their personnel and the information contained in their files and in their published and unpublished records. This pooling of Federal and local resources and efforts has demonstrated to an extent not previously recognized the value of the programs of cooperation in time of National emergency.

### CONTINUING ACTIVITIES RELATED TO BOTH WAR AND PEACE

The operations of the Geological Survey that are related to water 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 recurring 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 transfers from other Federal agencies. The field records are analyzed and released to the public and to the cooperating agencies 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 150 State and municipal agencies, the personnel operating from 45 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 artificial replenishment; their availability and adequacy for domestic, industrial, irrigation, and public supplies, and as watering places for livestock and desert travelers; 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 27 field offices were in progress during the year in nearly every State. In 34 States and in Hawaii the work was done in cooperation with 56 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 2,830 samples of water were made in the water-resources laboratory in Washington and of 5,263 samples in the division laboratories in Miami, Fla., Albuquerque, and Roswell, N. Mex., and Austin, Tex. Many of the samples were collected in connection with studies of water supplies for Army and Navy establishments and for munition plants and housing developments. Cooperative studies were continued on the chemical character of surface waters 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 17 bureaus in 6 Federal Departments and to 10 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. Among the important problems studied have been the international aspects of storage above the Grand Coulee Dam and in Kootenai Lake, both related directly to the production of power for war.

### CONSERVATION BRANCH

The principal functions of the Conservation Branch are (1) making surveys and investigations of the water and mineral resources of the



public domain and applying the results of such investigations to the problems of public-land administration and (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. During the present emergency these functions have been enhanced and extended beyond the proportions attained in times of peace. Exploitation and utilization of the natural resources of the United States have been and will continue to be accelerated for the duration of the emergency in order to meet the war needs for critical minerals, chemicals, fuels, lubricants, and water power, with a minimum dependence upon imports. The Conservation Branch, therefore, has given particular attention during 1943 to the location, availability, and extent of such supplies under Federal control and has directed its energies, subsequent to December 7, 1941, toward increasing the contribution of public-land resources to the war program.

#### CLASSIFICATION OF LANDS

*Mineral classification.*—As consultant and adviser in geology to certain Federal agencies, primarily those bureaus and offices in the Interior Department concerned with the administration of Federal, public, and Indian lands, the Mineral Classification Division continued during the fiscal year its vital function of supplying geologic findings and decisions that are prerequisite to the issuance or transfer of prospecting, development, and production rights pertaining to such lands under the mineral-leasing laws; to the determination of areas for unitization agreements for oil and gas holdings and pertinent participating areas; to the utilization of Federal lands for right-of-way purposes; and to the issuance of patents to States and individuals in the final disposal of such lands under the nonmineral-land laws.

In all, 7,900 cases, each involving from one to many geologic determinations, were acted on. Additional office activity included the preparation, revision, or cancelation of definitions of the known geologic structure of four producing oil and gas fields, the total net area so defined in nine public-land States being 1,691,617 acres at the end of the fiscal year.

In aid of mineral classification, investigations were made of geologic conditions relating to coal, oil, and gas in Colorado, Montana, New Mexico, Oklahoma, South Dakota, Utah, and Wyoming and of geologic conditions at one dam site in Washington.

*Water and power classification.*—The work of obtaining basic information concerning the water-power resources and storage possibilities of Federal lands and of making such information available for use in the administration of the public-land laws was continued throughout the fiscal year. Office activity resulted in the addition of 21,288 acres to power-site reserves and the elimination of 1,602 acres therefrom, with net increase of the outstanding reserves in 22 States and Alaska to 6,635,432 acres; in final action involving hydraulic determinations on 170 cases received for report from departmental sources and the Federal Power Commission; and in water-power classification on 2,522 cases, which also involved mineral classification. Reservoir site reserves in 9 States remained unchanged at 137,172 acres. One final and two preliminary mimeographed reports and one manuscript report were prepared on stream utilization.

In the field, operations were on a reduced scale because of war conditions. Topographic surveys were made of 20 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 163 power projects under license from the Federal Power Commission, to 179 such projects under permit and grant from the Department of the Interior, and to 151 in cooperation with the Office of Indian Affairs.

#### MINERAL LEASE SUPERVISION

*Mine supervision.*—The Mining Division is charged with the supervision of mining operations for the discovery and production of coal, potassium, sodium, phosphate, and oil shale in public lands; of sulfur in public lands in New Mexico and Louisiana; of gold, silver, and mercury in certain land grants; of all minerals except oil and gas in tribal and restricted-allotted Indian lands; and with the supervision of production on public lands by the Metals Reserve Co. under authorization of the Secretary of the Interior. It also serves as consultant to the Department of Agriculture on mining leases under the jurisdiction of that Department. The supervisory work was directed from 7 field offices in the western United States and Alaska and on June 30, 1943, covered 700 public-land properties under lease, prospecting permit, or license in 15 States and Alaska, 268 Indian properties under lease and permit in 14 States, and 3 Secretarial authorizations in 3 States, with an estimated value of production of approximately \$45,000,000.

In response to war demands for fuel, fertilizers, and strategic minerals, there has been a substantial increase in the production of coal, sodium, potassium salts, and phosphate rock from public-land proper-

ties under supervision of the Mining Division, and accrued revenues are correspondingly higher. The search for potash and associated magnesium and aluminum was intensified. The issuance of Order No. 1829 by the Secretary of the Interior on June 9 removed an 8-year restrictive order on the granting of potash prospecting permits and leases, and a further increase in prospecting is anticipated during 1944.

On Indian land mining activity was responsive to the same economic forces and resulted during the year in the working of substantially lower-grade lead and zinc ores, a considerable increase in the production of coal and vanadium, and in prospecting with a view to further development of known deposits of vanadium, uranium, tungsten, and copper.

Information and assistance on war-engendered problems relating to sources of coal for fuel, coke, resins, and as a supplemental source of liquid fuels, and of numerous metalliferous and industrial minerals in various parts of the country were provided by engineers of the division to numerous individuals contemplating development and to representatives of various State and Federal agencies.

*Oil and gas supervision.*—The Oil- and Gas-Leasing Division is charged with supervisory duties analogous to those of the Mining Division. They include 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 1943 the inspectional, regulatory, and accountancy duties of supervision were discharged through 19 field offices and suboffices in California, Colorado, Montana, New Mexico, Oklahoma, Utah, and Wyoming.

Petroleum and its derivatives are of vital importance to the successful prosecution of the war. By reason of heavy war-induced demands upon the productive capacity of known petroleum reserves in this country and an alarming reduction in the number of discoveries of new reserves, the military and certain Federal establishments have urged prompt remedial efforts. The petroleum industry has made a gratifying response and has instituted a widespread prospecting and development program designed to relieve the critical situation in the shortest possible time, with due regard for the use of equally vital materials. This accelerated program has been reflected in increased activities on federally supervised oil and gas properties which currently contain about 7 percent of the known petroleum reserves in the United States and from which are extracted annually about 5 percent



of the crude oil produced in the United States. Enhanced consultive activity and accelerated individual field studies and investigations, particularly those dealing with secondary recovery methods, all designed to augment the contribution of federally supervised oil and gas resources to the war program, may reasonably be expected to increase those percentages during the ensuing few years.

On public lands the number of properties under supervision at the end of the fiscal year aggregated 4,472 and involved 2,819,314 acres in 19 States and Alaska.

Drilling on public lands during the year included the spudding of 387 wells and the completion of 413 wells, of which 315 were productive of oil or gas and 98 were barren. In all, 10,532 public-land wells, including 5,601 capable of oil and gas production, were under supervision on June 30, 1943. The production of natural gas and gasoline from public lands during 1943 was somewhat less and the production of crude oil was somewhat greater than during 1942.

During the year 10 new plans of unit operation involving public lands were approved and 4 were terminated, leaving 123 approved plans, containing 1,862,337 acres, outstanding on June 30, 1943. Production under approved unit agreements constituted about 49 percent of the petroleum, 61 percent of the natural gas, and 76 percent of the gasoline and butane obtained from public lands during the year.

On Indian lands the Oil- and Gas-Leasing Division supervised 4,221 leaseholds in 8 States, containing at the end of the year a total of 7,522 wells, 4,036 of which were productive of oil or gas and 122 of which had been completed during the year. Production from such leaseholds was somewhat greater than in the preceding year, owing principally to a substantial increase from Otoe Indian lands in Oklahoma. The discovery and development of valuable helium-bearing natural gas on Navajo lands in New Mexico provided an outstanding contribution to the war program. Rentals, royalties, and bonuses accrued from operations on Indian land during the fiscal year are estimated to aggregate \$2,607,000.

On behalf of the Navy Department supervision was continued in 1943 over operations for the production of oil, gas, gasoline, and butane from 18 properties under lease in Naval Petroleum Reserves Nos. 1 and 2 in California and for the conservation of shut-in production in Reserve No. 3 in Wyoming. Production from 300 active wells on Reserves Nos. 1 and 2 aggregated 2,269,735 barrels of petroleum, 1,619,390,000 cubic feet of natural gas, and 7,964,900 gallons of natural gasoline and butane, the aggregate royalty value being \$492,748.

## WORK ON PUBLICATIONS

*Texts.*—The publications issued during the year numbered 94, including 76 reports in the regular series and 18 miscellaneous pamphlets, a total of 14,299 pages; 68 new manuscripts were received, and 65 were sent to the printer. Work on publications included the following: 12,563 pages of manuscript edited and prepared for printing; 939 galley proofs and 4,983 page proofs revised and returned; indexes prepared for 27 publications, covering 2,013 pages and consisting of 6,218 index entries. Copy prepared for mimeographing included 78 press releases, comprising 139 pages, and 165 pages of miscellaneous material.

*Illustrations.*—Twenty-four reports containing 320 illustrations were transmitted to the printer; of these, 9 reports with 38 maps and 8 sections were directly related to the war effort. In addition, 119 maps and 34 sections illustrating deposits of essential strategic minerals were prepared, and 263 proofs and 97 edition prints were examined.

*Geologic map editing and drafting.*—In order to make the results of its studies quickly available to public, the Geological Survey has from time to time prepared photostat copies of the geologic maps of areas containing minerals of war interest. These maps have been announced through press releases. Copy was edited for 23 maps to be photostated and for maps to be used in 26 printed reports of the regular series of publications.

*Distribution.*—The Division of Distribution received during the year a total of 858 publications, comprising 81 new books and pamphlets, 253 new or revised topographic and other maps, of which 12 maps were first published as preliminary editions, 44 Tennessee Valley Authority maps with contours, 409 reprinted topographic and other maps, 37 new advance sheets, and 34 reprinted advance sheets. The total units of all publications received numbered 149,289 books and pamphlets and 1,911,495 topographic and other maps, a grand total of 2,060,784. The division distributed 99,798 books and pamphlets, 883 geologic folios, and 910,021 maps, a grand total of 1,010,702, of which 800 folios and 805,502 maps were sold. The net proceeds (gross collections less copying fees and amounts refunded) from the sales of publications were \$16,056.72, including \$15,824.87 for topographic and geologic maps, and \$231.85 for geologic folios. In addition to this, \$38,525.91 was repaid by other establishments of the Federal Government at whose request maps or folios were furnished. The total net receipts, therefore, were \$54,582.63. The foregoing figures are exclusive of 486,965 Geological Survey maps delivered from the Division

of Engraving and Printing direct to the War Department on a repay basis.

*Engraving and Printing.*—During the year 253 new maps were printed and delivered. These consisted of 83 newly engraved topographic maps (including 3 revised maps), 160 multicolor topographic maps (12 of which were originally printed as preliminary editions), and 10 special maps. Reprint editions of 396 engraved topographic maps of 13 photolithographed State and other maps were printed and delivered. Of new and reprinted maps, 662 different editions, amounting to 1,835,165 copies, were delivered. A large amount of work was done for 85 other units of the Government, including branches of the Geological Survey, and the charges for it amounted to about \$190,000, for which the appropriation for engraving and printing geologic and topographic maps was reimbursed. Transfer impressions and velox prints, numbering 523, were made during the year, and the amount turned over to miscellaneous receipts was \$216.73. Topographic maps and contract and miscellaneous work of all kinds, totaling 3,156,063 copies, were printed and delivered. The photographic laboratory made 12,923 negatives, 27,912 prints, 2,810 photolith press plates, 260 intaglio etchings, and 6 celluloid transfers, and mounted 1,741 prints.

## LIBRARY

The first full year of participation in the war was strongly reflected in the work of the Library. In addition to assisting the Survey, especially in its work on military geology, the Library has been serving directly the War and Navy Departments, the War Production Board, the Board of Economic Warfare, and all the agencies whose work requires source material in natural resources, geology, or engineering. A total of 13,526 readers used the Library during the fiscal year, double the number normally served. More than 75,000 pieces of material were circulated, almost double that of a normal year and 20,000 more than last year's total of nearly 56,000, itself a record. Acquisitions again were below normal. Not only have most of the foreign publications been cut off, but some American publications have been suspended or curtailed. The bibliography and index of North American geology, 1940-41, was received from the printer in April. The cumulative index, 1929-39, has been sent to the printer.

## FIELD EQUIPMENT

A large number of the instruments used for war activities by the several branches of the Geological Survey are designed, constructed,



and repaired by the Division of Field Equipment. Many improvements have been made, especially in the mechanical devices used to produce trimetrogon maps from aerial photographs for the Air Corps. A new device, called an angulator, has been designed and constructed to further facilitate such work. The angulator performs functions similar to those of the rectoblique plotter but has fewer limitations in that it permits the use of photographs taken at practically any angle with the horizon by cameras having various focal lengths. The problems of administration, relief work, reconstruction, and pioneering that follow every war invariably carry with them an immediate need for dependable maps of the areas involved. Areas in interior Alaska, Canada, Russia, China, and Africa are particularly deficient in adequate maps. The mechanical devices constructed by this division for use in connection with the trimetrogon mapping method offer a rapid practicable means for reconnaissance mapping of combat and strategic areas and for making the reconnaissance maps that will be urgently needed in the early post-war period. Improvements have also been made in the design and construction of isometrographs, which are used by geologists for the semimechanical conversion of topographic maps into relief diagrams that provide pictorial representations of land surfaces. This equipment may also serve valuable purposes during the post-war period, as its use speeds the work of searching for new sources of metals, minerals, and other valuable natural resources, the present supplies of which are now being rapidly depleted.

## FUNDS

During the fiscal year 1943 there was available for expenditure under the direction of the Geological Survey a total of \$11,129,028. Of this amount \$4,699,390 was appropriated directly to the Geological Survey, and \$6,429,638 was made available by other Federal agencies, and by States and their political subdivisions. In addition, \$9,104 was allotted from the appropriation for contingent expenses of the Department of the Interior for miscellaneous supplies.

### *Funds available to the Geological Survey in 1943 from all sources*

General administrative salaries:

Interior Department Appropriation Act.....	\$181, 625	
Urgency Deficiency Appropriation Act.....	8, 300	
		\$189, 925

Topographic surveys:

Interior Department Appropriation Act-----	\$689,030
States, counties, and municipalities-----	337,279
War Department-----	2,199,124
Tennessee Valley Authority-----	76,900
Public Roads Administration-----	56,493
Miscellaneous repay-----	59,787
	<hr/> \$3,418,613

Geologic surveys:

Interior Department Appropriation Act-----	961,485
States, counties, and municipalities-----	40,090
Bureau of Mines-----	115,000
Board of Economic Warfare-----	20,090
War Department-----	30,000
Miscellaneous repay-----	8,151
	<hr/> 1,174,726

Strategic and critical minerals:

Interior Department Appropriation Act-----	644,580
State Department (for work in other American Republics)-----	96,500
	<hr/> 741,080

Mineral Resources of Alaska:

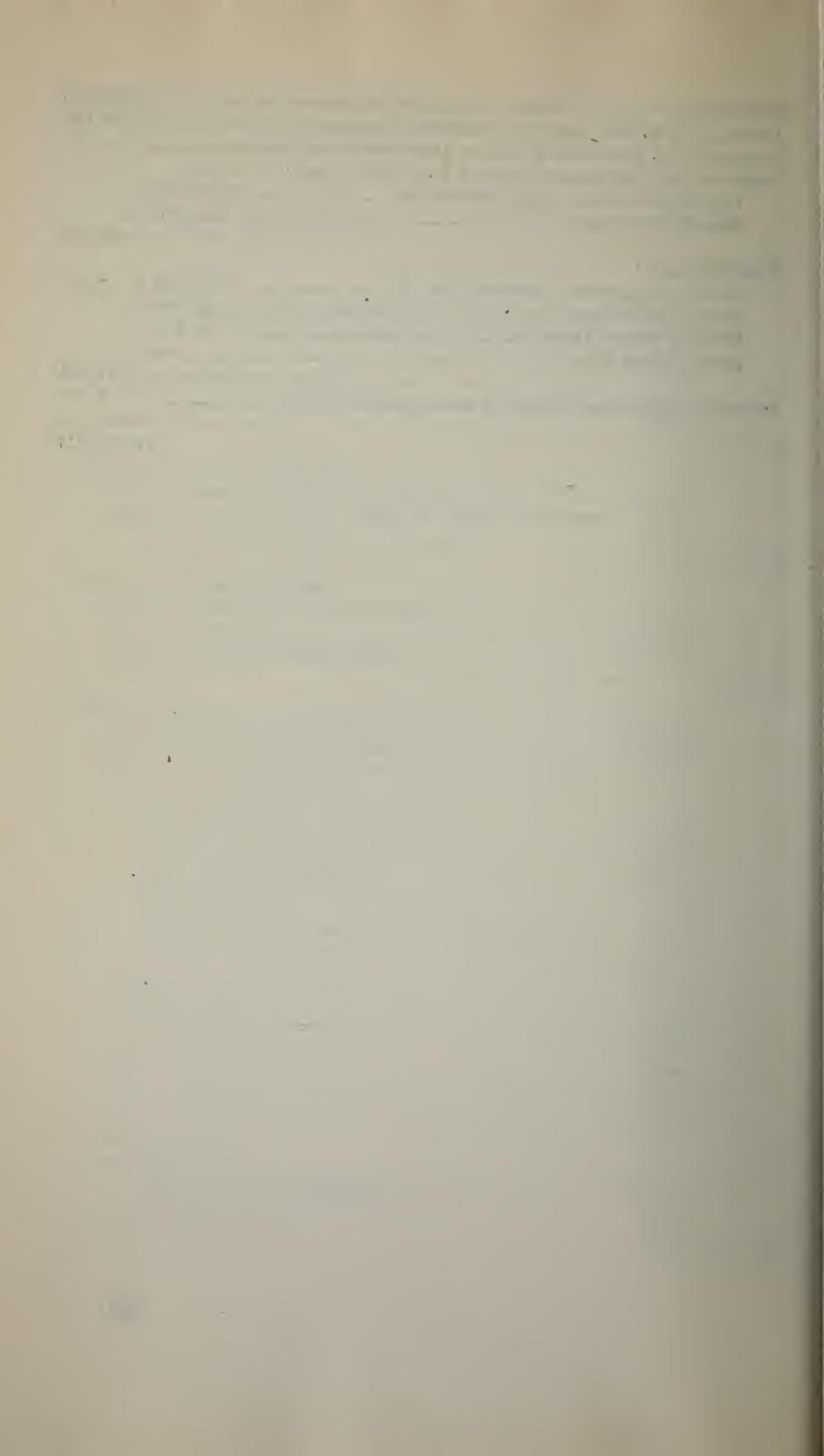
Interior Department Appropriation Act-----	75,635
War Department-----	1,010,480
Office for Emergency Management-----	163,241
	<hr/> 1,249,349

Gaging streams:

Interior Department Appropriation Act-----	1,308,930
States, counties and municipalities-----	1,038,445
Permittees and licensees of Federal Power Commission Department of the Interior:	25,059
Bonneville Power Administration-----	500
Fish and Wildlife Service-----	2,200
Office of Indian Affairs-----	8,463
Office of Land Utilization-----	11,500
Bureau of Mines-----	35
National Park Service-----	350
Bureau of Reclamation-----	9,317
Department of Agriculture-----	22,075
Commerce Department-----	20
Federal Power Commission-----	195
Defense Plant Corporation-----	12,500
Federal Works Agency-----	9,297
Navy Department-----	2,158
State Department-----	48,353
Tennessee Valley Authority-----	57,000
War Department:	
Office of Chief of Engineers-----	644,836
Mississippi River Commission-----	4,975
War Production Board-----	12,951
	<hr/> 3,219,159

Classification of lands, Interior Department Appropriation Act-----	\$105, 115
Printing and binding, Interior Department Appropriation Act-----	100, 000
Preparation of illustrations, Interior Department Appropriation Act--	25, 570
Engraving and printing geologic and topographic maps:	
Interior Department Appropriation Act-----	\$246, 370
Miscellaneous repay-----	179, 667
	<hr/>
	426, 037
Mineral leasing:	
Interior Department Appropriation Act-----	352, 750
Navy Department-----	35, 000
Office of Indian Affairs-----	90, 000
Miscellaneous repay-----	91
	<hr/>
	477, 841
Payment from proceeds of sale of water, special account-----	1, 613
	<hr/>
	11, 129, 028





# Bureau of Reclamation

HARRY W. BASHORE, Acting Commissioner <sup>1</sup>

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**T**HE spotlight of war retained a sharp focus during the fiscal year 1943 on two major fields of production—food and power. In both, the activities of the Bureau of Reclamation in the western third of the Nation played a major role.

The productive farms served by its irrigation facilities provided bountiful food crops to a hard-driving, fighting Nation. At the same time the Bureau's mighty hydroelectric generators sent an ever-growing stream of kilowatts into war production plants and projects.

In the early days of the war one of the greatest single tasks confronting the United States was to overcome Axis superiority in the production of planes, tanks, ships, and guns. Toward this objective the Bureau offered great blocks of power. The far-sighted policy which was exemplified in the construction of Boulder, Grand Coulee, and Parker Dams in time of peace to keep ahead of the inevitable growth of the West, paid immediate dividends as the Nation prepared for war. Reclamation's pre-Pearl Harbor installations were doubled by June 30, 1943. Generators rated at 900,000 kilowatts were added, most of them 2 to 10 years ahead of schedule. The potential output from the new capacity is sufficient to manufacture the aluminum to build more than 30,000 giant four-motored bombers annually.

Major attention also was directed toward measures to augment food stocks which were required to meet the increased demands of the armed forces, lend-lease countries, liberated peoples across the seas, and civilians at home.

The Bureau of Reclamation anticipated the wartime need for more food and was prepared to bring about increased food production to

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<sup>1</sup>Mr. Bashore, Assistant Commissioner of Reclamation since May 27, 1939, was appointed Commissioner by President Roosevelt and took office on August 3, 1943. William E. Warne, former Chief of Information of the Bureau, was appointed Assistant Commissioner by the Secretary of the Interior at the same time and entered on his duties on August 9. Due to ill health, John Chatfield Page, Commissioner of Reclamation since January 25, 1937, resigned his position in June.

meet an emergency as critical as the earlier need for increased hydroelectric power. From the nearly 4,000,000 acres of irrigated land served by Reclamation systems in 15 western states came large supplies of vital foods—beans, potatoes, sugar, fruits, and other commodities equally important. The output for the calendar year 1942 was valued at more than a quarter of a billion dollars, 45 percent greater than the record crop return for 1941.

For the 1943 season Reclamation farmers diverted their efforts from the less essential to the more important war crops. This "win the war" spirit resulted in record spring plantings of potatoes, beans, and alfalfa (for beef and dairy herds), the harvest of which is expected to exceed the high 1942 production total.

The Bureau's war food construction program to extend its irrigation service to nearly 2,000,000 additional acres by 1945 was given impetus toward the close of the year by congressional recommendations. The Senate and House Appropriations Committees urged the War Production Board, which controls construction, to reexamine stop-orders which that agency had issued against irrigation construction late in 1942 in order to divert critical materials to other war purposes. The objective was to obtain authorization to resume work on 19 projects and to initiate construction on others. Appropriations were made to advance the program.

The War Food Administration, which has the responsibility for food production, specifically recommended to the War Production Board that irrigation construction on eight Bureau projects, affecting about 900,000 acres, be permitted. Up to June 30 clearances had been given by the Board on projects serving 278,000 acres.

The power made available in the fiscal year from two new plants brought into operation and from additional generators at other major projects was responsible for much of the West's continued expansion in war production. With a 35 percent increase in capacity and a 100 percent gain in output, Reclamation plants supplied power to industries which produce aluminum and magnesium, airplanes, ships, ferro-alloys for tanks, explosives and manganese, and which process foods, and provide other materials vital to the prosecution of the war.

The output of Bureau power plants this fiscal year was 9½ billion kilowatt-hours. Additional installations in progress on June 30 indicate a production in the next fiscal year of 15 to 16 billion kilowatt-hours—a volume greater than was produced by all power plants in the United States in 1914.

Bureau facilities provided industrial water for war industries and municipal water for the civilian and military population of the Los



Angeles area and other western centers. This service also was an effective aid toward greater war output.

Through irrigation, power, or municipal water service, nearly all of the 52 Reclamation projects in operation facilitated war activities at such important points as Army and Navy military posts, air bases and training centers, and war production plants. Nearly 5,000,000 persons, a third of the population of the West, live in the areas which are served by the Bureau's systems.

While concentrating on war activities, the Bureau continued its investigation of the feasibility of irrigation and multiple-purpose projects which will be added to a shelf of post-war public works. The construction of these projects will provide local and regional employment and contribute to national post-war industrial activity. When completed, these projects will provide permanent settlement opportunities on irrigated land for demobilized service men and industrial workers.

The Bureau of Reclamation has as its objective the conservation of the limited water resources of the West for irrigation, power development, domestic and industrial water supply, and for other beneficial uses. Under the Reclamation Act of 1902, the Bureau's activities are confined to the 17 states west of, or bisected by, the 100th meridian. Except for a narrow strip on the Pacific coast, north of San Francisco, and in the high mountains, the rainfall in this region is inadequate, and irrigation is necessary to sustain agriculture. While coal, oil, and gas as fuel for power plants are available in some areas, the principal reliance is on hydroelectric developments for war and peacetime industries, and for military, commercial, domestic, and rural needs.

#### FIVE MILLION PERSONS IN AREA SERVED

Of the nearly 5 million persons who live in the areas which are served by the facilities provided by the Bureau of Reclamation in 15 western states, more than 3½ million were supplied power and domestic water, and 1,197,880 lived on the 88,050 farms which are served by the irrigation projects or in the 316 towns on or near these developments. In the irrigation areas served were 1,187 schools, 1,484 churches, and 137 banks with deposits totaling \$520,357,000 (see table 3).

At the end of the fiscal year 71 projects were in operation, under construction, or authorized. Fifty-two of this number were generating power or supplying water for irrigation or for domestic, military, or industrial use. Important features remain to be constructed on many of the projects that are in operation. Nine others are in vary-

ing stages of construction. Also authorized are nine projects on which the initiation of work was deferred at the beginning of the war. One project, authorized at the close of the fiscal year, is scheduled for early construction.

The storage capacity of 81 reservoirs in operation reached a new high of more than 64 million acre-feet, about 20,000 billion gallons. The 151-mile long lake behind Grand Coulee Dam (Columbia Basin project, Washington) reached capacity for the first time on July 12, 1942.

Cumulative crop values for the 41 years of operation have passed the 3 billion dollar mark (see table 2). The amount is more than four times the construction costs through June 30 (see table 5).

Under the Reclamation Act and amendments, and other legislation, more than 95 percent of the construction costs of projects is reimbursable. The remainder is allocated to flood control, aid to navigation, contributed labor, or will be repayable by municipalities for supplemental water supplies.

#### FOOD ASSUMES INCREASED SIGNIFICANCE

Long before the necessity for expanding the Nation's agricultural plant for war purposes was given the proper emphasis, the Bureau was reappraising its facilities and construction program to determine what contributions it could make toward increasing food production. The Bureau recognized that through construction of additional irrigation systems new lands could be brought into cultivation promptly and supplemental water could be provided for irrigated areas where water shortages were curtailing crop production.

The Bureau was also fully aware that because of the increased demand for food in the Far West due to war conditions it was doubly essential to expand irrigated agriculture in the arid and semiarid regions. This demand resulted from military concentrations, the growing civilian population, lend-lease requirements, and overseas shipments to the armed forces in the Western Pacific. Dependent on irrigation for 75 percent of its food and never self-sufficient in dairy products and meat, the West faced a critical situation. Added imports from the Middle West and East further taxed transportation facilities already overburdened with movements of troops and materials.

In March 1942, the Bureau proposed an accelerated program for expanding existing and developing new water supplies which called for a speed-up of work on projects under construction. It also included the initiation of new undertakings. The program would have made more water available for food production in 1943, 1944, and 1945.

Through the summer of 1942, the Bureau continued construction on 25 projects insofar as critical materials were available. The restricted construction came to a virtual standstill, except for power installations on five projects, following a sweeping stop-construction order which was issued by the War Production Board late in 1942. Subsequently limited construction of certain facilities was permitted on 12 irrigation and municipal water projects.

Alive to the increasing food requirements in the winter of 1942-43, the Bureau presented a second accelerated program under which, by 1945, the irrigated acreage it serves could be increased by 75 percent. The lands benefited were to be devoted primarily to the production of beans, potatoes, and alfalfa for livestock feed—critical war foods.

In March, the Secretary of the Interior announced a departmental food program under which the Bureau could extend irrigation service to a total of 9,000,000 acres in 5 years. Under this program, the output from irrigated land of some of the more important war crops could be doubled by 1947. The achievement of the results under these programs depended on immediate clearance for critical materials, adequate funds, and manpower. As a result of delays in obtaining these prerequisites, a revised program was outlined in June 1943 under which irrigation service could be extended to 2,000,000 additional acres by 1945. This program included resumption of construction on 19 projects on which work had been halted by stop-construction orders and initiating construction on a large number of new projects. Emphasis, as in the previous programs, was placed on those which could be begun quickly and which would require a minimum of critical materials.

Acting to get the projects approved and construction started, the Bureau presented detailed information on each to the War Food Administration which had the authority to recommend irrigation construction to the War Production Board.

At the close of the year, the War Food Administration had recommended for wartime construction eight projects proposed by the Bureau of Reclamation, as follows:

Colorado.....	Colorado-Big Thompson and Mancos. <sup>2</sup>
Idaho.....	Anderson Ranch Dam (Boise).
California.....	Central Valley (Friant Dam, Madera and Friant-Kern Canals).
Oregon-Calif.....	Klamath-Modoc. <sup>2</sup>
South Dakota.....	Rapid Valley. <sup>2</sup>
Utah.....	Newton. <sup>2</sup>
Washington.....	Yakima-Roza. <sup>2</sup>

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<sup>2</sup> War Production Board approved resumption of construction on July 27, 1943.



Of these, Friant Dam and the Madera Canal of the Central Valley project had been given clearance by the War Production Board on June 30 and the remainder were under consideration. Construction to protect the Yuma (Arizona) air base from dust storms had previously been authorized on the Gila project. Clearance had also been given on Scofield Dam in Utah primarily as a flood control measure. Both projects will aid in food production.

The Bureau personnel encouraged a shift from less essential to the more important war crops. As of June 30, 1943, reports of actual and estimated plantings received from 26 projects, comprising 82 percent of the total acreage of all projects, showed a 44.5 percent increase in potato acreage, a 36.2 percent increase in bean acreage, and a 1.8 percent increase in alfalfa acreage. The production of alfalfa, fed to beef and dairy stock, means increased quantities of meat and dairy products. The 1943 cultivated acreage will be the largest ever reported for Federal Reclamation projects.

### POWER FOR WAR

Keeping ahead of the unprecedented industrial expansion in the West, Reclamation power production rose from about 4¾ billion kilowatt-hours in the fiscal year 1942 to about 9½ billion in 1943, an increase of 100 percent.

The installed capacity of 30 power plants on 19 projects in 11 states is practically double the June 30, 1941 installation. The new 900,000 kilowatts made available in the 2-year period—potentially more than 7 billion kilowatt-hours—was transmitted almost entirely to busy war production centers. Translated into terms of war equipment, the added power is highly significant. It is sufficient to produce annually more than 30 huge battleships or more than 11,000 four-motored bombers.

Most of the new generators were installed far ahead of schedule. At Grand Coulee about half a million kilowatts were installed 2 to 5 years ahead of original plans. Initial schedules called for the first generator to be in service at Grand Coulee in 1943 or 1944. Instead, five giant machines are now turning. Parker Dam power plant, situated on the Colorado River below Boulder Dam and rated at more than 115,000 kilowatts, was put into operation 8 years ahead of schedule.

The gain in Reclamation power capacity during the fiscal year totaled about 480,000 kilowatts. In addition the Bureau began transmitting power from the Fort Peck (Montana) plant, built by the Corps of Engineers, War Department.

The gross revenue from power plants operated by the Bureau rose to a new high of \$14,335,613.01 as compared with \$8,233,477 in the fiscal year 1942.

Power produced at Grand Coulee Dam was consumed chiefly by aluminum reduction industries. From this area came 30 percent of the national output of this important light metal. Also served in this region are many shipyards and other war plants. The Pacific Southwest is to a large extent dependent on power generated at Boulder and Parker Dams on the Colorado River. Here are situated the largest magnesium plant in the world, major airplane factories, and industries producing steel, aluminum, ammunition, ships, and synthetic rubber. This power is also used in mining operations. In the intermountain states, war industries, food processing plants, and military establishments are served.

Boulder Dam power plant moved still further out in front as the largest in the world, its capacity being increased to nearly a million kilowatts by the addition of two more generators.

Grand Coulee took its place as the world's third largest hydroelectric development with an installation at the end of the year of nearly a half million kilowatts. Two units of more than 70,000 kilowatts each were transferred to this power plant from Shasta Dam (Central Valley project, California) to make their output available a year ahead of schedule. The Shasta powerplant was not ready to receive the machines and others would be available when the plant was completed.

Two units of more than 10,000 kilowatts each were installed in the Green Mountain Dam power plant, the first feature of the Colorado-Big Thompson project (Colorado) to begin operation.

The War Production Board late in 1942 permitted installations rated at 776,000 kilowatts to proceed at five projects, while halting installation of 865,000 kilowatts. In addition to the new generators at Boulder, Parker, Grand Coulee, and Green Mountain Dams, which have gone into operation, other installations were excepted from a general stop-construction order. These included an additional generator at Boulder Dam, to be in service in October 1944; three generators at Grand Coulee, scheduled to be in operation by February 1944; two generators of more than 70,000 kilowatts at Shasta Dam, to begin operating by March 1944; and a 97-mile transmission line from Shasta Dam to Oroville, Calif., over which Shasta power will be delivered for distribution to war industries in northern California.

Power installations scheduled for service before 1945-46, which were halted, totaled 865,600 kilowatts. These included generators at Keswick Dam of the Central Valley project, and Anderson Ranch

Dam of the Boise project (Idaho), where all construction work was limited. Work was barred on Davis Dam and power plant on the Colorado River in the Pacific Southwest and on facilities which would have made possible installations at six power plants (other than Green Mountain Dam) on the Colorado-Big Thompson project. Three big generators for the right powerhouse at Grand Coulee Dam and an additional machine for Shasta Dam were also barred.

## WATER SERVES WAR INDUSTRIES

In addition to providing power for war industries and irrigation water for increased food production, Reclamation projects made available, as a third major war contribution, a reliable supply of water for war factories and military centers. Five operating projects provided water and, in addition, a municipal supply for civilian use. Additional construction on one of these projects and on three others which are under construction will extend this service in the future.

Los Angeles and 12 other cities of the southern California metropolitan area, and the world's largest magnesium plant near Las Vegas, Nev., receive fresh water from the Colorado River through the Boulder and Parker Dam system.

The Contra Costa Canal of the Central Valley project (California) is the source of a supplemental supply for the cities of the upper San Francisco Bay region and for industries in the Pittsburg, Calif., area. Military encampments near El Paso, Tex., are dependent on the irrigation reservoirs of the Rio Grande project (Texas-New Mexico); and the cities of Salt Lake, Provo, and Ogden on projects in Utah.

To provide added industrial and domestic water for the increased population of the Salt Lake and Provo areas, resulting from the establishment of large military centers and from the expansion of industry, the Bureau, under limited War Production Board clearance, is continuing enlargement of the Weber-Provo Canal part of the Provo River project. This construction also will provide a supplemental supply of irrigation water for a large area of land.

The other three projects under construction are the Altus project (Oklahoma), the Rapid Valley project (South Dakota), and the Tucumcari project (New Mexico) which will supplement existing municipal storage for the cities of Altus, Rapid City, and Tucumcari, respectively, as well as irrigate land in the vicinity of each.



TABLE 1.—Reclamation areas and crop returns, calendar year 1942<sup>1</sup>

	Irrigable area <sup>2</sup>	Irrigated area	Area in cultivation (paying area)	Crop values	
				Total	Per acre
	<i>Acres</i>	<i>Acres</i>	<i>Acres</i>		
Regular projects .....	2,377,483	1,897,828	1,873,979	\$138,181,276	\$73.74
Storage projects <sup>3</sup> .....	1,014,223	790,895	796,442	55,602,431	69.81
Storage projects (no crop returns) .....	69,376				
Special and Warren Act lands .....	1,360,757	1,247,512	1,206,651	78,264,809	64.86
Grand total, 1942 .....	4,821,839	3,936,235	3,877,072	272,048,516	70.17
Grand total, 1941 .....	4,915,716	3,448,383	3,380,460	159,885,997	47.30
Increase or decrease, 1941-42 .....	<sup>4</sup> -93,877	+487,852	+496,612	+112,162,519	+22.87

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

<sup>2</sup> Area for which the Bureau is prepared to supply water.

<sup>3</sup> Includes Imperial Valley (California) served by the All-American Canal (not previously reported).

<sup>4</sup> Decrease from 1941 to 1942 explained by readjustments of estimated acreage.

### CROP VALUES SOAR TO NEW HIGH

The gross value of crops produced on land which is served by Reclamation facilities rose to a record high of \$272,048,516 during the calendar year 1942. The figure for the first time included returns, amounting to \$38,163,991, from the Imperial Valley of California, wholly served for the first year by the All-American Canal of the Boulder Dam system. Exclusive of the Imperial Valley, the gross returns from Reclamation projects in 1942 was 45½ percent greater than in 1941, when the grand total was \$159,885,997, and 100 percent greater than the next previous high, \$117,788,677, set in 1940 (see table 2).

These totals probably would be increased more than 25 percent if the value of livestock fattened on Reclamation projects, and of dairy and poultry products were included. The gross values are also exclusive of returns from two supplemental water projects.

The over-all cultivated acreage rose from 3,380,460 in 1941 to 3,877,072 in 1942. Most of this increase was due to the inclusion of 410,768 acres in the Imperial Valley of California. On projects that were constructed entirely by the Bureau, and on projects that were furnished supplemental storage water from Bureau works, the cultivated acreage totaled 2,670,421 and crop values, \$193,783,707 (including Imperial Valley returns). These totals compare with 1941 figures of 2,178,288 acres and \$110,399,807. The cultivated acreage under special and Warren Act contracts, which receive supplemented water from Bureau works, rose from 1,202,172 in 1941 to 1,206,651 in 1942 and the crop values from \$49,486,191 to \$78,264,809.

Farmers on Bureau of Reclamation projects produced large quantities of war crops, including an estimated 2,841,162 bushels of dry

edible beans, 27,329,085 bushels of white potatoes, and 2,744,970 tons of alfalfa. Translated into annual supplies for civilians, this production would supply beans for 22 million persons, potatoes for 13 million, and, through alfalfa for beef and dairy herds, beef for 4½ million persons and milk for 3¾ million.

In 1942 the area planted to sugar beets was 138,407 acres, an increase of 37,188 acres over 1941. The production was 1,775,559 tons—a record output and indicative of the response of Reclamation farmers to appeals for meeting the national sugar shortage. The yield per acre was lower than the yields of previous years, due primarily to inadequate labor. In the spring of 1943 an average decrease of 29.6 percent in beet acreage planted was reported from 24 projects due to labor and price conditions.

Other crops that are grown on Reclamation projects include fruit and nuts, vegetables, small grains, long-staple cotton, flax, hops, and seeds.

Due to war conditions no new land was opened to entry on the projects during the year.

TABLE 2.—Cumulative crop values, 1906-42

	Federal irrigation projects <sup>1</sup>				Warren Act lands				Entire area			
	Irrigated acreage	Net area in cultivation	Total crop value		Irrigated acreage	Net area in cultivation	Total crop value		Irrigated acreage	Net area in cultivation	Total crop value	
			For year	Cumulative total			For year	Cumulative total			For year	Cumulative total
1906	22, 300	2, 20, 100	244, 900	\$5, 005, 360	2, 22, 300	2, 20, 100	22, 300	\$99, 368, 468	2, 22, 300	2, 20, 100	\$244, 900	\$5, 005, 360
1907	187, 628	2, 169, 000	4, 760, 460	12, 641, 248	187, 628	2, 169, 000	187, 628	147, 263, 218	187, 628	2, 169, 000	4, 760, 460	12, 641, 248
1908	289, 549	2, 560, 500	7, 635, 888	24, 561, 911	289, 549	2, 560, 500	289, 549	17, 886, 586	289, 549	2, 560, 500	7, 635, 888	24, 561, 911
1909	410, 628	2, 969, 500	11, 920, 663	37, 506, 560	410, 628	2, 969, 500	410, 628	22, 583, 848	410, 628	2, 969, 500	11, 920, 663	37, 506, 560
1910	471, 423	3, 443, 000	17, 044, 639	50, 592, 991	471, 423	3, 443, 000	471, 423	26, 539, 548	471, 423	3, 443, 000	17, 044, 639	50, 592, 991
1911	562, 311	4, 000, 000	20, 000, 000	66, 600, 125	562, 311	4, 000, 000	562, 311	31, 145, 913	562, 311	4, 000, 000	20, 000, 000	66, 600, 125
1912	694, 142	4, 614, 477	26, 007, 134	88, 752, 051	694, 142	4, 614, 477	694, 142	36, 848, 056	694, 142	4, 614, 477	26, 007, 134	88, 752, 051
1913	810, 649	5, 200, 000	32, 512, 312	116, 916, 503	810, 649	5, 200, 000	810, 649	42, 064, 506	810, 649	5, 200, 000	32, 512, 312	116, 916, 503
1914	926, 663	5, 858, 291	36, 862, 313	126, 142, 788	926, 663	5, 858, 291	926, 663	47, 923, 290	926, 663	5, 858, 291	36, 862, 313	126, 142, 788
1915	1, 051, 193	6, 668, 211	43, 530, 526	170, 673, 316	1, 051, 193	6, 668, 211	1, 051, 193	53, 991, 504	1, 051, 193	6, 668, 211	43, 530, 526	170, 673, 316
1916	1, 189, 566	7, 513, 469	51, 043, 985	221, 716, 841	1, 189, 566	7, 513, 469	1, 189, 566	61, 505, 070	1, 189, 566	7, 513, 469	51, 043, 985	221, 716, 841
1917	1, 295, 480	8, 418, 750	59, 462, 735	281, 185, 591	1, 295, 480	8, 418, 750	1, 295, 480	70, 000, 520	1, 295, 480	8, 418, 750	59, 462, 735	281, 185, 591
1918	1, 421, 800	9, 370, 000	68, 832, 735	350, 018, 326	1, 421, 800	9, 370, 000	1, 421, 800	80, 480, 326	1, 421, 800	9, 370, 000	68, 832, 735	350, 018, 326
1919	1, 567, 500	10, 300, 000	79, 132, 735	429, 351, 071	1, 567, 500	10, 300, 000	1, 567, 500	91, 980, 326	1, 567, 500	10, 300, 000	79, 132, 735	429, 351, 071
1920	1, 723, 100	11, 200, 000	90, 332, 735	518, 683, 806	1, 723, 100	11, 200, 000	1, 723, 100	103, 712, 326	1, 723, 100	11, 200, 000	90, 332, 735	518, 683, 806
1921	1, 889, 000	12, 000, 000	102, 332, 735	618, 016, 541	1, 889, 000	12, 000, 000	1, 889, 000	116, 600, 326	1, 889, 000	12, 000, 000	102, 332, 735	618, 016, 541
1922	2, 064, 000	12, 800, 000	115, 332, 735	728, 349, 276	2, 064, 000	12, 800, 000	2, 064, 000	130, 540, 326	2, 064, 000	12, 800, 000	115, 332, 735	728, 349, 276
1923	2, 257, 000	13, 600, 000	129, 332, 735	848, 682, 011	2, 257, 000	13, 600, 000	2, 257, 000	145, 480, 326	2, 257, 000	13, 600, 000	129, 332, 735	848, 682, 011
1924	2, 467, 000	14, 400, 000	144, 332, 735	978, 014, 746	2, 467, 000	14, 400, 000	2, 467, 000	161, 420, 326	2, 467, 000	14, 400, 000	144, 332, 735	978, 014, 746
1925	2, 692, 000	15, 200, 000	160, 332, 735	1, 117, 347, 481	2, 692, 000	15, 200, 000	2, 692, 000	178, 360, 326	2, 692, 000	15, 200, 000	160, 332, 735	1, 117, 347, 481
1926	2, 934, 000	16, 000, 000	177, 332, 735	1, 266, 680, 216	2, 934, 000	16, 000, 000	2, 934, 000	196, 300, 326	2, 934, 000	16, 000, 000	177, 332, 735	1, 266, 680, 216
1927	3, 192, 000	16, 800, 000	195, 332, 735	1, 426, 012, 951	3, 192, 000	16, 800, 000	3, 192, 000	215, 240, 326	3, 192, 000	16, 800, 000	195, 332, 735	1, 426, 012, 951
1928	3, 465, 000	17, 600, 000	214, 332, 735	1, 596, 345, 686	3, 465, 000	17, 600, 000	3, 465, 000	235, 180, 326	3, 465, 000	17, 600, 000	214, 332, 735	1, 596, 345, 686
1929	3, 754, 000	18, 400, 000	234, 332, 735	1, 776, 678, 421	3, 754, 000	18, 400, 000	3, 754, 000	255, 120, 326	3, 754, 000	18, 400, 000	234, 332, 735	1, 776, 678, 421
1930	4, 058, 000	19, 200, 000	255, 332, 735	1, 967, 011, 156	4, 058, 000	19, 200, 000	4, 058, 000	276, 060, 326	4, 058, 000	19, 200, 000	255, 332, 735	1, 967, 011, 156
1931	4, 377, 000	20, 000, 000	277, 332, 735	2, 167, 343, 891	4, 377, 000	20, 000, 000	4, 377, 000	298, 000, 326	4, 377, 000	20, 000, 000	277, 332, 735	2, 167, 343, 891
1932	4, 709, 000	20, 800, 000	301, 332, 735	2, 377, 676, 626	4, 709, 000	20, 800, 000	4, 709, 000	321, 940, 326	4, 709, 000	20, 800, 000	301, 332, 735	2, 377, 676, 626
1933	5, 064, 000	21, 600, 000	327, 332, 735	2, 597, 009, 361	5, 064, 000	21, 600, 000	5, 064, 000	346, 880, 326	5, 064, 000	21, 600, 000	327, 332, 735	2, 597, 009, 361
1934	5, 434, 000	22, 400, 000	354, 332, 735	2, 836, 342, 096	5, 434, 000	22, 400, 000	5, 434, 000	372, 820, 326	5, 434, 000	22, 400, 000	354, 332, 735	2, 836, 342, 096
1935	5, 827, 000	23, 200, 000	382, 332, 735	3, 094, 674, 831	5, 827, 000	23, 200, 000	5, 827, 000	400, 760, 326	5, 827, 000	23, 200, 000	382, 332, 735	3, 094, 674, 831
1936	6, 242, 000	24, 000, 000	411, 332, 735	3, 372, 007, 566	6, 242, 000	24, 000, 000	6, 242, 000	430, 700, 326	6, 242, 000	24, 000, 000	411, 332, 735	3, 372, 007, 566
1937	6, 684, 000	24, 800, 000	441, 332, 735	3, 669, 340, 301	6, 684, 000	24, 800, 000	6, 684, 000	461, 640, 326	6, 684, 000	24, 800, 000	441, 332, 735	3, 669, 340, 301
1938	7, 152, 000	25, 600, 000	472, 332, 735	3, 984, 673, 036	7, 152, 000	25, 600, 000	7, 152, 000	493, 580, 326	7, 152, 000	25, 600, 000	472, 332, 735	3, 984, 673, 036
1939	7, 644, 000	26, 400, 000	504, 332, 735	4, 327, 005, 771	7, 644, 000	26, 400, 000	7, 644, 000	526, 520, 326	7, 644, 000	26, 400, 000	504, 332, 735	4, 327, 005, 771
1940	8, 160, 000	27, 200, 000	538, 332, 735	4, 696, 338, 506	8, 160, 000	27, 200, 000	8, 160, 000	561, 460, 326	8, 160, 000	27, 200, 000	538, 332, 735	4, 696, 338, 506
1941	8, 700, 000	28, 000, 000	573, 332, 735	5, 091, 671, 241	8, 700, 000	28, 000, 000	8, 700, 000	600, 400, 326	8, 700, 000	28, 000, 000	573, 332, 735	5, 091, 671, 241
1942	9, 272, 000	28, 800, 000	609, 332, 735	5, 523, 003, 976	9, 272, 000	28, 800, 000	9, 272, 000	643, 340, 326	9, 272, 000	28, 800, 000	609, 332, 735	5, 523, 003, 976

<sup>1</sup> Includes projects constructed by the Bureau of Reclamation and those for which supplemental water is furnished from storage works built by the Bureau.

<sup>2</sup> Estimated.

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

<sup>4</sup> Does not include project acreage and returns from All American Canal (Imperial Valley) and 2 supplemental water projects.



## CONSTRUCTION ACTIVITIES CURBED

The War Production Board, late in 1942, ordered construction halted on all Reclamation projects excepting power installations on five projects, Parker Dam, Boulder Dam, Columbia Basin (Grand Coulee), Colorado-Big Thompson (Green Mountain Dam), and Central Valley (Shasta Dam and the Shasta-Oroville transmission line). Inability to obtain critical materials previously had greatly limited construction.

Cognizant that the future food demands of the Nation would exceed its current agricultural production capacity, the Bureau waged a vigorous campaign throughout the remainder of the fiscal year to bring about cancellation of the stop-construction orders.

Appeals were made to the Facility Review Committee of the War Production Board. As a result, additional work was permitted to proceed under specified limitations on certain facilities of the following irrigation and municipal water projects:

*Gila (Arizona)*: 5,500 acres for the production of guayule rubber.

*Shirley and Terry units, Buffalo Rapids No. 1 project (Montana)*: where facilities, which would serve 8,150 acres, were nearing completion.

*Yakima-Roza project (Washington)*: where facilities, which would serve 5,000 acres, were nearing completion.

*Buford-Trenton project (North Dakota)*: where facilities, which would serve 14,800 acres, were nearing completion.

*Gooding Division of the Minidoka project (Idaho), Tule Lake Division of the Klamath project (Oregon-California), and Heart Mountain Division of the Shoshone project (Wyoming)*: to provide employment for Japanese evacuees.

*Mancos project (Colorado), Rapid Valley project (South Dakota), and Deschutes project (Oregon)*: to provide employment for conscientious objectors in Civilian Public Service Camps.

*Lugert-Altus project (Oklahoma)*: construction of Altus Dam to a height sufficient to provide a supplemental supply of water for the city of Altus near which a large military activity is located.

*Provo River project (Utah)*: enlargement of the Weber-Provo Canal to bring industrial water to a new steel plant.

Plans were under way to complete Friant Dam by installing control valves borrowed from Boulder Dam, and the Madera Canal, two features of the Central Valley project (California). These features were given clearance by the War Production Board. Two power plants, at Parker Dam on the Colorado River and Green Mountain Dam of the Colorado-Big Thompson project (Colorado), were com-

pleted. Excavation of two major tunnels was continued until late in December when stop-construction orders went into effect. They were the 13-mile Continental Divide tunnel (Colorado-Big Thompson project) and the 6-mile Duchesne tunnel (Provo River project, Utah).

Action of the Rubber Director in reducing the scope of the guayule program, resulted in adjustments of the plans for construction on the Gila project. The acreage to be served was increased from 5,500 to 8,500 acres for dust control in the vicinity of the Yuma air base, and for the production of alfalfa for livestock feed.

Construction at the end of the year remained at a standstill or was restricted because of War Production Board orders (exclusive of power installations) on the following projects: the Coachella Branch of the All-American Canal (California); the Friant-Kern Canal of the Central Valley project; Mirage Flats (Nebraska); Tucumcari (New Mexico); Eden, Kendrick, and Riverton (Wyoming); Davis Dam (Arizona-Nevada); Anderson Ranch Dam and Payette Division, Boise project (Idaho); Buffalo Rapids No. 2 (Montana); Provo River (Utah); and Columbia Basin (Washington).

#### WATER CONSERVATION PROGRAM PROGRESSES

Construction proceeded on 8 projects under the Water Conservation and Utilization program, the purpose of which is to stabilize agricultural production and employment in the Great Plains and similar areas suffering periodic droughts. One of the projects, Buffalo Rapids No. 1 (Montana), under which 15,500 acres of land were brought into cultivation, was completed. Water was delivered for the first time on the Buford-Trenton project (North Dakota) this spring, to 9,000 acres. This acreage may be expanded to 14,800 during the year.

The 8 projects when completed will irrigate 94,000 acres of land and will benefit nearly a million acres of range land valuable for the support of livestock. In addition to the above two, the projects in this program are: Eden (Wyoming), Rapid Valley (South Dakota), Newton (Utah), Mirage Flats (Nebraska), Buffalo Rapids No. 2, (Montana), and Mancos (Colorado).

Construction progress was seriously retarded by the disbandment of the Civilian Conservation Corps and the Work Projects Administration which had contributed nonreimbursable labor for construction. Stop-construction orders of the War Production Board relating to six of the projects brought work to a halt. These were issued late in 1942 and were in effect for the remainder of the fiscal year.

On June 24, 1943, President Roosevelt authorized construction of the Scofield project (Utah) for flood control. A new earth-fill dam, which

will also provide irrigation water to 12,500 acres of land, is to be constructed.

### **Fifty-two Projects in 41 Years**

One hundred and sixty-seven dams and 30 power plants have been constructed by the Bureau of Reclamation in connection with the construction of 52 irrigation or multiple-purpose projects since the passage of the Reclamation Act of 1902. In addition, the Bureau has built 5,822 miles of transmission lines, 5,106 miles of ditches and drains, 210,487 canal structures, 14,357 bridges, 23,401 culverts, 6,498 flumes, 381 tunnels totaling 108 miles in length, 2,290 miles of pipe, and 4,208 miles of road. In building these structures 611,560,346 cubic yards of earth and rock were excavated and 33,203,253 cubic yards of concrete (containing 37,310,546 barrels of cement) were placed.

### **Shasta Dam Nears Completion**

Shasta Dam on the Sacramento River, dominant structure of the vast Central Valley project (California) and one of the three largest concrete dams in the world, was 87 percent complete at the end of the fiscal year. Ultimately to be higher than Grand Coulee and more massive than Boulder, Shasta will contain 5,556,667 cubic yards of concrete. The first crest block was poured in April.

Two of five generators, each rated at more than 70,000 kilowatts, are being installed and will be ready for commercial production by March 1944.

Stop-orders which the War Production Board issued late in 1942, affecting Friant Dam, Keswick Dam, and the Madera Canal, all prominent features of the Central Valley development, were modified late in the fiscal year. Concrete work was resumed on Keswick Dam, to bring it to full height and to complete the powerhouse building. The Bureau advertised for bids on the Madera Canal construction and plans were completed for borrowing three 84-inch needle valves from the Boulder Dam outlet works for installation at Friant Dam to control diversion of the river's flow to the irrigation canal system.

### **Yakima-Roza Developed Rapidly**

Irrigators on the Roza division of the Yakima project (Washington) kept ahead of canal construction in preparing their land for cultivation. Many planted their crops before their farm ditches were completed. About 14,000 acres of land had been brought into production. Plans were under way to bring 18,500 acres under irrigation during 1944 following a recommendation of the War Food Administration for resumption of work on the project.



## FIELD INVESTIGATIONS ON WARTIME BASIS

The project planning activities of the Bureau of Reclamation since 1941 have been geared to war and post-war considerations. The investigation and study of the land and water resources of the 17 western states is preliminary to the preparation of plans for the development of irrigation and multiple-purpose projects, including power installations.

Studies and investigations by the Bureau cover entire river basins and their subdivisions, followed by studies and investigations of individual projects fitting into the pattern of an economic basin development. This avoids the haphazard construction of individual projects without consideration of each region as a whole.

Investigations in the upper Missouri River states are representative of basin-wide studies. These extend from the headwaters in Montana and Wyoming to Yankton, S. Dak., and to the subbasins of the Platte and Republican Rivers. As a result of the data assembled, Commissioner Page in October 1942 proposed that the Missouri River Basin states seek the consent of Congress to negotiate a compact dividing the waters of the river in the best interests of the inhabitants of the area for irrigation, power, flood control, and navigation. A Missouri Basin states committee was formed at Omaha in May 1943 to further the development of the river.

During the fiscal year the investigations had two major objectives. The first was the extension of irrigation to increase food production. The second was the development of a shelf of projects for inclusion in a comprehensive post-war public works program.

During the year, 150 irrigation and multiple-purpose projects and 38 river basins and subbasins were actively under investigation.

Progress on 35 projects warranted their being listed as desirable for immediate construction as part of the war food production program. On 41 others, field work and studies were advanced to the point where immediate preparation of construction plans for post-war execution was scheduled. Projects not approved for construction because they would not produce food in sufficient quantities in time to aid the prosecution of the war and others whose feasibility has been determined can be included in the post-war reserve.

With the objective of providing additional electric power for vital war production in the West, final reports were completed on 3 power projects and detailed surveys continued on 8 others. Preliminary reports on 27 developments, including the above 11, were completed in fiscal year 1942.

In addition to the foregoing activities the Bureau also reviewed flood control reports of the Corps of Engineers, War Department, in

numerous stream basins in California. This work is being carried on under the terms of an agreement dated August 14, 1939, by which the Bureau of Reclamation, the Corps of Engineers, and the Department of Agriculture interchange information on multiple-purpose projects. This coordination and cooperation provides for maximum utilization of water resources of each region.

## POST-WAR PROGRAMMING IN PROGRESS

At the end of the war, providing employment opportunities for returning service men and emergency industrial workers will be one of the Nation's greatest responsibilities. Recognizing that the solution of this grave problem is dependent on advance preparations, the Bureau continued the development of a post-war public works program involving construction of 150 to 200 irrigation and multiple-purpose projects.

The program would provide 3 billion man-hours of work—equivalent to 3 years employment for 480,000 men. Tentative estimates place the construction cost at about 3 billion dollars.

Projects which are not completed as part of the war food program will be added to the post-war reservoir. As rapidly as current investigations can be carried out without impeding the Bureau's war activities, the list of projects will be enlarged.

In addition to providing employment, the program will prove a stabilizing influence in western economy. It will extend the Bureau's irrigation service to 15,000,000 acres of land. Settlement opportunities will be provided on newly irrigated land for 125,000 farm families. By supplementing existing irrigation supplies the Bureau will make it possible to settle 40,000 additional families on land now inadequately irrigated. Through the construction of hydroelectric installations, 3,300,000 kilowatts of new power can be provided.

### Special Studies Advanced

To assure the best results from irrigation facilities under construction or proposed, the Bureau advanced special studies directed at agricultural and other economic problems on three projects.

An interim report was in preparation on the Columbia Basin Joint Investigations, inaugurated in connection with the large area to be irrigated in Washington from Grand Coulee Dam. This report will outline a program for the development and settlement during the post-war period of lands which cover an area larger than the State of Delaware.

Progress was made on the Central Valley Project Studies which were announced in 1942 as a means of assuring the best results from the construction in California of the most complex multiple-purpose project the Bureau has undertaken. As in the Columbia Basin Joint Investigations, many Federal and State agencies are participating.

The Yuma Mesa (Gila project, Arizona) Predevelopment Committee continued its plans for launching a large scale demonstration of the productivity of desert mesa lands under irrigation. The Appropriations Committee of the United States Senate on June 17, 1943, reaffirmed recommendations for this work. In approving a dust control program for the project to protect a nearby Army airbase, the committee urged alfalfa production for war food purposes. It also directed that the Bureau should seek to obtain the greatest permanent benefit possible from the wartime activities on this and other projects.

### **Structures Protected Against Sabotage**

Approximately 650 Federal guards continued to protect vital Reclamation dams, power plants, and irrigation structures where saboteurs might strike. Vigilance was maintained on a 24-hour basis. Flood lights, steel fences, and other protective devices aided the officers.

### **Laboratory Streamlines War Work**

Faster construction methods and the use of alternative designs and substitute materials resulted from the activities of the Bureau's engineering laboratories in Denver toward solving problems introduced by the shortage of manpower and strategic materials.

The laboratory facilities served the Bureau's needs and were used extensively by other agencies of the Government. These included the War and Navy Departments, the Maritime Commission, the War Production Board, the Public Roads Administration, the Tennessee Valley Authority, and the Panama Canal.



TABLE 3.—Settlement and economic data, 1942

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 <sup>1</sup>	Population	
Arizona	<i>Regular</i>	Salt River	13,158	42,000	12	144,500	96	157	7	126,372,773	69,273	1,110	5,142
		Yuma	1,945	3,153	5	12,312	13	27	1	2,072,841	2,293	---	---
		Orland	1,900	1,900	1	1,366	9	6	1	1,549,737	2,094	---	---
		Grand Valley <sup>2</sup>	951	2,662	6	19,950	17	40	3	8,720,020	9,121	814	1,628
		Uncompahgre	1,715	5,335	3	7,936	28	35	4	5,880,460	6,700	---	---
		Boise	4,106	16,100	16	51,350	118	130	4	27,690,923	328,400	3,334	12,068
		Minidoka <sup>4</sup>	3,542	12,069	10	14,514	35	74	6	11,913,385	311,300	11,161	50,674
		Bitter Root	3,335	1,238	6	4,000	18	13	4	3,073,074	5,341	---	---
		Frenchtown	42	180	1	110	1	1	---	3,170,140	5,220	---	---
		Huntley	653	1,893	5	672	7	6	1	271,878	350	---	---
Milk River	598	2,257	15	12,117	31	39	7	9,839,288	8,339	---	---		
Sun River	1,015	2,753	5	818	11	15	1	486,468	8,883	---	---		
Lower Yellowstone	690	2,492	7	4,280	18	22	3	2,970,930	4,365	---	---		
Montana - North Dakota		North Platte	3,172	9,364	16	27,313	73	67	9	15,057,396	15,575	---	---
		Newlands	2,659	4	4	2,395	16	13	1	2,200,000	2,540	---	---
		Carlsbad	442	2,062	4	19,400	14	20	2	4,066,669	5,350	---	---
		Rio Grande	6,004	22,754	40	134,020	87	183	6	74,926,647	42,642	122	974
		Umatilla	430	1,568	4	2,800	7	12	1	1,953,961	1,940	33	68
		Vale	532	1,763	4	1,333	8	14	1	1,126,519	1,250	---	---
		Klamath	959	2,741	6	28,084	30	35	5	3,425,274	3,680	500	1,260
		Owyhee	1,480	5,403	8	14,990	28	27	2	7,402,197	3,650	220	924
		Belle Fourche	2,000	2,002	3	3,730	22	15	3	4,005,000	5,795	---	---
		Strawberry Valley	2,000	8,940	13	18,490	28	31	4	5,655,708	11,215	---	---
Oregon-California		Okanogan	5,459	16,617	24	44,313	79	82	2	2,251,233	2,900	---	---
		Yakima	0	7	7	19,500	17	10	2	12,000,385	14,506	---	---
		Kendrick	500	1,793	3	2,668	4	16	2	14,082,333	11,000	---	---
		Riverton	1,034	2,743	5	2,271	3	14	1	1,162,000	1,500	---	---
Shoshone	---	---	---	---	---	---	---	1,395,190	---	---	---		
Wyoming	---	---	---	---	---	---	---	---	---	---	---	---	
Subtotal	53,121	175,414	238	600,152	823	1,123	93	351,437,429	281,282	21,703	91,317		

*Supplemental Storage Projects*

California.....														
All-American Canal:														
Imperial Valley.....	4,412	27,000	8	33,723	157	76	7	341,145,905	3	22,500				
Coachella Valley <sup>3</sup>	(5)	8,000	4	4,400	9	12	2	8,402,240	3	4,600				
Minidoka-Fremont Madison Irrigation District.....	1,022	4,474	16	13,755	23	30	3	1,983,829		4,237				
Nevada.....														
Humboldt.....	78	315	1	1,310	3	4	1	1,650,000		1,505				
Truckee Storage.....	606	2,520	2	31,318	21	21	3	31,650,000		22,187				
Burnt River.....	130	800	6	1,900	11	8	1	273,000		450				
Oregon.....														
Deschutes (Central Oregon Irrigation District)	651	2,200	3	25,300	23	32	4	3,055,951		5,951				
Utah.....														
Stanfield.....	160	412	1	600	1	2	0	0		0				
Westland.....	78	279	0	0	0	0	0	0		0				
Hyrum.....	516	1,520	3	3,730	5	6	0	0		0				
Moon Lake.....	678	2,500	6	2,255	15	23	1	935,779		2,145				
Ogden River.....	1,079	4,300	7	87,524	33	60	4	37,432,000		35,560				
Provo River (Deer Creek Division).....	31,260	3,000	5	36,200	24	47	6	14,975,358		17,235				
Sanpete.....	340	2,000	2	2,950	4	4	1	920,000		1,750				
Weber River.....	2,100	10,000	11	10,800	26	20	7	22,000,000		26,000				
Subtotal.....	13,110	69,320	75	255,765	355	345	40	164,424,062		144,120				
<i>Water Conservation and Utilization Projects</i>														
Montana.....														
Buffalo Rapids.....	116	247	3	5,065	11	16	4	4,495,391		5,500				
Grand total.....	66,347	244,981	316	861,582	1,189	1,484	137	520,356,882		430,902				

<sup>1</sup> Farms furnished partial or whole water supply by Bureau-constructed works.

<sup>2</sup> Includes Orchard Mesa Irrigation District.

<sup>3</sup> Estimated figures used.

<sup>4</sup> Does not include Fremont-Madison Irrigation District. See supplemental projects.

<sup>5</sup> Data not available.

## Project Operators Increase Food Output

Increased production of critical foodstuffs to meet expanding war demands resulted from the activities of the Division of Operation and Maintenance, with headquarters in Denver. Results were achieved by urging farmers to cultivate small undeveloped tracts near their holdings, and by encouraging them to shift from less essential to the more important war crops.

Cooperative arrangements were continued with the Farm Security Administration, which extends financial assistance to settlers on newly developed Reclamation areas, including Water Conservation and Utilization projects, and with the Extension Service of the Department of Agriculture, whose agricultural specialists assist farmers in irrigation matters on new Bureau developments.

As part of the Bureau's educational program, a new film "Irrigated Pastures" was completed and released. This and other movies, illustrated lectures, and circulars, designed to assist farmers in making the most economical use of available water supplies, in preventing soil erosion, and in eradicating noxious weeds, were widely distributed during the year among farmers and local organizations on the projects and in communities of the West.

## Reclamation Lands Leased

More than 625,000 acres of public land (withdrawn by the Bureau in connection with completed or partially completed projects, or projects under investigation) were under lease at the end of the fiscal year. Approximately 580,000 acres are being grazed and 45,000 are being utilized for crop production. In addition, approximately 650,000 acres of Reclamation withdrawn lands have been temporarily transferred to the Grazing Service for supervision in the interests of efficient range administration under the Taylor Grazing Act.

## Soil and Moisture Problems Studied

Control of erosion and prevention of seepage in irrigation canals was the major activity under the Soil and Moisture Conservation program. Much field testing work was done on a number of projects in placing and testing various types of canal linings and in experimenting with different types of vegetation as soil retention agents. Programs previously initiated for better control and use of land were carried forward by means of demonstrations, experimentations, and laboratory and field studies.



## Revised Repayment Contracts Negotiated

Eight amendatory repayment contracts were negotiated with water users' organizations under the Reclamation Act of 1939 which provides for adjustment of existing schedules according to the ability of water users to pay. Several other new contracts of 37 requested are in the final stage of negotiation and approval. Due to present and anticipated augmented incomes, water users on several projects have indicated that there is no desire for early action on amendatory contracts.

Approximately 200,000 acres on 11 irrigation projects are in progress of reclassification under the act of 1939.

## Marked Decrease in Requests for Relief

Reflecting increased crop values over all Reclamation projects, the fiscal year 1943 saw a marked decrease in the number of applications received for relief from payment of accrued construction charges. Applications were submitted by 6 water users' organizations and 7 individuals, aggregating \$189,922.44. At the end of the year relief had been granted to 4 water users' organizations for a total amount of \$24,530.

In comparison, applications were received in the fiscal year 1942 totaling \$1,061,556 from 22 water users' organizations. Relief in the total amount of \$585,432.85 was authorized.

## Japanese Evacuees on Three Projects

Thirty-six thousand persons of Japanese ancestry, evacuated from the Western Defense Zone on the Pacific Coast, occupied relocation centers on three projects. Camps of 10,000 persons each were completed and occupied early in the fiscal year on the Gooding division of the Minidoka project (Idaho), and on the Heart Mountain division of the Shoshone project (Wyoming). Sixteen thousand evacuees had moved into their temporary war quarters on the Tule Lake division of the Klamath project (Oregon-California) late in the previous fiscal year. The original plans contemplated that the evacuees would do much of the remaining construction work on these projects. Difficulties in obtaining critical materials and equipment made it necessary to limit activities to completion of irrigation facilities for an area considered adequate for the subsistence of the occupants of each center. Work on this restricted program was in progress during the year with several thousand acres under irrigation. The remainder of the acreage required will be developed during the next fiscal year.

The centers were constructed by the Army Engineers. The Bureau supervises the irrigation construction work done by the Japanese.

### Civilian Public Service Building Dam

A moderate-sized earth-fill dam is being constructed on each of three projects under arrangements made with the Selective Service System for the establishment of three Civilian Public Service camps for conscientious objectors. These forces also clear the reservoir sites and participate in canal construction.

Camps were first occupied during the year on the Rapid Valley project (South Dakota) and on the Deschutes project (Oregon) with a religious organization responsible for the welfare of the men. A supervisory staff was assembled in June for a camp to be operated entirely by the Bureau of Reclamation on the Mancos project (Colorado). The first assignees to this camp are due in July 1943. At the end of the year 116 men were stationed at the Rapid Valley camp and 153 at the Deschutes camp.

### C. C. C. and W. P. A. Disbanded

Operations on Reclamation projects of the Civilian Conservation Corps and the Work Projects Administration were terminated during the year.

All but seven C. C. C. camps had been closed by the end of fiscal year 1942. The remaining camps, located on Water Conservation and Utilization projects, were suspended by August 1, 1943. Although the war had greatly reduced the extent of the operations of the Work Projects Administration, it was not until early in 1943 that the order was given for its liquidation. The C. C. C. enrollees and the W. P. A. workers contributed construction labor on a nonreimbursable basis.

Under the act of July 2, 1942, the Bureau was required to participate in disposing of C. C. C. equipment, supplies, and buildings valued at many million of dollars most of which was transferred to the War and Navy Departments and the Civil Aeronautics Administration.

### NEW LEGISLATION ENACTED

Two major pieces of legislation, the Columbia Basin Project Act and the Republican River Compact Consent, were enacted during the fiscal year. Another measure, presented late in the fiscal year, was the amendments to the Water Conservation and Utilization (Wheeler-

Case) Act, gearing the construction program carried out under that law to war needs.<sup>3</sup>

### Columbia Basin Project Act Passed

In planning for the settlement and development of 1,200,000 acres on the Columbia Basin project (Washington), which is scheduled for construction, the Bureau encountered the difficult question of how to get the raw land to settlers at its reasonable value without speculative increment on account of prospective irrigation.

The prime purpose of the Columbia Basin Project Act (Public Law 8, 78th Cong., 1st Sess.) is to meet this problem squarely. It requires owners of land in excess of specified acreages to sell the excess acreage at the Government appraised values. Owners who dispose of any holdings within 5 years after water is available must sell at not more than the appraised values. Appraisals are based on dry land or pre-irrigated values.

Other basic purposes of the act are: (1) to reauthorize the project as one subject to the repayment principles of the Reclamation Act of 1939 (53 Stat. 1187); (2) to authorize the Secretary of the Interior to acquire, sell, exchange, or lease project lands and adjacent lands, to establish town sites, and to dedicate portions for public use, all in aid of and for the protection, development, or improvement of the project; (3) to anticipate local taxing problems, arising out of the acquisition of lands by the United States, by authorizing the payment, out of funds derived from the lease of these lands, of sums in lieu of taxes to the State of Washington or its political subdivisions.

Construction of the main pumping plant and balancing reservoir is authorized, but other work on the irrigation system must await execution of repayment contracts with the irrigation districts in which the project lands are located.

### Consent to Republican River Compact

The Republican River Compact provides for the equitable apportionment of the waters of the Republican River and its drainage area among the three States of Colorado, Kansas, and Nebraska, thereby removing the basis for interstate litigation and laying the groundwork for the development of the water resources of the river basin.

The consenting legislation is noteworthy also in that, to conform to the compact, it provides for Federal consultation with state compact officials with respect to certain Federal programs or projects

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<sup>3</sup> This measure became Public Law 152, 78th Cong., 1st Sess., approved July 16, 1943.



and requires the Federal Government to respect certain established water rights as property.

Congress in 1942 gave its consent to a compact entered into by the three States allocating the waters of the river on an equitable basis, but the consent was vetoed by the President because of its potentially adverse effect upon Federal activities in the area.

Subsequently the states and representatives of interested Federal agencies met and revised the compact to meet the objections contained in the veto message. The legislatures of the three states meeting early in 1943 approved the compact and a bill to grant the consent of Congress became law on May 26, 1943 (Public Law 60, 78th Cong., 1st Sess.).

### W. C. U. Amendments Proposed

To fit the construction of projects under the Water Conservation and Utilization program to the war food production program, amendments to existing legislation relating to these projects were drafted during the fiscal year.

The amendments authorize, for the duration of the war, the expenditure for project construction of appropriated funds in lieu of contributions of labor and materials formerly made by the defunct Work Projects Administration and the Civilian Conservation Corps. The law will permit using prisoners of war in the construction of projects, subject to regulation by the appropriate Federal agency.

The new legislation also will facilitate the speedy construction and administration of projects thus permitting quick expansion of productive acreage to meet the critical food shortage.

A wartime Reclamation Act (H. R. 3018), which seeks to permit the Bureau to speed the construction and operation of irrigation projects, was pending when the Congress recessed for the summer.

### BUREAU DECENTRALIZATION PLAN COMPLETED

After long consideration, plans for decentralizing the Bureau of Reclamation to assure a full utilization of the land and water resources of the West to meet war and post-war requirements were completed during the year. Under the program,<sup>4</sup> six major field offices, headed by Regional Directors of Reclamation who would be directly responsible to the Commissioner of Reclamation, would be established.

The reorganization plan, it is felt, will provide for a more thorough understanding of area problems and of the needs and potentialities of

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<sup>4</sup> The plan was put into effect on September 9, 1943.

each area than has been possible heretofore through the Washington, D. C., headquarters and Denver (Colo.) engineering office. It is proposed to establish regional offices at Boise, Idaho; Sacramento, Calif.; Boulder City, Nev.; Salt Lake City, Utah; Amarillo, Tex., and Billings, Mont.

The plan would also establish four branches with offices at Denver. These are: the Branch of Design and Construction, which will assume the design and construction responsibilities of the Office of the Chief Engineer at Denver; the Branch of Project Investigations, which will perform the work now done by the Project Planning Section of the Chief Engineer's office; the Branch of Operation and Maintenance, which will carry out the functions of the Operations and Maintenance Division, as presently constituted, for irrigation activities; the Branch of Fiscal and Administrative Management, which will assume the duties of the Office of the Chief Accountant, including the central accounting office, and those of the general clerical section of the Office of the Chief Engineer.

Military furloughs, transfers, and stop-work orders restricting construction reduced the number of Reclamation employees from 8,016 on June 30, 1942, to 6,543 on June 30, 1943. Twelve Washington office employees and 1,373 field employees were in the armed forces of the United States.

The number of field offices, exclusive of headquarters of project investigations, was reduced from 57 to 54.

The Bureau pay roll was segregated as follows: 5,623 employees engaged in construction or operation and maintenance on field projects; 773 in the field headquarters at Denver; 49 attorneys and clerical employees engaged in field legal work under the supervision of the Chief Counsel; and 98 employees in the Washington office, including the Commissioner, the Assistant Commissioner, and several who are detailed to other offices.

#### Commissioner Page Resigns

Due to ill health John Chatfield Page, Commissioner of Reclamation since January 25, 1937, resigned his position in June. His resignation was to be effective upon appointment of his successor. When his health permits, Mr. Page then will resume his active association with the Bureau as consulting engineer with headquarters at Denver. He first joined the Bureau early in 1909. After 2 years'

TABLE 4.—*Accretions to Reclamation Fund by States*

States	Sale of public lands		Proceeds from oil leasing act		Total to June 30, 1943
	Fiscal year 1943	To June 30, 1943	Fiscal year 1943	To June 30, 1943	
Alabama.....			\$31.76	\$197,604.02	\$197,604.02
Arizona.....	\$2,604.23	\$2,766,339.36	1,451.71	6,303.95	2,772,643.31
California.....	1,971.54	8,304,067.54	1,092,995.24	21,722,351.47	30,026,419.01
Colorado.....	3,531.91	10,326,330.20	107,527.88	1,104,787.40	11,431,117.60
Idaho.....	3,350.40	7,058,097.58	128.64	22,374.93	7,080,472.51
Kansas.....		1,033,601.40	3,391.28	10,206.82	1,043,808.22
Louisiana.....			11,111.94	332,596.76	332,596.76
Michigan.....			9.19	56.45	56.45
Mississippi.....				110.25	110.25
Montana.....	1,397.12	15,388,624.90	95,404.14	1,631,988.61	17,020,613.51
Nebraska.....	410.45	2,097,698.70	78.75	330.75	2,098,029.45
Nevada.....	1,960.00	1,042,345.90	577.76	6,191.98	1,048,537.88
New Mexico.....	519.31	6,742,810.30	579,531.45	4,218,905.43	10,961,715.73
North Dakota.....		12,219,646.27	18,786.60	259,194.50	12,478,840.77
Oklahoma.....		5,931,145.58	1,079.55	7,169.32	5,938,314.90
Oregon.....	376.76	11,995,324.73	105.26	957.28	11,996,282.01
South Dakota.....		7,733,675.48	6,550.46	19,296.72	7,752,972.20
Utah.....	33.56	4,397,539.48	147,567.67	1,131,995.80	5,529,535.28
Washington.....	2,242.03	7,475,102.22	1,666.45	43,974.71	7,519,076.93
Wyoming.....	1,652.23	8,722,080.55	1,150,413.57	40,644,043.15	49,366,123.70
Total.....	20,049.54	113,234,430.19	3,218,409.30	71,360,440.30	184,594,870.49
Proceeds, Federal water power licenses.....					<sup>1</sup> 927,307.88
Proceeds, potassium royalties and rentals.....					<sup>2</sup> 1,391,465.21
Receipts from naval petroleum reserves, 1920 to 1938, act of May 9, 1938.....					29,778,300.23
Grand total.....					216,691,943.81

<sup>1</sup> Proceeds for fiscal year \$33,463.43.

<sup>2</sup> Proceeds for fiscal year \$246,059.79.

### Reclamation Fund Accretions

service in other fields, he returned in 1911 to serve continuously thereafter.

Accretions to the Reclamation Fund, created by the Reclamation Act of 1902 (table 4), brought the total cash available from this source in 41 years to \$216,691,943.81. Collections—construction and operation and maintenance repayments, water rentals, power, etc.—were \$148,346,928.86. Disbursements totaled \$344,595,311.90, leaving a balance in the fund on June 30 of \$20,443,560.77.

Construction repayments to the Reclamation fund during the year totaled \$3,116,583.23; operation and maintenance collections amounted to \$1,298,081.11; and water rental, power, and other receipts aggregated \$2,665,801.74.

The total collections, which are the highest with the exception of two years in the history of the Bureau, reflect the improved conditions of Reclamation farmers and their response to the President's anti-inflation policy through maintaining payments. The high level of the Reclamation fund provides a backlog of resources for the extension of irrigation when the resumption of construction is possible.



## Federal Investment Increased

Expenditures for construction on all projects during the year totaled \$53,336,884.87 bringing the federal investment to \$870,105,474.92 (see table 5).

Due to war restrictions on construction of irrigation systems, the major expenditures were on facilities which would expedite the generation of power for war production. These expenditures, however, advanced the completion of facilities which will aid irrigation through additional storage. The power revenues for these installations will assist in financing the cost of irrigation systems.

Preliminary studies indicate that when the Reclamation construction program as laid out at the beginning of the war is completed, about 50 percent of the repayable costs will come from power revenues and approximately 45 percent from irrigation. The remaining costs will be allocated to nonreimbursable purposes—flood control, navigation, and contributed labor—or will be repayable by municipalities for supplemental water supplies.

For the fiscal year 1944, Congress appropriated \$21,044,000 for construction of irrigation facilities. With unexpended balances on June 30, 1943, this brings to \$54,745,450 the funds available for extending irrigation for war food production. New appropriations by Congress for power and multiple-purpose facilities, which will also aid irrigation, flood and salinity control, or navigation, totaled \$13,149,000. The unexpended balance for power and multiple-purpose facilities brings to \$55,340,200 the total available for construction of this type. The Bureau thus has available for the fiscal year 1944 a total of \$100,085,650 for construction purposes. Under existing war conditions, irrigation construction is subject to recommendations of the War Food Administration to the War Production Board and approval by the latter agency. Similarly, the construction of power facilities is governed by rulings of the War Production Board.

TABLE 5.—Consolidated summary statement of construction cost of reclamation projects <sup>1</sup>

	Construction cost		Operation and maintenance before public notice (net)		Operation and maintenance deficits and arrearages and penalties		Construction revenues, contributed funds, and nonreimbursable appropriation		Abandoned work and nonreimbursable cost and authorized charge-offs		Total repayable	
	Fiscal year 1943	To June 30, 1943	Fiscal year 1943	To June 30, 1943	Fiscal year 1943	To June 30, 1943	Fiscal year 1943	To June 30, 1943	Fiscal year 1943	To June 30, 1943	Fiscal year 1943	To June 30, 1943
<i>Regular projects</i> <sup>2</sup>												
Total.....	\$36,860,268.71	\$487,138,350.23	\$62,790.05	\$83,357,498.12	\$19,017.72	\$89,414,902.96	\$794,790.46	\$16,266,170.49	\$17,131,187.06	\$36,109,714.22	\$466,513,393.76	
<i>Water conservation and utilization projects</i>												
Total.....	\$869,500.77	\$5,554,123.70	\$682.11	\$39,695.81								Net construction cost
<i>Special projects</i> <sup>3</sup>												
Colorado River Dam Fund: <sup>4</sup>												
All-American Canal Boulder Canyon project.....	\$324,067.33	\$32,097,714.58										
Arizona:	4,701,409.66	139,600,355.18										
Davis Dam.....	685,466.00	1,053,259.85										
Parker Dam <sup>5</sup> .....	\$ 24,027.84	6,779,055.31										
Parker Dam power.....	2,917,532.71	13,685,607.88										
Montana: Fort Peck.....	2,057.69	2,057.69										
Texas: Colorado River, Tex. <sup>7</sup> .....	\$ 27,246.54	23,539,005.78										
Washington: Columbia Basin.....	7,027,856.38	160,652,343.72										
Total.....	15,607,115.39	377,413,000.90										
Grand total.....	\$53,336,884.87	\$870,105,474.92										

<sup>1</sup> Consolidated statement by individual projects available in mimeographed form at Bureau of Reclamation, Washington, D. C.

<sup>2</sup> Authorized under Reclamation law.

<sup>3</sup> Multiple-purpose project; all costs repayable except when noted.

<sup>4</sup> All costs repayable.

<sup>5</sup> Reduction adjustment.

<sup>6</sup> Funds advanced by Metropolitan Water District of Southern California.

<sup>7</sup> Repayable costs not determined.

# Office of Solid Fuels Administration for War

HOWARD A. GRAY, Deputy Administrator

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**E**XPANSION of the United States war program has created enormous demands for coal with requirements keeping pace with the quickened tempo of armament production. Increased production has been required to fill the demands of industry, particularly steel, public utilities, railroads, and as raw material used in the manufacture of explosives, synthetic rubbers, plastics, medicines, and other essentials.

Shifts of population to war-production centers and the concentration of soldiers and sailors in training camps and naval stations brought increased demands for coal. Conversions of heating plants from petroleum to coal also contributed to the necessity for a greater supply of coal.

Increased requirements have been accompanied by changes in the distribution pattern and difficulties in meeting demands were accentuated by acute manpower and equipment shortages, and by labor disturbances.

Three general coal mine strikes resulted in reducing the amount of coal produced by approximately 25,250,000 tons.

By Presidential Executive order on May 1, the Secretary of the Interior took possession and control of mines producing 50 tons or more per day, on which work stoppages or strikes had occurred or were threatened. The Solid Fuels Administration directed operation of the mines until the end of the fiscal year, when this task was turned over to the newly-organized Coal Mines Administration.

During the year essential demands for coal were supplied and the largest protective stock piles in the history of the industry were built. Production of bituminous coal reached record heights and anthracite output was the largest since 1930.



Deficiencies in the production of certain types and sizes of coals, uneven distribution of protective stocks and increasing requirements in certain areas were recurrent problems requiring constant attention.

Establishment of the Solid Fuels Administration for War followed issuance of Executive Order No. 9332 on April 19, 1943, designating the Secretary of the Interior as Administrator. The new organization absorbed the personnel and the records of the former Office of Solid Fuels Coordinator, which had been set up by Presidential request on November 5, 1941.

The Executive order granted definite authority while the former office had been empowered only to recommend and advise.

Within a few weeks after its establishment, the new authority was exercised in meeting the complex problems raised by the strikes and the Government's control of the mines. These were handled expeditiously through an organization which was assembled with the cooperation of the Bituminous Coal Division and the Bureau of Mines.

Through its organization of the coal industry in the previous fiscal year and with the assistance of the Solid Fuels Advisory War Council, the Office keyed the Nation's coal program to the estimated requirements for 1943. Based on careful studies it estimated 1943 production requirements for bituminous coal at 600,000,000 tons and for anthracite at approximately 65,000,000 tons.

These figures represented increases of 20,000,000 tons over preliminary 1942 bituminous output estimates (which exceeded the previous record of 1918) and about 5,000,000 tons above 1942 anthracite production.

The heavy 1942 production was made possible by a coal-stocking campaign which the Office pressed vigorously to provide an outlet for mine output during the normally slack summer months. By December 1, despite increasing consumption, bituminous stocks were approximately 90,874,000 tons, about 15,000,000 tons above the previous 1927 record. Total anthracite stocks were also believed to be above normal.

While rising consumption cut bituminous stocks during the winter, at the end of the fiscal year stocks were estimated at 74,028,000 tons, a substantial cushion against emergencies which might arise. These stocks however, were unevenly distributed, with wide differences between individual consumers and classes of consumers.

In cooperation with the Office of War Information, other Government agencies, railroad and industry groups, we carried out a Nation-wide campaign to stimulate early ordering of coal.

National radio commentators and radio stations cooperated in the campaign which, because of the tight supply in anthracite, was definitely directed to bituminous coal consuming areas.

The Office of War Information disseminated material relating to the campaign through all media.

The Administration, through the Department of the Interior Radio Section, prepared and distributed radio records which carried the Order-Coal-Now message. These were distributed free to retail coal dealers and other participants in the campaign, and were used on radio advertising programs. The radio time in all cases was paid for by the campaign participants.

Cooperation with civic groups has been freely given and the advice of the Administration has been sought by organized retail groups, civic committees and newspapers interested in the campaign.

Public response to the campaign was reflected in the increased number of orders reported by coal dealers.

The major problems of the coal industry—manpower and equipment shortages—increased during the year in spite of every effort at their solution. Estimates indicated a net loss of upwards of 60,000 miners in 1942, and these losses to the armed services and industry were continuing in 1943. Manpower losses likewise hampered retail distribution, restricting its capacity.

While the Solid Fuels Office repeatedly brought the manpower situation to the attention of the War Manpower Commission and the Selective Service System in an effort to halt or retard the critical drain on the industry, marked losses in potential capacity for production and distribution were directly traceable to heavy labor turn-over.

The coal supply would have been further reduced except for the establishment of the 42-hour, 6-day week, in the mines which was instituted at the behest of the Office.

Earlier, labor, at the request of the Solid Fuels Coordinator, relaxed restrictions against Sunday and holiday overtime work in mines in Oregon, Washington, Wyoming, Utah, Colorado, and New Mexico.

The Office collaborated closely with the War Production Board in providing equipment and materials for mining operations. Likewise, it worked with the Reconstruction Finance Corporation which furnished financial assistance for many of these purchases and for the extension of mining operations.

Close collaboration with the Office of Defense Transportation, the War Shipping Administration, and the Association of American

Railroads facilitated the movement of coal and in many instances averted serious disruption of industrial activity.

The greater volume of coal and longer rail hauls have put increased strain upon the railroads' car supply in spite of efforts to speed "turn-around" time and increase car loadings.

Three general areas, where transportation has caused problems, are:

1. New England, where increased requirements have arisen from war industries and because of fuel-oil conversions. Normally this area received most of its coal by tidewater colliers. Submarine activity and diversion of colliers necessitated a greater movement by rail. Now the bulk of the region's coal moves by the long all-rail haul direct from the mines or by a long rail haul to barge terminals where it is transshipped for water movement. Because of the special problems of New England, a Solid Fuels Office was opened in Boston in December 1942.

2. The Great Lakes area, which is served by coal cargo vessels, and especially the Lake Superior and west bank of Lake Michigan regions, which are virtually inaccessible to coal moved by rail. The delayed opening of lake navigation in 1943, coupled with serious loss of tonnage because of strikes, put shipments far behind schedule. As the fiscal year ended, every effort was being put forth to move more coal to the upper lake docks, which had been drained by the long severe winter of the usual "carry-over" stocks.

3. The Pacific Northwest States of Washington, Oregon, and Idaho, where coal requirements had increased sharply due to conversions from other fuels, influx of population, and new war industries. Simultaneously, manpower losses reduced the production of Rocky Mountain and Pacific Northwest mines. A Solid Fuels Office was opened at Seattle in September to keep in close touch with the situation. During the winter, the area's inadequate fuel supply was supplemented by approximately 225,000 tons of eastern coal hauled from the Lake Superior docks by railroad. Lend-lease coal requirements added to the burden in the Northwest.

The most troublesome problem in the fiscal year was in meeting the needs of anthracite users in the Eastern States. Because of spring floods in 1942, production was behind schedule and maldistribution of the output resulted in orders piling up and customers clamoring for coal throughout the season. During January a series of strikes cut production approximately 500,000 tons and at the request of the Solid Fuels Coordinator the industry temporarily suspended anthracite shipments outside of the area until the emergency had passed.



In an endeavor to step up production, the Office assisted War Production Drive Headquarters in conducting a production drive in the anthracite and certain bituminous mines.

However, continuing tightness of the anthracite supply through the spring months, added to the losses of production in the strikes of January, May, and June, necessitated the institution of a temporary anthracite distribution program in June which provided for the equitable distribution of the available supply until a permanent program could be developed.

A major activity of the Administration and its predecessor has been to assure a constant supply of suitable coal for the manufacture of coke used in the iron and steel industry. A field agent was assigned to the Connellsville region to aid in maintaining a constant flow of the proper coals to beehive ovens which supplemented the output of by-product coke plants. New and additional sources of this coal were explored. These activities contributed to maintaining continuous operations of the beehive ovens.

Last November influence was exerted on byproduct coke plants to make fuel contracts for the coal year 1943-44. The Office assisted them in obtaining this coal and induced the industry generally to build up larger stock piles. The wisdom of this policy was demonstrated during the strikes when a great loss of coke output and consequently of steel was averted.

In July 1942, in conjunction with the Bureau of Mines, the Office formed a coke production committee, representing the coke-making industry. Valuable work was done by this committee in investigating the coke problems limiting pig-iron production and in developing a program designed to increase pig-iron output by an estimated average of 50 tons per blast furnace daily.

To keep abreast of current trends, the Office instituted and elaborated various surveys through the Economics Branch of the Bituminous Coal Division. Among these were:

a. A monthly survey of consumption stocks and days' supplies of fuel used by 18,000 manufacturers and a similar report from 15,000 coal dealers.

b. Studies of mine manpower, covering employment, critical shortages, additions, separations, and labor needs.

c. Weekly reports from all river and rail connected mines of more than 50 tons daily capacity showing production, number of days' operation, shifts and time and tonnage lost due to "no orders."

At the Office's request, the Bureau of Mines instituted anthracite distribution studies, and forms for gathering these statistics were almost ready for use at the year's end.

Various studies begun in the year covered other phases of the coal industry, including the more effective use of lake and river transportation.

Besides handling problems as they arose, the Administration neglected no opportunity to prepare for future contingencies. Additional study was made of plans for the emergency distribution of coal in the event that developments might require such close control to ensure all essential needs being met.

# Bituminous Coal Division

DAN H. WHEELER, Director

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SINCE the Bituminous Coal Act of 1937, administered by the Bituminous Coal Division, expired August 23, 1943, it seems appropriate to appraise the agency's activities during the period from July 1, 1942, through August 23, 1943 (for the purpose of this report referred to as the fiscal year) in the light of the over-all objectives of the act.

Conceived in peacetime as legislation to remedy chronic economic distress in the bituminous coal industry, the statute proved to be an effective war measure and the Bituminous Coal Division readily adapted its activities to performance of direct and vital war work.

## CONTRIBUTION OF BITUMINOUS COAL ACT TO WAR PROGRAM

The bituminous coal industry first experienced minimum price regulation under NRA. When the National Recovery Act was declared unconstitutional the price structure for coal became void, but hope of further stabilization by legislation was not abandoned. From 1935 until they became effective October 1, 1940, under the Bituminous Coal Act, minimum prices established by law seemed always imminent. The hope of ultimate statutory relief from their economic distress influenced many operators to remain in a business in which they were losing capital. Thus enough potential capacity remained after 15 years of continuous annual losses in the industry to permit rapid expansion of production to meet growing war requirements. This explains the ability of the industry to increase production from 461,000,000 tons in 1940 to 580,000,000 tons in 1942 and to attempt to reach a goal of 600,000,000 tons in 1943.

Freed from unfair competition through the operation of the act many months prior to the outbreak of war, the industry had been



able to undertake the development of mines necessary to reach the high production level demanded by the war. Orderliness established in the industry and the mechanism for its cooperation with a government agency which resulted from the Bituminous Coal Act helped expedite the handling of the Nation's wartime fuel problems.

Material assistance to many other departments of the Government, mostly in connection with war work, was provided by the Bituminous Coal Division, especially through the Economics and Marketing Branches. Frequently information made available by the routine administration of the act was processed to serve other agencies' needs. In many cases these branches used their trained personnel and existing machinery to make special inquiries. These wartime functions were essential, and with the expiration of the act, either must be discontinued or carried on by specially organized agencies.

The agencies served in this manner by these branches include the War Department, the Navy Department, the War Production Board, the War Labor Board, the Office of Economic Stabilization, the Office of Economic Warfare, the Bituminous Coal Consumers Counsel, the Solid Fuels Administration for War, the Coal Mines Administration, the Office of Price Administration, the Interstate Commerce Commission, the Maritime Commission, and many others. Each branch carried on this special war work together with a large volume of routine work in connection with the administration of the act.

## OBJECTIVE OF THE BITUMINOUS COAL ACT

The Bituminous Coal Act was devised by the Congress to stabilize the bituminous coal industry by the equalization of weighted average costs of production with weighted average realizations in each of 10 minimum price areas described in the act. It was designed to achieve this balance without imposing upon the industry a rigidity of costs or a rigidity of prices; without insuring the industry a profit and without proscribing the opportunity for one.

Apparently many misconceptions prevailed as to the meaning of stabilization under the Bituminous Coal Act. As comprehended in this statute, stabilization meant preventing the deterioration of the operating positions of all companies, as a whole, within a price area, under the impact of a competitive price cutting which normally prevailed in the industry. However, stabilization as conceived in the act and competition were not incompatible. On the contrary the stabilization mechanisms under the act were designed to promote the

type of competition which would bring about an orderly outcome of affairs, and to prevent the type which wouldn't. Within the bounds prescribed by the act, it was intended that competition be fair, free, and unrestrained.

It should be observed that the act was designed to stabilize the relationship between costs and prices. The act did not require operators and miners to enter into wage contracts and did not preclude controversy between operators and miners. Its stabilization process began with the completed determination of labor costs and other costs whatever may have been the factors in determining them. Unquestionably it was hoped that the frequency and violence of labor disturbances would be among the effects of instability in the industry which would be lessened by controlling the causes, but the act could not eliminate the fundamental desire on the part of any groups to act in their own self-interest.

### ACT OUTGROWTH OF LONG CONGRESSIONAL STUDY

The Bituminous Coal Act of 1937 was the outgrowth of a quarter of a century of investigations of the industry by Congress. These disclosed that the industry had suffered annual losses ranging into millions of dollars for at least 15 years prior to 1937. Indeed the whole history of the industry since shortly after the First World War was revealed as a long record of huge financial losses to investors with consequent widespread bankruptcies; lack of employment for miners with consequent impoverishment of entire mining communities; and a trend toward low wages with consequent strikes frequently accompanied by violence. The general instability of the industry was found to have led to price discrimination against smaller consumers and to the wasteful and ruthless exploitation of the Nation's bituminous coal resources.

Long studies of the industry made it apparent to the Congress that these unhealthy economic conditions had arisen as the outgrowth of competition based on price-cutting below cost levels and other unfair practices. These practices, in turn, were found to stem from excess production capacity and peculiarities inherent in coal mining. The problems of the industry appeared to be of a nature which defied solution by the industry itself, although they threatened its complete dissolution. The bituminous coal industry is national in scope. It is indispensable to the country's industrial civilization. It operates in 29 States, provides 75 percent of the fuel for manufacturing, about 80 percent of the fuel for railway locomotives, and about 70 percent

of the fuel for steam-generated electricity. In accordance with its traditional policy, Congress decided to stabilize the industry by legislation in the interest of the public.

## METHOD OF STABILIZATION

The problems faced by the bituminous coal industry in the United States after the First World War were almost identical with those faced by the industry in virtually every other major coal producing country. Various countries tried various devices, including nationalization of coal deposits to remedy the economy of their coal industries. In the United States, however, the Congress chose to deal with these problems by balancing cost against realization through institution of minimum prices with the aid of the industry rather than resort to Government-controlled cartels or industry-freezing production or marketing quotas.

To insure producers the largest possible field for initiative compatible with stabilization, the Congress wrote into the Bituminous Coal Act the specific provision that "existing fair competitive opportunities" must be preserved by giving consideration, in fixing minimum prices, to the relative market value of coals, values as to uses, seasonal demand, transportation methods and charges, and competitive relationships between coal and other forms of fuel and energy, and the interests of consumers of coal.

Administration of the act was entrusted originally to the National Bituminous Coal Commission composed of seven members, some of whom represented the industry. Although it was able to perform important work in organizing the task before it, the Commission did not succeed in putting into effect the statutory mechanisms intended to rehabilitate the bituminous coal industry.

## ORIGIN OF THE BITUMINOUS COAL DIVISION

Under Reorganization Plan No. II, issued by the President pursuant to the Reorganization Act of 1939, the Commission was abolished and its functions were transferred to the Secretary of the Interior as of July 1, 1939. By an order dated July 1, 1939, the Secretary constituted the Bituminous Coal Division in the Department of the Interior and empowered its Director to exercise, with minor exceptions, the functions of the Commission.

At the outset of its administration of the act, the Division effected extensive changes in organization and procedure; the field offices were consolidated and other economies were made. Pursuant to the pro-



visions of the Ramspeck Act, practically all employees were placed under civil service. Minimum prices and marketing rules and regulations were initially established on October 1, 1940. No court actions were prosecuted and consequently no stays or injunctions were issued by any court against the enforcement of those minimum prices and fair marketing rules. Minimum prices were generally revised October 1, 1942, in order to reflect changes in the costs of production.

## BENEFITS TO INDUSTRY MEASURED

Although the fact that the industry enjoyed sufficient economic vigor to be able to meet wartime coal requirements may be regarded as substantial proof that its condition had improved under the operation of the act, the benefits which the act brought the industry are confirmed by more specific evidence.

Prior to the establishment of minimum prices, the costs of producing coal exceeded realization and the whole industry lost money. Despite the growing impetus of wartime industrial activities, this condition remained during the first 9 months of 1940. During these last months in which the industry operated without the protection of minimum prices, the average loss per ton for the industry as a whole was roughly 5 cents. The condition was not showing any progressive improvement. However, coincidental with the establishment of effective minimum prices, all coal has sold on a level sufficient to return to the industry its cost of production as defined in the coal act, and the industry's habitual losses disappeared.

The contrast between conditions in the industry with respect to the relationship of costs and realization before and after establishment of minimum prices is shown in Charts 1 and 2. Chart 1 shows that in 1938 about 80 percent of the commercial tonnage sold at a deficit. The average deficit of all commercial tonnage that year was 15 cents a ton. This amounted to an operating loss for commercial operators of about \$40,000,000. At all periods since the establishment of minimum prices, not less than approximately two-thirds of the industry's commercial tonnage sold at a margin above costs. During most of the time after the establishment of minimum prices, about three-quarters of the industry was operating above costs. In the first 3 months of 1941 there was about 80 percent of the production with a margin above costs. This percentage dropped somewhat with the revision of wages in April 1941, but remained at about 65 percent during the summer months. During October 1941 the industry was making in excess of 15 cents per ton, and 76 percent of the commercial mines were able to make a margin above costs.

COMPARISON OF REALIZATION AND COST<sup>1/</sup> FOR COMMERCIAL<sup>2/</sup> BITUMINOUS COAL MINES IN THE UNITED STATES, 1938.

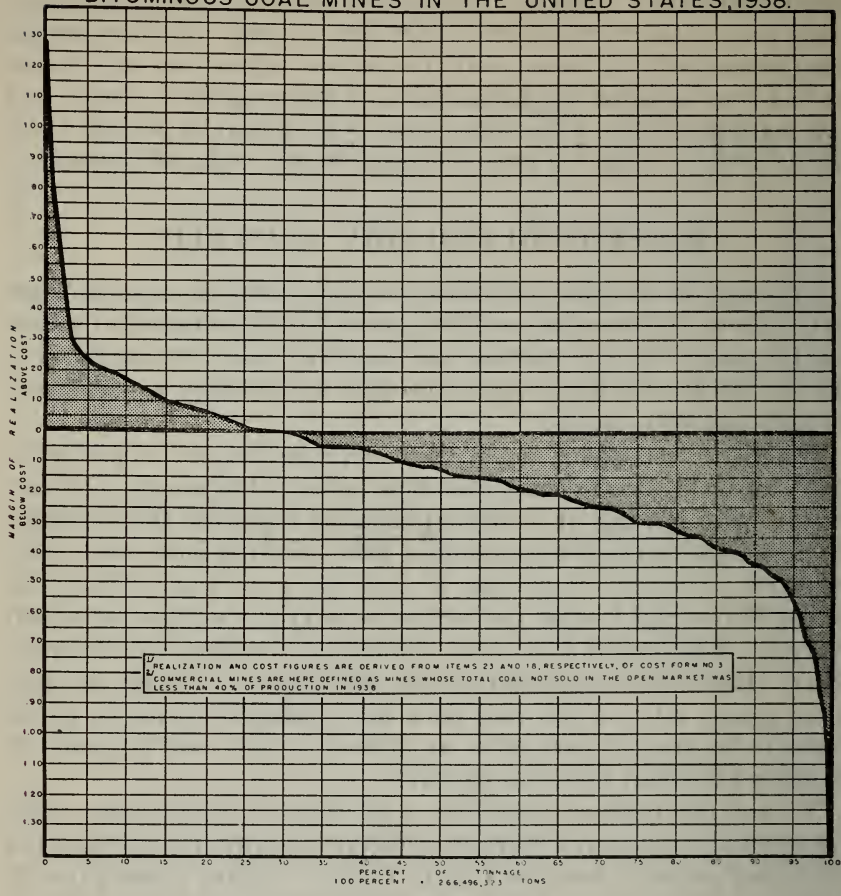


CHART 1

Chart No. 2 for 1942, shows that about three-fourths of the coal mines made a margin above costs. The margin for that year was about 12 cents a ton, a modest return, and for the commercial industry as a whole the operating margin was \$52,200,000, in sharp contrast with the deficit of \$40,000,000 in 1938.

While the establishment of minimum prices was not, perhaps, solely responsible for this changed relationship, clearly much of the improvement in the economic condition of the industry must be credited to the operation of the act. A considerable percentage of coal sold at the minimum price level throughout the year of 1942. In all likelihood this coal would have sold at still lower prices in the absence of the restraints of the statute. This would have wrought a considerable

COMPARISON OF REALIZATION<sup>1/</sup> AND COST<sup>2/</sup> FOR COMMERCIAL<sup>3/</sup> BITUMINOUS COAL MINES IN THE UNITED STATES 1942.

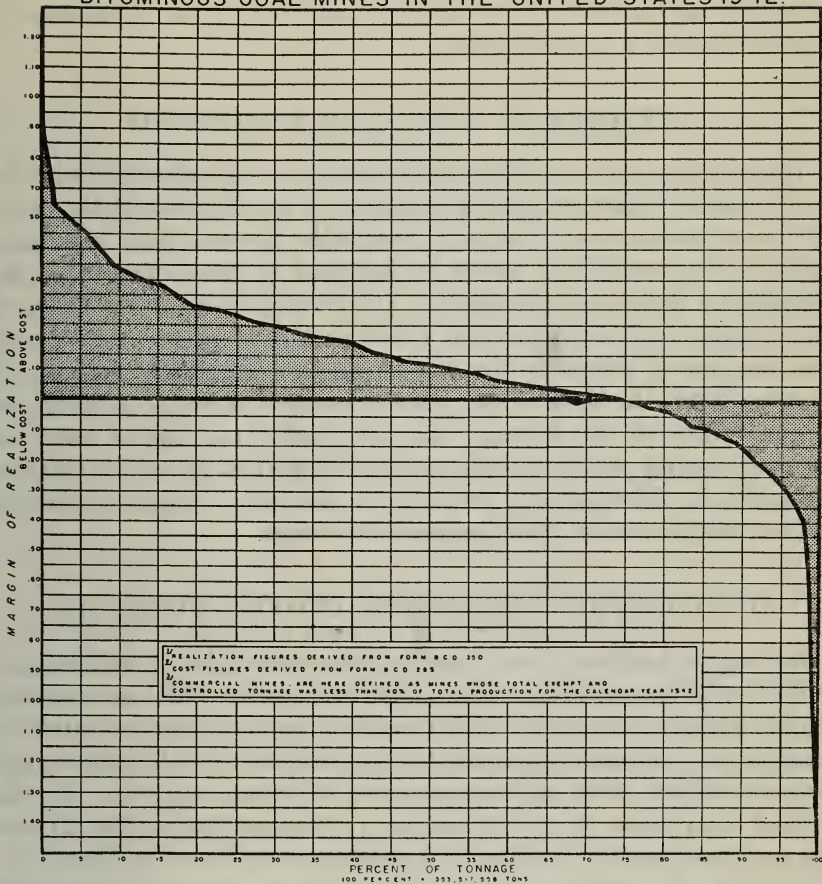


CHART 2

change in the picture presented in Chart 2. It may reasonably be concluded that a much larger segment of the industry would have lost money at a time when the Nation could ill afford to have the industry weakened.

The Bituminous Coal Act also established a structure for the marketing of coal. It provided for the elimination of discriminatory and other unfair trade practices which characterized the industry in the period prior to its enactment. Among these were secret rebates, discounts, attempts to purchase business, the intentional misrepresentation of the quality and kind of coal, misleading and deceptive advertising; the unauthorized use of trademarks, trade names, and slogans of a competitor, the breaching of contracts between a competitor and



his customer, employment of persons primarily for the purpose of procuring preferment with a customer. The act thus played an important part in bringing order to the coal industry out of the anarchy which prevailed a few years ago.

### INTEREST OF CONSUMER PROTECTED

The benefits which accrued to the bituminous coal industry under the operation of the act were not prejudicial to the interests of the country's coal consumers. The act specifically directed that minimum prices, when established, must be designed to have regard for the interests of the consuming public. It also provided for the Office of the Bituminous Coal Consumers' Counsel, authorized to represent the coal consuming public before the Division. Minimum prices as of October 1942—the date of the general over-all revision of minimum prices—were, on the average, only 29 cents a ton higher than the depressed going prices of 1939, the last full year of unrestrained price competition. The average increase in the mine price of domestic sizes of coal was lower than the over-all average.

### STABILIZATION MECHANISMS PROVED WORKABLE

During the last fiscal year, the administration of the act with respect to routine matters within its scope as well as special situations resulting from the Nation's change-over to a wartime economy, demonstrated the soundness of the act's approach to the problem of stabilization, and the workability of its mechanism under varying conditions. In this respect completion of the proceeding in General Docket No. 21 and the resultant general revision of minimum prices was significant.

Novel and complex economic and legal issues were involved both in the establishment and subsequent revision of a minimum price structure for an industry the marketing of whose products involved the most intricate price relationships. A sound and careful approach demanded that all interested persons be granted an opportunity to present in full their points of view. Lengthy hearings were the natural result. Time lags consequently preceded both the initial establishment and the general revisions of the minimum price structure. Yet it was clear that the objectives of the act could not be achieved unless it were feasible to translate speedily increases or decreases in costs of production into increases or decreases in minimum prices. Techniques were evolved in the course of the proceeding in General Docket No. 21 which assured the expedition of future proceedings looking toward general price revision.

The first phase of this proceeding was concerned with determining the changes in costs from those upon which the original price structure was based. Using 1940 as a base year, the Division made adjustments, over the protest of the Associated Industries of New York State, Inc., to reflect increases in labor costs due to the Appalachian wage agreement effective April 1, 1941. The determination was challenged in court by a petition for review filed by Associated Industries, which remained undecided upon the expiration of the act.

The second phase was concerned with the establishment of a minimum price structure for each minimum price area which would reflect the costs as determined in the first phase. One of the questions involved was whether minimum prices should be revised merely to reflect cost changes since the determination upon which the first price structure was based, or whether they should be revised to bring about approximate equivalence between costs established as current in the first phase of the proceeding. The formula adopted by the Director, over the protest of Associated Industries, and affirmed by the Secretary of the Interior was that in a general price revision proceeding, the minimum price should be increased or decreased so that minimum price realization, estimated upon as current and representative a distribution period as possible, would be at parity with current costs of operation, as nearly as could be ascertained.

Another basic issue was resolved in the second phase of the proceeding. It was discovered that the extent to which minimum prices for coals of each minimum price area had to be increased in order that an approximate equivalence between minimum price realization and costs of operation could be attained varied from minimum price area to minimum price area.

Revising in varying amounts the minimum prices for coal of different minimum price areas would have destroyed the coordination between competing districts, established in the initial price structure to effectuate the provision of the statute that the effective minimum price should preserve so far as possible the fair existing competitive opportunities in the industry.

To resolve this problem, the Director, again over the objection of Associated Industries, and the Bituminous Coal Consumer's Counsel, applied the so-called "weighted average adjustment method" in order to preserve the coordination. Under this method, price adjustments on coal moving into selected groups of consuming market areas were made uniform by the amount of the weighted average increase determined by weighting the realization increases needed by the combined tonnages of the coal sold in selected groups of consuming areas.

By applying these techniques in future general price revision proceedings it would have been possible to have made a general revision of minimum prices generally subject almost to mathematical determination.

## ADJUSTMENT OF PRICES FLEXIBLE

As a means of keeping minimum price structures equitable, the Congress wrote into the act the means for quick adjustment of particular minimum prices or coordinations through petition under section 4 II (d). The operation of this provision of the act during the last fiscal year continued to demonstrate that varying interests involved in the production and marketing of bituminous coal can be equitably reconciled in the fixing and enforcement of minimum prices.

A majority of the 531 petitions filed under the section requested the establishment of prices for new coals coming on the market, rather than for revision of established prices. Of the petitions filed from July 1, 1942, through June 30, 1943, all but 68 had been acted upon and disposed of by the latter date.

## RAIL-RIVER COORDINATION

One of the most complex tasks of the Division was to assign proper weights to the various factors enumerated in the price-fixing provisions of the act in establishing minimum prices for coals moving into markets served by both river and rail transportation.

The act provides that, in the establishment of minimum prices, "transportation methods and charges and their effect upon a reasonable opportunity to compete on a fair basis" shall be taken into account, and that prices "shall have due regard to the interests of the consuming public," and furthermore that "existing fair competitive opportunities shall be preserved as nearly as possible."

In many instances the cost of shipping coal by river is lower than the cost of shipping by rail, with the result that river-borne coals may have a competitive advantage in certain market areas although many other factors may play a part in determining the ability of producers who must ship by rail to compete against river shipping producers. Thus it becomes apparent that in defining the scope of the price provisions enumerated with respect to competing river and rail coals, the Division had to reconcile a complex of conflicting interests.

If the same price were established for river and rail coal moving into a previously rail-dominated market, river coal would deliver



cheaper and destroy previous competitive opportunities. Accordingly, in the original minimum price structure, in general, differentials in mine prices were established favoring rail coals which had been competing with river coals at a particular market area to the extent necessary to allow the rail coals to be sold at that market at the same delivered prices as river coals of equal value. No such differential was provided for rail coals which had not been competing with river coals. Mine prices for most river-borne coal were equated with mine prices for rail coal so that the minimum delivered price was for river-borne than for coal shipped all-rail.

It was not intended, however, to freeze the competitive situation in each market as it was recognized that any of many factors might encourage a particular consumer, or retailer, in the absence of minimum prices, to purchase river-borne coal rather than rail-borne coal. With this possibility in view, minimum price schedules for districts affected contained "special case machinery" whereby petitions for "free alongside prices" might be addressed to the Division under section 4 II (d). Twenty-one petitions for relief under this machinery were filed and permanent relief was granted in 13 and temporary relief in 3 cases. Disposition of 2 of the 5 remaining cases hinged upon the final disposition of the proceeding in Docket No. A-1239. This case was instituted by the Division to ascertain the merits of complaints by some independent retailers that the coordination of rail and river coals in the Cincinnati, Ohio, marketing area had placed them at a competitive disadvantage. Cincinnati had been found to be a rail-dominated market when the first price structure was established in General Docket No. 15. The record indicated that it was essential to maintain the Cincinnati rail market because lack of continuity of traffic on the Ohio River due to freezing or floods jeopardized a continuous coal supply. At such times when transportation was disrupted serious coal shortages might occur in the Cincinnati area if the rail market were eliminated through preferential treatment of river-borne coal. It was found that the marketing situation in Cincinnati was further complicated by a conflict of interests between independent retailers and the so-called integrated retailers who were part of large organizations engaged in the production and transportation as well as the retailing of coal. After considering all factors involved, the Division had coordinated the mine prices for all-rail coals and river coals moving into the Cincinnati area so as to equate the delivered price of such coals.

However, data obtained in the proceeding in Docket No. A-1239 indicated that a substantial differential existed between the costs of the independent and integrated retail operations in the Cincinnati

area. The record also indicated that a substantial increase had taken place in the volume of coal moving by river into this area.

The report of the Examiner in Docket No. A-1239 issued after the end of the fiscal year, illustrates that the minimum price structure is susceptible of sensitive and equitable adjustment at controversial points.

The examiner recommended, first, that all retail dealers in Cincinnati, whether independent or affiliated with producers, should be permitted to purchase at mine prices for free alongside delivery provided they undertake to resell at prices not below the minimum f. o. b. mine price for all-rail shipment, plus the all-rail freight rate from the origin point to the point of resale. The examiner recommended, second, that machinery be established whereby a rail shipper threatened with loss of any business with a retail dealer, might be permitted to reduce his prices on particular sizes to the extent necessary to afford him an opportunity to compete for business previously enjoyed. Finally the examiner recommended that producers shipping coal by river to the Cincinnati area in facilities owned or controlled by them, and selling it through affiliates at retail, be required to increase on their books their f. o. b. mine realization by the amount representing the difference between the all-rail freight rate between the points of transit and the actual cost to them of transportation reasonably computed. Because of the expiration of the act, time was not available for final disposition of the proceeding.

## MARKETING AGENCIES

Section 12 of the act exempted from the prohibitions of the anti-trust laws of the United States marketing agencies disposing of bituminous coal in commerce upon condition that such agencies obtain Division approval and conform with "reasonable regulations for the protection of the public interests" to be prescribed by the Division. The grounds for Division approval were enumerated in the statute. The Division deemed it a crucial responsibility to see that general national policies exemplified in the antitrust laws were not violated by the marketing agencies and that, on the contrary, such agencies were made to subserve the national interest by employing more economical methods of marketing coal.

At the outset of the administration of the act a number of marketing agencies were provisionally approved by the National Bituminous Coal Commission. By 1941 these agencies had become fully organized and were beginning to exercise an appreciable influence on the market. The Division issued orders to the agencies to show cause why

additional restrictions should not be imposed on them in the public interest. During the last fiscal year examiners' reports were submitted in 11 proceedings. The examiners recommend that previous orders which had been issued provisionally approving the agencies involved be modified. Although the additional restrictions varied in detail from agency to agency, the examiners recommended generally that the commissions the agencies received on sales should not exceed 10 percent, that no increases should be effected in the agency list prices without Division approval, that the list prices might be suspended by the Division upon proof of their unreasonableness, and that the agencies should submit appropriate reports. Expiration of the act prevented final disposition of these proceedings.

### COMPLIANCE

The magnitude of the task of enforcing compliance may be judged by the fact that the act and implementing regulations issued by the Division applied to some 17,000 companies or individuals as producers, sales agents, or distributors engaged in diverse practices in connection with the production and marketing of coals of a wide variety of kinds, qualities, and sizes. A great preponderance of those engaged in the industry were appreciative of the benefits of these regulations and cooperated in their enforcement. However, the urge to obtain more business prompted a relatively few to resort to practices prohibited by the act. This was true even in times of unprecedented demand such as experienced during the past fiscal year.

Instances of price violations were generally found in connection with the sales of lower grades of coal. Some producers disregarded the over-all benefits of the act to resort to unfair practices to obtain markets for residual sizes. A greater proportion of all violations were simple, most frequently being sales of coal at prices less than the effective minima. However, several cases came to light where elaborate and intricate schemes had been devised for evading price and other regulations. Systematic checking by the compliance staff of the Division disclosed many inadvertent as well as wilful violations. When compliance checks indicated wilful violation, compliance proceedings were instituted either by the Bituminous Coal Producers' Boards or by the Division.

During the fiscal year, 508 such investigations were completed, 88 hearings were held, and 129 orders imposing the penalties under the act, and Rules and Regulations were issued. Of these, 69 directed producers to cease and desist from further violations; 42 revoked the code membership of producers, the restoration of which were condi-



tioned upon payment of taxes ranging from moderate sums up to \$8,500.08, and totaling \$49,803.65; 15 suspended or revoked the registration of distributors, and 3 directed distributors to cease and desist from further violations.

One compliance proceeding during the fiscal year was the second of its kind in the history of the act. In the *Matter of Albuquerque and Cerrillos Coal Co.*, Docket No. 1808-FD, the Director was called upon to make a ruling under the provisions of section 9, which insures that labor practices in the coal industry will be consistent with the national policy relative to collective bargaining established by other statutes. It was found that the Albuquerque and Cerrillos Coal Co., a New Mexico producer, had failed to accord its employees the right to bargain collectively and that it had been guilty of restraining, coercing, and interfering with the free exercise of their collective bargaining rights. The Director thereupon certified his findings to departments or agencies of the United States to which the producer was supplying coal, in accordance with the provisions of section 9, which further provided that such agencies or departments should cancel their contracts for coal with the producer.

## LITIGATION

The nature and extent of litigation with respect to the rulings and other administrative actions of the Division during the fiscal year testified to a high degree of acceptance on the part of those concerned. Although a considerable number of punitive orders were issued by the Director because of violations of the act, and a considerable number of orders were issued resolving complicated and delicate issues, only one petition for review of administrative action was filed during the fiscal year in a circuit court of appeals under section 6 (b) of the act. It and all the challenged determinations of the Division which had been reached before the beginning of the past fiscal year were upheld by the courts.

The city of Indianapolis had filed on May 21, 1942, in the Circuit Court of Appeals for the Seventh Circuit, a petition for review of the Director's order, dated April 7, 1942, dismissing its application under section 4 II (1) of the act for exemption of coal produced by a wholly owned subsidiary corporation of West Virginia. The single question raised was whether the Director had correctly found that the petitioner was not the producer of the coal involved. The court, basing its decision upon one by the United States Supreme Court, repudiated one of its former decisions which had reached a contrary result, and upheld the action of the Director, *City of Indianapolis v. Wheeler and*

*Ickes*, 132 F. (2d) 897 (C. C. A. 7th, 1943). Petition for writ of certiorari was denied by the Supreme Court April 5, 1943.

The Ozark Coal Co. had filed on May 23, 1942, in the Circuit Court of Appeals for the Sixth Circuit, a petition for review of the Director's order, dated March 28, 1942, establishing minimum prices for certain coals produced at the Sunshine Mine in District 14 (Arkansas). The principal questions raised were whether the Director's findings concerning the physical characteristics and market value of the coals involved were supported by substantial evidence, whether the prices were properly established pursuant to the price-fixing provisions of the act, and whether the administrative findings were proper in form. By order, dated May 31, 1943, the court affirmed the action of the Director without opinion. *Ozark Coal Co. v. Wheeler and Ickes*, No. 9275. The time for filing a petition to the Supreme Court for writ of certiorari has not yet expired.

The Binkley Mining Co. of Missouri, filed on July 16, 1942, in the Circuit Court of Appeals for the Eighth Circuit petitions to review two orders of the Director, dated June 4, 1942, directing the petitioner to cease and desist from violations of the Bituminous Coal Code. These cases, involving similar facts, raised the question whether the Division possessed statutory authority to continue a compliance proceeding instituted upon complaint by a district board when the district board subsequently sought to terminate the proceeding. Also involved was the question whether the Director's findings that the petitioner had wilfully violated the code in selling coal at less than the applicable minimum prices which had been established by the Division, were supported by substantial evidence. The court affirmed the Director's action in both cases. *Binkley Mining Co. of Missouri v. Wheeler and Ickes*, 133 F. (2d) 863 (C. C. A. 8th, 1943); *Binkley Mining Co. of Missouri v. Wheeler and Ickes*, 133 F. (2d) 872 (C. C. A. 8th, 1943). The Supreme Court denied petitions for certiorari filed in both cases, June 7, 1943.

## OUTLOOK FOR THE BITUMINOUS COAL INDUSTRY

Several bills were introduced during the first session of the Seventy-Eighth Congress to extend the Bituminous Coal Act which was due to expire April 26, 1943. Although the act twice was extended—for a total of 4 months—by congressional resolutions, the Ways and Means Committee of the House of Representatives failed, after a complete hearing, to report any bill providing for extension of the act beyond August 23, 1943. On June 30, during the hearing on H. R. 1454, and other bills to extend the act, H. J. Resolution 145

was introduced. It provided for extension of the act until January 1, 1944. This resolution was reported by the Ways and Means Committee July 1, and the Rules Committee was asked for a rule permitting its consideration by the House. Pending consideration of the Resolution by the Rules Committee, the Ways and Means Committee voted not to report H. R. 1454, and no further action was taken on H. J. Resolution 145.

Testimony offered at the hearing on bills to extend the Bituminous Coal Act was to the effect that it had provided workable mechanisms for stabilizing the industry without injury to the consumer. It was testified that continued stabilization is needed so that the industry can continue to supply an adequate amount of fuel both in time of peace and in time of war.

In any event, the fundamental economic characteristics of the coal industry which led the Congress to consider regulation desirable in the first instance have in no way been modified and will continue during and after the present war. The various factors responsible for these continuing conditions are:

(1) The number of production units in the coal industry ranges between 12,000 and 17,000 scattered over 29 States, selling coal in competition in numerous markets without let or hinderance, yet the four largest commercial companies produce only a little more than 10 percent of the country's commercial tonnage. The situation is then one in which there are a large number of weak sellers confronted with a relatively small number of strong buyers who can demoralize the market by playing one necessitous seller against another, because the operators, being so numerous and having such a diversity of interests, are not able by themselves to bring about a stability between costs and prices in contrast with other industries in which the units are not so numerous or heterogeneous.

(2) There are wide variations in costs and prices, which enables those favored by these conditions to demoralize the market in the competitive pursuit of tonnage.

(3) A further cost characteristic of the coal industry has a marked effect on prices. That is, coal of various sizes is produced at joint costs. In order to produce lump, it is necessary also to produce other sizes. It is not possible to determine accurately what amount of the cost should be borne by each product other than to let the relative demand for the products make such a determination. If one particular size is in demand, the company will concentrate on that size and then sell the other resultant sizes for whatever the market will yield. It is hoped by the company that the total revenue will equal or exceed the total costs. But the entrance onto the market of coal



which must be produced in order for the company to fill its contracts has a demoralizing effect on the market, and may be detrimental to all other companies competing in that market. Much coal is thus sold on the market at prices which are in no way related to costs, and the result under free competition frequently was that total revenue was less than total costs for the industry as a whole.

(4) Certain factors make for an existence at various periods of an overcapacity in the coal industry. Coal production ordinarily is a highly seasonal industry. The industry is built up to produce enough coal at least to supply the market during the peak seasons. During the other seasons there is a great overcapacity in many districts. There is an urge to sell coal to keep the plant going to lessen the burden of overhead costs. During periods of slack production, of either a seasonal or cyclical character, there is a downward pressure on prices.

(5) The fact that the demand for coal is inelastic has much to do with the instability of the industry. That is, a reduction in prices does not encourage coal consumers to consume any appreciably greater amount of coal at any one time. The existence of large stocks has an unusually depressing effect on coal prices, and prices fluctuate violently up and down as the stocks of coal are small or large. The stage is set for price-cutting in a situation in which the total requirement is fixed and in which various producers attempt to save themselves from a small volume of output in dealing with buyers who are indifferent to price as an incentive to use more coal. On the contrary, when there is a reversal of all of these factors, the price of coal soars to levels in no way related to costs.

(6) Certain practices in the sale of coal, sometimes associated with the fact that coal of various sizes is a joint product with coal of other sizes, tend to aggravate the effect of the extreme willingness of sellers to sell at any price obtainable. A car of coal may be listed with several distributors who contact many prospective customers, and each distributor if given the opportunity, may be willing to sell this distressed coal at any price in order to realize a commission. This demoralizes the market out of all proportion to the amount of coal which is being offered at distressed prices.

The result of these economic factors that make for ruinous competition was disastrous. The market price at the mine was set by the delivered price less the freight, and those mines with higher freight rates at greater distance from the market in some cases practically were giving their coal away. The low prices exert a pressure on costs which are largely in the form of wages. Since about 60 percent of the cost of mining is in wages, and since all other elements in the delivered price of coal are more or less rigidly fixed, except certain

overheads which can be ignored a while, there was great pressure directly or indirectly on wages as prices declined. This opened the way for conflict between owners and miners.

But the mine owners were not able to pass on in wage economies all of the burden of the instability of the industry, even though wage rates under free competition in the pre-regulation period sunk to ever lower levels. The ultimate consequence in too many cases was the bankruptcy of mining companies. Contrary to some theoretical doctrines, bankruptcy of mining companies was slow in bringing any relief to the coal industry. Once bankrupt, the capital structure was reorganized, capital charges written off, new money raised in one way or another for working capital, and the new concern proceeded in its desperate course trying in its turn to avoid bankruptcy through a still more desperate process of cutting prices, cutting wages, and wasting the coal resources of the Nation. Thus the process went on without any relief and brought chaos to the industry and the development of unfair trade practices which were patently detrimental not only to the industry itself but detrimental to the orderly course of business and detrimental to consumers. The whole process took no account of the morrow and was violently prejudicial to the interest of the consumers of the near future.

The existence of the present period in which there is a favorable relationship between realization and costs is not unique. Such periods have existed before. In every such instance, however, weakened markets have followed such periods accompanied by a return of chaotic conditions to the coal industry.

In the absence of any statutory control designed to continue stabilization and with markets weakened when the war-expanded demand ceases, it is reasonable to assume that the destructive forces which were eliminated by the Bituminous Coal Act will again become characteristic of the bituminous coal industry.

# Petroleum Conservation Division

J. W. STEELE, Acting Director

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**T**HE program of the Federal Government to conserve the Nation's deposits of crude oil was inaugurated a little more than a decade ago with the enactment of the NIRA, later held unconstitutional by the Supreme Court. The Connally Act, approved February 22, 1935, was enacted shortly after the demise of the NIRA and contains the same prohibitions with respect to the transportation in interstate commerce of petroleum that were contained in the latter act. With the Nation now in its second year of active participation in World War II, facing what may become a serious shortage of petroleum, the foresight of Congress in enacting this legislation is becoming increasingly apparent.

The Petroleum Conservation Division, established in the Department pursuant to Executive order, has for more than 8 years been devoted to the promotion of conservation of petroleum and to the administration and enforcement of the Connally Act. The act prohibits the transportation in interstate commerce of petroleum and its products produced in excess of amounts permitted under State laws and authorizes the President, or any officer he may designate, to prescribe regulations for enforcement of its provisions. Under this authority, regulations have been promulgated requiring the keeping of books and records by those engaged in producing, transporting, and refining petroleum and providing for the filing by those operators of comprehensive sworn reports of their operations. The report system is designed not only to keep the Division informed as to operations in the industry but also to deter the production of oil in excess of allowables by rendering difficult its undetected disposition. The Supreme Court has held that the falsification of a report required under these regulations is a felony punishable under Section 80, Title 18, United States Code.



## OPERATIONS OF FEDERAL PETROLEUM BOARD

Federal Petroleum Board, with headquarters at Kilgore, Tex., in the East Texas Oil Field, and subordinate branch offices at Midland, Houston, and Corpus Christi, Texas and New Orleans, Louisiana received during the fiscal year monthly reports of petroleum production, transportation, and refining operations from the principal oil producing and refining areas of the southwest. The regulations under the act are effective in 106 counties of Texas, in the two principal oil producing counties of New Mexico, and in the entire State of Louisiana, an area containing 726 oil fields producing daily an average of 1,571,000 barrels of crude oil, 77 refineries producing daily an average of 1,200,750 barrels of petroleum products, and 126 gasoline plants producing daily an average of 91,000 barrels of gasoline and liquefied petroleum gases.

The regulations require also that operators of tankers, barges and other vessels shall report to the Washington, D. C., office of the Petroleum Conservation Division, on a prescribed form, all cargoes of petroleum or its products loaded for interstate shipment at any port in Texas, Arkansas, Louisiana, or Mississippi and the discharge of such cargoes if unloaded at any port in the United States. Statistical information from these as well as reports filed with the Federal Petroleum Board is made available regularly to the Petroleum Administration for War.

Enforcement of the act and administration of the regulations in effect thereunder is principally a field operation. Physical inspection of properties and facilities of oil operators is considered necessary to effective enforcement and maintenance of proper control over the interstate movement of petroleum and petroleum products. The Board's activities in this regard have of necessity been curtailed within the past year because of inductions into the armed forces of experienced personnel and reduction in automobile travel to conserve rubber.

Despite reductions in personnel and travel the volume of criminal investigative work has been maintained at a comparatively high level. Eighteen major criminal investigations initiated in the fiscal year together with 6 investigations in progress at the close of the preceding year were disposed of as follows: One case was successfully prosecuted as to 8 of 10 defendants, leaving 2 defendants yet to be tried; 2 cases were closed by action of the Board; 2 cases were closed by United States attorneys; 1 case was closed by the Attorney General. At the close of the year 6 cases were pending with the Department of Justice, 2 were pending on dockets of United States district

courts on indictments returned during the year, 2 cases were complete and in process of transmittal to the Department of Justice and 4 cases were under investigation.

At the beginning of the year 10 criminal cases involving violations of the act were pending with the Department of Justice. Six of the cases were closed without action because of insufficiency or inconclusiveness of the evidence. One case was tried to a jury which returned verdicts of not guilty, and 3 cases in which indictments were returned during the year were pending trial on June 30, 1943.

Four criminal cases were pending in the courts at the beginning of the year. Two of them were successfully prosecuted, one was dismissed on motion of the United States Attorney and one was pending trial on June 30, 1943.

In the three cases successfully prosecuted fines aggregating \$21,500 were assessed and several suspended sentences were imposed.





# Bonneville Power Administration

PAUL J. RAVEN, Administrator

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## I. THE WAR YEAR

COLUMBIA River hydroelectricity, sold directly by the Bonneville Power Administration during the fiscal year 1943, powered the production of enough aluminum to make 70,000 fighter airplanes.

By mid-year, 19 aluminum pot lines had been installed in 5 huge Northwest aluminum reduction plants. At each plant, as construction neared completion, Bonneville had a power supply ready and waiting.

The wisdom of a regional program, premised on the development of Northwest power resources well in advance of need, had, by 1943, proved the greatest single factor in making effective the Nation's light metals production for war.

The \$300,000,000 investment by the people of the United States in the 10-year Bonneville-Grand Coulee enterprise had proved, in the words of Frank J. Taylor, writing in the Saturday Evening Post, "as gilt-edged as any war bond, cheap at any price."

### WEAPONS FOR WAR

In the fiscal year 1943, power from the Federal system flowed directly into Northwest war plants with a capacity sufficient to produce in one year:

Enough calcium carbide, valued at \$2,400,000, to make approximately 30,000,000 cubic feet of acetylene, sufficient to build 200 Liberty ships.

Enough ferrosilicon, valued at \$1,200,000, to deoxidize 2,500,000 tons of steel, sufficient for 150,000 medium tanks.

Enough additional ferrosilicon, valued at \$1,000,000, to produce 48,000,000 pounds of magnesium metal, worth \$10,000,000, sufficient for 10,000,000 incendiary bombs.

Enough ferrochrome, valued at \$5,000,000, to produce 300,000 tons of armor plate, sufficient to protect 30,000 heavy tanks.

Motive power and electric heat for the production of 208 ships.

Not the least of these contributions to victory was the fact that these basic materials were being produced at the year's end through a minimum use of manpower. The Columbia River offset the drain on man-hours with kilowatt-hours.

### POWER POOLED FOR WAR

In addition to direct power service to its own war customers, the Bonneville Administration supplied 11 other utilities systems with net deliveries of 959,617,265 kilowatt-hours during the last 11 months of the fiscal year 1943 under terms of a region-wide power pool agreement.

The autumn months of 1942 saw the lowest stream flow conditions in 54 years of recorded run-off history on all rivers but the Columbia, which has its source in the perpetual ice fields of the Canadian Rockies.

During this period, by consistently overloading the generators at Bonneville and Grand Coulee, the Bonneville Administration was at times able to assume, through pool connections, nearly 50 percent of the entire power load in the States of Oregon and Washington.

But the Bonneville Power Administration's contribution was not confined to the production of weapons and the conservation of manpower. During the fiscal year ending June 30, 1943, the Administration's revenues from the sale of power totaled \$11,265,468.<sup>1</sup>

### SIX YEARS GROWTH

This record of wartime achievement was established during the Bonneville Administration's sixth year of existence.

In August of 1937 the Administration was created by act of Congress as a provisional agency, set up for the transmission and sale of hydroelectric power generated at Bonneville Dam.

In the annual report for that first fiscal year (ending June 30, 1938), the Bonneville Administrator said:

Modern warfare is fought in the factory as much as in the air or trenches. America must be ready to meet not only peacetime needs of power for home, farm and industry, but must be assured of her ability to cope with emergency demands for large blocks of electricity. In the hydroelectric streams of the Pacific Northwest is potential power far in excess of that available in other regions of the Nation. It should be developed at an economic rate to meet mounting peacetime needs and the equally important possibilities of emergency drains.

Preparedness requires foresight.

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<sup>1</sup> Detailed financial reports have been omitted for duration of the war.

The second fiscal year (ending June 30, 1939) saw the launching of a basic construction program which involved the design and initial construction of the agency's huge network of high-voltage transmission lines.

In the third fiscal year (ending June 30, 1940), the agency's power sales program was begun and by the close of that year 188,415,933 kilowatt-hours of electricity had been sold.

In the fourth fiscal year (ending June 30, 1941), Bonneville, by virtue of its substantial volume of power sales, assumed major status as an operating utilities enterprise. It was during this year that Bonneville became a dominant force in the Northwest's preparedness program. As the year closed, 265,000 kilowatts of demand were under contract to six first-line defense industries.

In the fifth fiscal year (ending June 30, 1942), power contracts had risen to approximately 500,000 kilowatts.

## II. POWER SALES FISCAL YEAR 1943

Thirty-five power contracts involving new power sales were executed by the Administration during the fiscal year.

Of these, 20 contracts were with new customers and embraced an over-all contract demand of 203,450 kilowatts. The remaining 15 represented revisions or amendments or supplemental agreements with existing customers for additional power.

Contract demand for all 35 contracts totaled 398,145 kilowatts. Of this total, 363,200 kilowatts represented industrial sales; 15,160 kilowatts, sales to military establishments; 1,100 kilowatts, sales to cooperatives; 18,285 kilowatts, sales to public or peoples' utilities districts; 200 kilowatts, sales to municipalities; and 200 kilowatts, sales to privately owned utilities companies.

By June 30, 1943, the Administration had in effect 85 executed power and interchange contracts, with a total over-all contract demand of 910,752 kilowatts.

On a contract demand basis, these sales were divided as follows:

Industrial sales 806,200 kilowatts; military establishments 21,200 kilowatts; cooperatives 8,060 kilowatts; public or peoples' utilities districts 45,900 kilowatts; municipalities 5,725 kilowatts; and privately owned utilities companies 23,667 kilowatts.

The 1943 revenues of \$11,265,468 more than doubled the 1942 total of \$5,162,376, and brought the total revenues collected by this Administration since its inception to \$18,719,753.



## THE WAR MARKET

The Administration's war power market involved principally two types of customer: industrial purchasers and military establishments.

Principal sales in this category, during the year, were the six contracts executed with Defense Plant Corporation establishments, involving 332,000 kilowatts of contract demand. Most of this power was for aluminum reduction and fabrication. Another 32,000 kilowatts of contract demand was divided among six other customers. Of these, the principal purchaser was a third large shipyard in the lower Columbia River district, with a demand for 12,000 kilowatts. Of the 11 military establishments to execute power contracts during the fiscal year, four were Navy Department installations and seven were army installations. Although these military establishments were widely scattered throughout the entire Northwest area, the wide range of the Administration's already constructed transmission facilities made it possible to render prompt service with relatively small difficulty.

### *New industrial and military sales fiscal year 1943<sup>1</sup>*

	Contract demand in kilowatts	Date executed
DPC-Spokane Aluminum Reduction Plant .....	130,000	Feb. 9, 1943
DPC-Spokane Aluminum Rolling Mill .....	50,000	Nov. 25, 1942
DPC-Spokane Ferrosilicon Magnesium Plant .....	56,000	Dec. 21, 1942
DPC-Tacoma Aluminum Reduction Plant .....	42,000	Aug. 20, 1942
DPC-Troutdale Aluminum Reduction Plant .....	32,500	Dec. 23, 1942
DPC-Wenatchee Ferrosilicon Plant .....	22,000	Dec. 21, 1942
E. I. du Pont de Nemours & Co. ....	<sup>2</sup> 800	Mar. 31, 1943
Electro Metallurgical Co. ....	<sup>3</sup> 2,000	Mar. 1, 1943
Kaiser Company, Inc. ....	<sup>2</sup> 300	July 1, 1942
Kaiser Company, Inc. (Swan Island) .....	12,000	Nov. 24, 1942
Olympic Mines, Inc. ....	2,000	May 24, 1943
Pacific Carbide & Alloys Co. (Portland) .....	400	Aug. 1, 1942
Pacific Carbide & Alloys Co. (Tacoma) .....	6,000	Feb. 25, 1943
Reynolds Metals Co. ....	<sup>4</sup> 4,000	Nov. 18, 1942
Do .....	<sup>3</sup> 1,200	Jan. 23, 1942
Do .....	<sup>5</sup> 2,000	
11 military establishments .....	15,160	
Total .....	378,360	

<sup>1</sup> Includes direct sales only. Excepts sales and deliveries to public and private utilities for war purposes.

<sup>2</sup> Temporary construction power.

<sup>3</sup> Short-term overload power.

<sup>4</sup> Covered 4,000 kilowatts.

<sup>5</sup> This amendment to be executed as of June 1, 1943, increased to 6,000 kilowatts the contract demand under preceding footnote.

## THE PUBLIC POWER MARKET

Seven new contracts negotiated with public-owned power agencies and cooperatives during the fiscal year comprised a total demand value of 19,585 kilowatts.

Of these, one contract was signed by a municipality, three were signed by utilities districts, and three by cooperatives. They brought

the total of "public agency" contracts in force to 52 by the end of the year exclusive of those contracts executed with federally owned agencies.

The cumulative list follows:

*Contracts with public agencies as of June 30, 1943*

Name of purchaser (D)	Contract demand	Date	Name of purchaser (D)	Contract demand	Date
<b>I. PUBLIC OR PEOPLES' UTILITY DISTRICTS</b>			<b>II. MUNICIPALITIES.—Con.</b>		
Central Lincoln <sup>1</sup>	Kilowatts ( <sup>2</sup> )	Feb. 25, 1942	City of—Continued Tacoma, Department Public Utilities, Division, Tacoma, Wash.-----	( <sup>11</sup> )	Mar. 5, 1940
Clark County, Wash. No. 1-----	10,750	Aug. 1, 1942	Total-----	5,725	
Clatskanie <sup>3</sup>	800	Mar. 4, 1942	<b>III. COOPERATIVES</b>		
Columbia River <sup>4</sup>	( <sup>2</sup> )	Dec. 18, 1942	Benton-Lincoln Electric Inc.-----	400	Oct. 9, 1942
Cowlitz County, Wash. No. 1-----	3,000	Apr. 28, 1941	Benton Rural Electric Assn., Inc. <sup>12</sup> -----	325	June 4, 1942
Grant County, Wash. No. 2 <sup>5</sup> -----	370	June 12, 1942	Big Bend Electric, Inc. <sup>5</sup> -----	260	June 11, 1942
Grays Harbor Co., Wash. No. 1-----	2,300	Sept. 21, 1942	Blachly - Lane County Electric Assn. <sup>13</sup> -----	50	Oct. 7, 1941
Kittitas County, Wash. No. 1-----	100	Aug. 21, 1942	Clearwater Valley Light & Power Assn., Inc. <sup>5</sup> -----	700	June 17, 1942
Klickitat County, Wash. No. 1 <sup>6</sup> -----	7,575	June 3, 1942	Columbia County Rural Electric Assn.-----	300	Dec. 1, 1942
Lewis County, Wash. No. 1-----	400	May 1, 1942	Douglas Electric, Inc. <sup>10</sup> -----	625	July 1, 1942
Nehalem Basin <sup>4</sup>	( <sup>2</sup> )	July 9, 1942	Idaho County Light & Power Assn., Inc. <sup>5</sup> -----	160	June 8, 1942
Northern Wasco County <sup>4</sup>	4,000	Oct. 28, 1940	Inland Empire Rural Electrification, Inc. <sup>5</sup> -----	1,400	May 28, 1942
Pacific County, Wash. No. 2-----	980	Sept. 8, 1941	Kootenai County Rural Electric Assn. <sup>5</sup> -----	210	June 9, 1942
Skamania County, Wash. No. 1 <sup>8</sup> -----	925	Apr. 9, 1942	Lincoln Electric, Inc.-----	700	May 20, 1942
Tillamook <sup>4</sup>	2,000	May 15, 1940	Nehalem Valley Electric Assn.-----	150	Dec. 24, 1942
Union County <sup>4</sup>	( <sup>2</sup> )	Mar. 2, 1942	Nespelem Valley Elec- tric, Inc.-----	100	Feb. 19, 1941
Wahkiakum County, Wash. No. 1-----	700	Feb. 17, 1943	Northern Idaho Rural Electrical Rehabilitation Assn., Inc. <sup>5</sup> -----	400	Apr. 29, 1943
Whatcom County, Wash. No. 1 <sup>4</sup> -----	16,500	May 15, 1942	Okanogan County Elec- tric, Inc. <sup>5</sup> -----	120	June 8, 1942
Yakima County, Wash. No. 1 <sup>4</sup> -----	2,500	July 9, 1941	Pend Oreille Electric, Inc. <sup>5</sup> -----	200	May 1, 1943
Total-----	45,900		Salem Electric Assn. -----	100	Mar. 17, 1941
<b>II. MUNICIPALITIES</b>			Stevens County Electric, Inc. <sup>5</sup> -----	310	June 2, 1942
City of—			Umatilla Electric Assn. <sup>12</sup> -----	1,350	June 10, 1942
Canby, Oreg. <sup>9</sup> -----	300	Dec. 22, 1939	Wasco Electric, Inc.-----	200	Dec. 1, 1942
Cascade Locks, Oreg.-----	200	Feb. 14, 1939	Total-----	8,060	
Centralia, Wash.-----	300	Feb. 13, 1940	Grand total-----	59,685	
Drain, Oreg. <sup>10</sup> -----	250	Mar. 14, 1941			
Ellensburg, Wash.-----	2,000	Apr. 1, 1942			
Eugene, Oreg.-----	( <sup>11</sup> )	Aug. 20, 1940			
Forest Grove, Oreg. <sup>9</sup> -----	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.-----	( <sup>11</sup> )	May 6, 1940			

<sup>1</sup> This public utility district is currently operating but is not at present served by BPA.

<sup>2</sup> No contract demand specified.

<sup>3</sup> This public utility district is currently operating but presently has only an emergency service connection with BPA.

<sup>4</sup> This public utility district is not yet in operation.

<sup>5</sup> Served via WWP Co.

<sup>6</sup> Served (at Condit point of delivery) via PP&L Co.

<sup>7</sup> Total of 3 points of delivery, only 1 of which is energized or constructed, viz.: Condit, 100 kilowatts; North Dalles, 125 kilowatts; Goldendale, 350 kilowatts.

<sup>8</sup> Served via PP&L Co. at White Salmon River point of delivery, but directly by BPA at North Bonneville and Bonneville Dam delivery points.

<sup>9</sup> Served via PGE Co.

<sup>10</sup> Served via COP Co.

<sup>11</sup> Interchange.

<sup>12</sup> Served via PP&L Co.

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

## PROGRESS OF PUBLICLY-OWNED AGENCIES

The progress of the Northwest's publicly owned and operated power distribution agencies which purchased all or part of their requirements from the Bonneville Administration was reflected during fiscal 1943 in the increased volume of these purchases. During the year Bonneville power sales to such agencies practically doubled, rising from a total of 89,454,000 kilowatt-hours in fiscal 1942 to 176,723,000 kilowatt-hours.

Of this total, Bonneville's sales to municipalities rose from 22,212,000 in 1942 to 25,737,000 in 1943, while the revenue received increased from \$98,463 to \$99,952. Sales to public utility districts rose from 62,918,000 kilowatt-hours in 1942 to 123,519,000 kilowatt-hours in 1943, while the revenue received rose from \$159,194 to \$364,546. Sales to cooperatives rose from 4,324,000 kilowatt-hours in 1942 to 27,467,000, an increase of 500 percent, in 1943, and the revenues received rose from \$20,526 to \$123,142.

Public power distribution agencies showed steady gains throughout the year in operating revenue, and many showed continued reductions in retail power rates to consumers. A number accumulated substantial surplus funds and, pending further reductions in rates, applied these moneys to the purchase of war bonds.

Several public agencies went into operation during the year. Of these, particularly notable were the Central Lincoln Public Utility District and the Clatskanie Public Utility District, both in the State of Oregon. The latter agency succeeded in selling its revenue bonds at the remarkably low interest rate of 2.8 percent.

Following are typical case histories of public power distribution agencies in the Pacific Northwest.

*Cowlitz County Public Utility District No. 1*, one of the larger districts in the State of Washington, acquired its properties in November 1940 at \$6,800,000. For the year ending December 31, 1942, it showed a net surplus of \$112,575.06 and an accumulated surplus of \$405,669.99 for amortization after paying all costs of operation, interest, depreciation, and taxes.

During the year ending June 30, 1943, the district reduced the rates or "revenue per kilowatt-hour" from 2 to 1.8 cents. This reduction, together with previous reductions, effected annual savings over rates previously charged by privately owned companies amounting to \$9.60 or 21 percent to customers using 100 kilowatt-hours per month and \$123.60 to those using 750 kilowatt-hours (6 kw.) per month.



*Pacific County Public Utility District No. 2* for the year ending December 31, 1942, increased its power requirements from 10,345,680 kilowatt-hours to 11,676,936 for the year, and its annual operating revenues from \$222,273.31 to \$237,479.61 or 6.84 percent. Total operating expenses for the same period had increased 5.14 percent, allowing a net operating income of \$61,050.95, an increase of 7.20 percent over the previous year and a net to surplus of \$52,904.69. Total annual reductions under present rates compared to those previously charged by private companies were estimated at \$51,121 or 25 percent.

*Monmouth municipal system* by March 31, 1943, had increased its sales by 467,009 kilowatt-hours over the previous year, or 47.2 percent; had reduced its rates or "revenue per kilowatt-hour," from an average of 1.649 to 1.368 cents, thus effecting an annual saving over former rates of \$13.20 or 31 percent to customers using 100 kilowatt-hours per month, and \$147 or 45 percent to those using 75 kilowatt-hours per month.

The city met all operating costs including interest, bond payments and taxes of \$13,311.60, and earned a surplus of \$1,734.13 in 1943 and \$8,170.81 in 1942, or a total surplus to date of \$9,904.94 which is \$4,995.44 in excess of the total debt charges, or 24.84 percent of gross revenue.

*Forest Grove municipal system* increased its total number of customers for the 12 months ending March 31, 1943, from 1,294 to 1,349, a gain of 55. Its kilowatt-hour sales for the period increased from 2,910,297 to 3,490,245 or 19.93 percent; its operating revenues from \$51,256.95 to \$56,797.96 or 10.81 percent. Operating income increased 23.27 percent. The city reduced the operating revenue received per kilowatt-hour from 1.749 to 1.61 cents during the period. This, added to previous reductions, resulted in an annual saving of \$13.68 over former rates to customers using 100 kilowatt-hours per month or 31 percent, and \$258 or 61 percent to those using 750 kilowatt-hours (6 kw.) per month.

The system paid all operating costs including city taxes of \$4,800, interest of \$7,500 and depreciation, leaving a net income of \$16,095.53. An amount equal to \$7,500 of deferred maintenance was set aside for post-war purposes. A building fund of \$12,000 was established.

*McMinnville municipal system* increased its total number of customers in the year ending March 31, 1943, from 2,362 to 2,406, a gain of 44; increased its total generated and purchased power from 10,435,552 kilowatt-hours to 11,223,971. The city reduced rates during the year from an average operating revenue per kilowatt-hour of 1.439 to 1.298 cents, effecting an annual saving of \$8.40 or 22 percent to

domestic customers using 100 kilowatt-hours per month, and \$147 or 47 percent for such customers using 750 kilowatt-hours (6 kw.) per month.

Meanwhile the system met all operation and depreciation costs, paid \$26,400 interest to the city, paid \$3,925.79 taxes and had a net income for the period of \$19,272.64. Total earned surplus, accumulated since the beginning of Bonneville Power Administration service, was \$40,893.40.

*The Inland Empire Cooperative, Inc.*, operating in eastern Washington, one of the largest in the United States, began operation in 1938 but did not begin using Bonneville power until August 1942. Securing Bonneville power at once reduced the cooperative's annual wholesale power cost by \$32,851. This in turn effected annual savings of \$12 or 16 percent to retail customers using 100 kilowatt-hours per month, and \$78 or 25 percent to those using 750 kilowatt-hours per month.

By the end of 1943 the cooperative had 2,010 miles of energized lines and 3,293 consumers. Its operating revenues for the year were \$193,833.44; expenses were \$155,333.86.

#### OTHER SALES

By June 30, 1943, three power contracts with private utilities companies were operative. Deliveries had been continued through the year to the Portland General Electric Co. on a day-to-day extension of the terms of the contract first executed in December 1939. Efforts to negotiate a long-term contract with the company were not successful due largely to the fact that the parent company, which owns all of Portland General Electric Co.'s common stock is in reorganization and negotiations had to be conducted with a number of parties who had diverse interests in that reorganization. Agreement could not be reached with all of these diverse interests on terms which would comply with the Bonneville Act and adequately protect the Federal Government's interest. This inability to agree on a long-term power contract resulted in the filing of two lawsuits against the Administrator. The purposes of these suits were to determine the terms under which the Administrator may enter into long-term power contracts with privately owned utilities. The Administrator, however, has continued to serve the growing demands of this company's system on a day-to-day basis because of the shortage of generating capacity in the Portland area.

As the fiscal year closed, the Bonneville Administration was furnishing the operating company approximately 70,000 kilowatts of monthly billing demand—about one-third of its total power requirements.

Other power sales contracts with utility companies at year's end were in force with the Pacific Power & Light Co., with a delivery point at Astoria, Oreg., for a demand of 2,000 kilowatts; and an interchange contract with the Washington Water Power Co. and the Pacific Power & Light Co., which included transfer service to public-owned distribution agencies under contract to the Bonneville Administration.

In addition to its sales contracts, the administration had in force a large number of pole contact and miscellaneous amendatory agreements. Contract actions of all types during the fiscal year totaled 125 items, as follows:

*Summary of contract actions fiscal year 1943*

<i>Type of Item</i>	<i>Number of Items</i>
Strictly new customers.....	20
Amendments or new agreements with existing customers for additional power .....	13
Revisions to apply revised wholesale rate schedules.....	12
Pole contact agreements, including amendments and supplements thereto .....	5
Miscellaneous amendatory agreements.....	25
Miscellaneous agreements.....	29
Supplemental agreements in regard to transfer service for Bonneville's account under the interchange contract of April 1, 1942, with The Washington Water Power Co. and Pacific Power & Light Co.....	21
Total.....	125

**III. FUTURE POWER SALES**

On June 30, 1943, 11 contracts involving an over-all minimum demand of 237,000 kilowatts and a possible maximum demand of 312,000 kilowatts were in active negotiation. Individually, these sales prospects ranged from 2,000 to 120,000 kilowatts of demand. They included the new electro-development laboratory and the new alumina reduction plant approved during the fiscal year 1943, as well as a number of new war industries, military establishments and several utilities systems. It was anticipated execution of these contracts during the fiscal year 1944 would bring total contract demands on the Bonneville-Grand Coulee system to nearly 1,300,000 kilowatts, with actual monthly billing demands probably running well in excess of that figure at times.



## MARKET DEVELOPMENT SHOWS RESULTS

Industrial progress of the Pacific Northwest region clearly demonstrated, during the fiscal year 1943, the importance of a strong power market development program; and as the year drew to a close, it became increasingly apparent that this phase of the Bonneville Administration's activities had materially assisted not only in the orderly development of the region's war industry but in providing a solid foundation for future industrial expansion.

Strenuous efforts were made toward stabilizing the tremendous aluminum manufacturing industry. Of the six huge Northwest aluminum plants, four were built by the Defense Plant Corporation and operated under lease as war plants. In order to safeguard the continued operation of such industries as permanent enterprises, the Administration's Market Development staff concentrated its efforts on the establishment of a plant for the manufacture of aluminum oxide from local Northwest clays.

As the fiscal year drew to a close, agencies of the War Production Board and the Bureau of Mines approved the establishment of an aluminum oxide plant in the Pacific Northwest. This plant, of 50-ton production capacity, will be constructed and operated in its initial stages by the Chemical Construction Co., an affiliate of American Cyanamid. Plans for this plant, as approved by the several interested agencies, require that it be operated ultimately by Columbia Metals Co., owned and financed by a group of Northwest businessmen.

During the year the Administration was also able to be of some assistance to the Bureau of Mines in the establishment of an electrodevelopment laboratory in the region. This laboratory, under construction as the year closed, was to investigate the feasibility of using the many large deposits of Northwest minerals through the application of low-cost electric power.

In addition to this work, the Administration's Market Development staff continued to cooperate with chambers of commerce and other public and semipublic agencies of the region in the development of community industrial surveys. More than 20 such surveys were completed during the fiscal year. Results were published by the Administration with the inclusion of complete information on available industrial plant sites, raw material and labor supplies, transportation and housing facilities and other pertinent factors.

These reports were made available to a large number of industrial organizations, for the purpose of encouraging them to consider the

Pacific Northwest as a suitable region for the expansion of their enterprises.

All these activities brought substantial recognition of the program's value from a number of industrial sources. Typical was the comment of the industrial publication *The Iron Age*, which, in its issue of May 20, 1943, stated:

. . . The Bonneville-Coulee Power Administration in its business development and industrial analysis departments has now become a general agency and factor in the industrial life and future of the Pacific Northwest which is not only primary but which has become constantly more constructive and beneficial.

### THE POST-WAR POWER MARKET

As the United Nations gained victory after victory during 1943, it became necessary, in the interest of good management, for the Bonneville Administration to consider the effects of the post-war period upon its power market. Furthermore, this was required by Presidential memorandum on May 22, 1943.

The post-war problem, as it directly affected Bonneville, was two-fold: (1) the stabilization and expansion of power-using industry; and (2) the development of the rural and domestic use of low-cost electric power.

Accordingly, it was toward the solution of this dual problem that the Bonneville Administration began to shape a post-war program, to be undertaken as soon as possible, for the approval of the Congress, the Department of the Interior and the War Production Board.

Stabilization of the immense Northwest aluminum industry comprised one of the largest single phases of the problem. In order to determine what steps were necessary to this stabilization, consideration was given to a study of the competitive position of existing aluminum plants, an analysis of the Defense Plant Corporation contracts for each of the plants, and finally, to the active promotion of steps to provide continuing operations on a competitive basis, by businessmen of the region.

With this proposal, consideration was given to methods whereby post-war aluminum markets could be developed in and accessible to the Northwest region.

Along with this, the possibilities of assisting in further research relative to other power-using industries were being considered.

Active consideration also was being given to plans for expansion of the rural and domestic power market. Rough estimates arrived at during the fiscal year indicated that, with proper development, irri-

gation, rural electrification and domestic power use would require, during the first post-war decade, an additional generating capacity in the Pacific Northwest of about 1,700,000 kilowatts.

All these aspects of the post-war problem as it would affect the Northwest power market were being pulled together for consideration by the proper Government bureaus and the Congress during the fiscal year 1944. Such studies were considered not only to be fundamental to the proper administration of the Bonneville Act, but of considerable importance to future protection of the Pacific Northwest economy.

#### IV. GROWTH AND OPERATION OF THE SYSTEM

At the beginning of fiscal 1943 the Administration had on hand a total of \$55,365,170 in unexpended congressional appropriations. This sum included the 1943 appropriation of \$20,007,000 for facilities required for war power deliveries, a carry-over from former fiscal years of \$26,000,000 which were being maintained as a reserve for projects authorized prior to the war but which could not be built during the critical material shortage, and approximately \$8,700,000 which had been allocated to specific projects then under construction.

On October 20, 1942, the chairman of the War Production Board halted all nonmilitary construction projects generally throughout the United States, pending review by a special Facilities Review Committee to determine which could be postponed as least essential to the war program.

On November 17, 1942, the Bonneville Administrator was ordered by the Facilities Review Committee to continue the agency's 1943 construction program to completion. The committee's findings showed that without exception the 23 major construction projects reviewed, as well as a number of smaller, related projects, were all of first importance to the Northwest's war production program.

#### POWER SYSTEM EXTENDED

In accordance with this approval, the Administration completed and energized 695 circuit miles of transmission line during fiscal 1943, of which 495.6 circuit miles were of 230 kilovolt construction. The Bonneville system's power substations were increased in number from 37 to 51 during the same period. Substation transformer capacity was increased by 733,667 kilovolt-amperes—a substantial gain over the 530,050 kilovolt-amperes of substation capacity installed during the previous fiscal year.



By June 30, 1943, the Administration had in operation a total of 2,443 circuit miles of transmission lines and a total substation transformer capacity of 2,049,579 kilovolt-amperes.

### OPERATIONS

All facilities of the entire system were taxed to their utmost throughout the year. During the fall months of calendar year 1942, the unprecedented drought conditions on all Northwest power streams, with the single exception of the Columbia River, made it necessary for Bonneville to operate without adequate reserves of generating or transmission capacity. At times the generators at Grand Coulee and Bonneville were overloaded well in excess of 10 percent as an emergency measure. Following the extreme low-water period in the fall months of 1942, added demands by war industry throughout the Northwest made it necessary to continue overload conditions much of the time.

### THE NORTHWEST POWER POOL

The principal emergency operations measure undertaken during the year was the development of the Northwest power pool in cooperation with 10 other major utilities serving the entire Pacific Northwest region. Prior to the beginning of the fiscal year 1943, the Bonneville Administration's system was already interconnected with several major utilities systems. In order to forestall the development of area-wide power shortages within the region and to make available at all times maximum power for war production within six Northwest States, arrangements for interconnections with six other major utilities systems were completed, with the concurrence and sponsorship of the War Production Board, in April of 1942. Later the War Production Board endorsed and made mandatory such interconnection programs by its Limitations Order L-94, issued May 1, 1942.

Actual operations of the Northwest power pool began August 1, 1942—one month after the beginning of the fiscal year. During the 11-month period between August 1, 1942, and June 30, 1943, the Bonneville Power Administration made total energy deliveries to other pool members of 1,365,911,630 kilowatt-hours.

During this same period, energy received by the Bonneville Administration from other pool members totaled 406,294,365 kilowatt-hours. This made the Government's net contribution to the Northwest power pool 959,617,265 kilowatt-hours during the 11-month period.

Thus, in addition to direct power deliveries to Bonneville's own war customers, the two Federal dams on the Columbia River contributed

nearly 1 billion kilowatt-hours to fill the wartime needs of other utility systems.

### THE POWER-SUPPLY PROBLEM

On June 30, 1943, combined installed rated generating capacity at the Bonneville and Grand Coulee plants totaled 884,400 kilowatts. Additional units totaling 432,000 kilowatts were undergoing construction and installation. Completion of these latter units was scheduled to increase combined rated capacity at both plants to 1,316,400 kilowatts by the spring of calendar year 1944. In addition, U. S. Army engineers were engaged in raising the pool elevation behind Bonneville Dam for the purpose of adding 29,000 kilowatts of prime power capacity to the over-all system total.

Estimates by Bonneville engineers in the spring of 1943 indicated that in the 12 months immediately following final installation of this capacity, the total average load on the Bonneville system would rise as high as 1,038,400 kilowatts, of which 97 percent would comprise deliveries to war industries and military establishments. It was estimated that during the same period the loads for the interconnected utilities systems, excluding the Bonneville-Grand Coulee system, might exceed the dependable generating capacity of these other systems by 100,000 to 200,000 kilowatts if the year proved to be one of low water. In such event, the Bonneville-Grand Coulee system would have to supply the deficiency.

These and other pertinent factors were presented to the Bonneville Advisory Board at a meeting in Washington, D. C., on March 12-13, 1943.

In its consideration of these matters, the Advisory Board came to the conclusion that, if the war continued, there was some danger of a region-wide power shortage in the winter of 1944 and almost certain danger of such a shortage in the winter of 1945 and thereafter.

Accordingly, at its March 12-13 meeting, the Advisory Board recommended the following program:

(1) Rapid completion of generating units already under construction at both dams.

(2) Rapid completion of the City of Seattle's Ross Dam and the 35,000-kilowatt unit at the city of Tacoma's Nisqually project.

(3) Increase in the level of the Bonneville pool.<sup>1</sup>

(4) Reinstatement immediately, with adequate priorities, of generator No. 7 at Grand Coulee for service in 1944, if possible.

(5) Arrangement for completion of Rock Island project.

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<sup>1</sup> This had already been undertaken by the U. S. Army engineers.

(6) Investigation of the possibility of developing not less than 3 million acre-feet of water storage on the Clark Fork of the Columbia River.

(7) Reinstatement, with adequate priorities, of generating units 8 and 9 to be installed at Grand Coulee Dam by 1945.

(8) Action to insure immediate construction of substantial additional power supply for 1946 and subsequent years by construction of the Umatilla project.

Upon presentation of these recommendations, the War Production Board concurred in a number of them, including the proposal to investigate the possibilities of storage projects in the Clark Fork watershed. As the fiscal year closed, the Clark Fork investigations were in an advanced stage; and on June 28, 1943, the War Production Board approved the construction and installation of Grand Coulee generating unit No. 7.

Depending upon successful conclusion of these negotiations for upstream storage and completion of Coulee Generator No. 7, the Administration anticipated any power shortage developing in 1945 could be adequately met.

#### POST-WAR CONSTRUCTION PROGRAM

On May 22, 1943, in a memorandum to the heads of all departments and agencies, the President of the United States requested the submittal of detailed construction plans for public works which had been deferred because of the war, along with proposed supplemental appropriations required for effectuating such plans and suggestions as to additional legislation which might be required to implement them.

In accordance with this order, the Bonneville Administration began work on a detailed post-war construction program. As the year closed, initial estimates indicated the Administration would be prepared, on demobilization day, to call for bids on \$26,000,000 worth of projects.

This backlog represented about 45,000 man-months of labor and an expenditure of at least \$15,000,000 for equipment and materials.

Money for these projects already had been appropriated by the Congress prior to and during the early months of the war and was being held in reserve for continuance of the agency's peacetime program.

In addition to this sum, it was estimated that at least \$25,000,000 more must be spent, following the war, on Bonneville's huge network of transmission lines, if the Congress appropriated funds for addi-



tional generators at Grand Coulee Dam and for construction of the \$90,000,000 Umatilla Dam.

The initial \$26,000,000 program included nearly 35 individual projects involving additions to existing substations, construction of new substations, construction of new high-voltage transmission lines and extensions to Bonneville's subtransmission system. The plan also included about \$11,000,000 of expenditure for a wide variety of service lines, substations and other facilities for the delivery of Columbia River power to public distribution agencies in Oregon and Washington.

It was the Administration's view that such a program was in conformance with Department of Interior policy to build Northwest power facilities in advance of need.

Such a policy had already paid high dividends, both in promoting industrialization prior to the war and in heavy contribution to war production following Pearl Harbor.

# Division of Power

ARTHUR GOLDSCHMIDT, Acting Director

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THE INCREASING number and complexity of the power problems of the Department during the past year resulted in a great increase in the work of the Division of Power. In large part, the added problems were a direct consequence of the tremendous expansion of the power facilities under the control of the Department. Work of the Division was further augmented by the fact that the power program of the Department is in general undergoing a transition from a construction stage to an operations and marketing stage, with present emphasis upon the disposition of power to meet the demands of the war program. Problems of policy and practice dealing with marketing and related activities require considerably more of the attention of the Secretary and of this Division than do problems of construction. For the most part construction problems have related to the action of the War Production Board in curtailing construction and equipment installation on several of the most important of the partially finished projects of the Department. The shift in emphasis in the war program from the production of materials and munitions to the production of food and the conservation of fuel and manpower, has further enhanced the value of hydroelectric projects of the Department which combine irrigation and power features.

As a result of 2 years of experience in which an efficient working procedure between the Division of Power and the Department's power operating agencies in the field has developed, an order of the Secretary was issued further formalizing the relationship between the Division of Power and the agencies and codifying the tested procedural arrangements. The order effectively summarizes the function of the Division as follows:

The Division of Power assists the Secretary in supervising the discharge of the Department's responsibilities in electric power matters. The primary

duties of the Division of Power are to assist (1) in the formulation and coordination of the Department's objectives, policies and programs to encourage and facilitate the most widespread use of electric power in the public interest and, during the present emergency, to assure the most effective utilization of the Department's power resources in the prosecution of the war; (2) in the prompt dissemination to the bureaus and offices of information as to the Department's objectives and policies; and (3) in the supervision of the application and prosecution of these policies and programs.

The order provides for the handling of contractual matters, statistics and reports, rates, budget matters, market development programs, findings of feasibility and construction programs. The resources and personnel of the Division are made available to all bureaus and offices of the Department, whether directly concerned with power or not, in the development of programs affecting power. With the issuance of this basic manual of administrative responsibility and practice the Division of Power has established a sound basis for the administration of far-flung and varied power developments under the jurisdiction of the Department of the Interior.

## EXPANSION AND UTILIZATION OF FACILITIES

The major portion of the power from Department projects is sold wholesale to war industries and military and naval establishments and to public and private distributing agencies. The great volume of power which has been made available for war purposes by plants of the Department has played a most important and in some respects a crucial role in the ability of the Nation to meet war production demands. It is estimated that generators in the power plants of the Department will produce, and the agencies of the Department will dispose of, approximately 14,900,000,000 kilowatt-hours of electrical energy in 1943. This is an increase of nearly 300 percent over the Department's power production of 1940. The most significant increases during the past year have been at Grand Coulee where four 108,000- and two 75,000-kilowatt generators are now in service. Two more 108,000-kilowatt units are scheduled for operation shortly. The Green Mountain plant of the Bureau of Reclamation, first of the plants of the Colorado-Big Thompson project, also began operations with a capacity of over 20,000 kilowatts. The Parker Dam project on the Colorado River in Arizona and California with an installation of 120,000 kilowatts reached full production early in 1943. At the end of the fiscal year final tests were being completed at the Fort Peck project, a United States Engineers' project on the Missouri River in Montana for which the Department has by act of Congress been given the responsibility of marketing the power.



The Division of Power endeavors to see that the power facilities of the Department are used to the utmost in the war program by ordinary direct sale as well as by special arrangement where necessary. During the year an agreement was effected by the Bureau of Reclamation and the Indian Service to pool power on the Parker Dam transmission system in Arizona, utilizing power generated from the San Carlos project of the Indian Service and by several private utilities in the area, in order to guarantee adequate power for the magnesium plant in Las Vegas and other war loads in the area. In line with the President's directive to war procurement agencies and the Federal Power Commission to arrange for the purchase of power from the cheapest reliable sources, the Division asked the agencies of the Department to keep abreast of present and prospective war loads in order to determine whether and how they may be served more economically from facilities of the Department.

One of the fundamental power policies of the Department is that the abundant power resources under its jurisdiction be so managed as to assure the widest possible use of electric energy at the lowest possible cost to the consumer. In addition to searching for means of effecting economies by means of transmission and delivery arrangements, the Division is constantly endeavoring to keep the rates for power sold by the Department to the lowest level feasible under the law and compatible with good business practice. To this end, during the year the Division consulted with and advised a number of other agencies of the Government including the Defense Plant Corporation, Federal Power Commission and the National Housing Agency. The staff of the Division has also been actively engaged for several months in basic technical and other work involved in a reduction in wholesale power rates for all Reclamation power projects in Wyoming. The Division has made standard in the Department the practice of securing from purchasers of power for resale an agreement that resale rates will be kept at the lowest feasible level in order to assure that the benefits of low cost power developed at the projects of the Department are passed on to the ultimate consumer and also to assure a continuing market for the Department's power.

During the year the War Production Board stopped construction on the Anderson Ranch Dam in Idaho, the Davis Dam in Arizona, the Colorado-Big Thompson project in Colorado, and the Keswick Dam in California. Projected power machinery installations at Grand Coulee Dam and the Shasta Dam in California were cut. The Division participated actively and with partial success in the efforts of the Department to obtain revocation or modification of these stop orders to prevent waste, and to provide for a safe margin of power capacity in

the war program, to save manpower and fuel and to increase food production.

## CONTRACTS

During the past year the Division has reviewed 90 contracts for the sale of power from the many projects of the Department to consumers or distributing agencies, public and private. Approximately one-half of these contracts involved the sale of power to war industries and naval and military establishments. Contracts of the latter kind accounted for far more than half of the aggregate amount of power sold and the technical and policy problems presented by such contracts were much more intricate than those presented by the nonwar contracts. In addition to the review of contracts, with the technical and legal work required therefor, the Division has participated in the negotiation of several of the larger war contracts of both the Bureau of Reclamation and the Bonneville Power Administration. Although it is a basic policy of the Department to decentralize the administration of its power projects, during this war period certain important negotiations with other agencies of the Government must necessarily be handled in Washington. The Division has been able to effect a saving in time and money by carrying on and unifying such activities. In addition, constant negotiation of a general nature with the War Production Board, other Federal agencies and representatives of groups wishing to obtain power has been necessary.

## CENTRAL VALLEY

Members of the staff of the Division are participating in several of the studies now under way for the Central Valley project in California. These studies, which are under the direction of a representative of the Bureau of Reclamation and are being made by committees upon which are representatives of various groups and interests, Federal as well as local, encompass all of the many problems to be encountered in the development and operation of this vast project. A number of the problems directly or indirectly involve the power features of the project.

Throughout the past year the Division and the Bureau of Reclamation have been engaged in negotiating a contract for the sale of a large block of power from the Shasta Dam power plant to the Pacific Gas & Electric Co. Due to lack of facilities for line construction, power from the first two 75,000-kilowatt generating units that the War Production Board has allowed to be installed must be sold to the company during the war, so that it may be devoted to war uses with the least expenditure of critical materials.

## MISCELLANEOUS

During the year the Division assisted in the drafting of new regulations governing the granting of right-of-way easements for transmission lines over lands under the jurisdiction of the Department. The Division was also able to suggest special conditions or stipulations for the full protection of the public interest in a number of the right-of-way permits reviewed. The Division continued to take part in the handling of the legislative problems of the Department which relate to or affect power. Among the matters of this kind which required attention were two compacts for the apportionment of the waters of interstate streams. The Division also advised and assisted the other agencies, particularly the Bonneville Power Administration, with questions of litigation having important policy implications.

Four major problems were active in the Division at the end of the year. Careful study was being given to the report of the Bureau of Reclamation upon the proposed Canyon Ferry irrigation and power project for the upper Missouri River near Helena, Mont. The reports and recommendations of the representatives of the Department engaged in working out the allocation of costs of the Grand Coulee Dam project between power, irrigation, and other uses were almost ready for submission to the Commissioner of Reclamation, the Administrator of the Bonneville Power Administration and the Director of the Division in order to provide the Secretary with a basis for determining the final cost allocation. Members of the staff of the Division were also working with the Bureau of Reclamation on plans for the disposition of power from the Fort Peck project in Montana and in North Dakota where the power can serve the Nation at war by replacing gas fuel and permitting increased irrigation for food production. Study was being given to the administrative and legal relationship between the Department and the Salt River Valley Water Users Association in Arizona in cooperation with that association.





# Division of Territories and Island Possessions

BENJAMIN W. THORON, Director

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**D**URING the past year the Division has been reorganized to meet more effectively the increasing and complex problems in the Territories and islands as a result of their strategic location in the war picture. It has worked closely with other agencies and Departments of the Government in an effort to coordinate programs and eliminate duplication of activities. Each area is confronted with unique problems and each requires individual solution. The Virgin Islands and Puerto Rico were in a particularly critical situation as a result of the shipping shortage and submarine activity in the summer and fall of 1942. Here an acute crisis in the supply of the necessaries of life was narrowly averted by the Civilian Food and Supply Unit, established to carry out the provisions of Public Law 371, Seventy-seventh Congress, working in close cooperation with the Department of Agriculture and the War Shipping Administration to supply the immediate needs of the people of these areas.

As part of the operation, it was contemplated originally that stock piles of food, drugs, hospital supplies and other materials, supplies and equipment would be established at carefully selected points in order to meet the emergency needs of the civilian population in the event that Alaska, the Virgin Islands, or Puerto Rico should be cut off from the mainland through enemy action or shipping service disrupted to such an extent that regular supply was found impossible. Plans were formulated for the establishment of such stock piles and a quantity of food and medical supplies for this purpose was shipped to the Virgin Islands in early 1942.

In the case of Puerto Rico, shipping suffered increasingly because of enemy submarine action during the spring and summer months of 1942 to such an extent that the supply of the island was seriously threatened and it became necessary, in order to insure that food necessary to feed the Puerto Rican people would reach the island in

the available shipping space, that the Food Distribution Administration (then the Agricultural Marketing Administration) of the Department of Agriculture purchase and ship the basic food requirements. An agreement was reached between the Department of the Interior and the Department of Agriculture under which the FDA would furnish and, acting for this Department, distribute by sale to wholesalers in Puerto Rico the different food items in accordance with estimates of requirement set up by this Department. Many difficulties were encountered at the outset in placing the operation in effect, not the least of which was the very limited amount of shipping space which was made available for Puerto Rican service during the latter part of 1942 and January 1943, due to the extreme need for vessels in other war areas. Since last February, the War Shipping Administration has increased shipping to Puerto Rico to such an extent that it has been feasible to bring stocks of all necessary food items in Puerto Rico to a very satisfactory level. Also, shipments of supplies needed by industry, as well as consumption foods, have been made in such quantities that the Puerto Rican supply situation generally is in a good and satisfactory condition. This has been made possible by the agreement between the War Shipping Administration and the Department that after September 1, 1942, all cargo space on ships sailing for Puerto Rico, with the exception of military vessels, would be allocated by the Department of the Interior and that only cargo approved by this Department would be loaded. Such action has insured that the food and general supplies most needed in the Island would be loaded in the available shipping space. By January 1943 a plan was put in operation through which applications for importation of goods, other than food, would be cleared by the General Supplies Administration, a Puerto Rican governmental office, before the Civilian Food and Supply Unit would allocate steamship space. This plan has worked out most satisfactorily and is in line with the desire to forward supplies in accordance with priorities set up by the Puerto Rican Government in consultation with representatives of local business and industry.

In all plans for shipping Puerto Rico and the Virgin Islands have been considered jointly, since there have been no large vessels going directly to the Virgin Islands and all supplies consigned to the Virgin Islands must be transhipped from San Juan. The FDA has also acted in a similar capacity for the Virgin Islands.

The establishing of emergency stock piles has been carried out in Alaska. Large shipments of food and other supplies necessary for the civilian population in case of need were made in the fall of 1942 and suitably warehoused at a number of strategic points in the Terri-



tory. The facilities of the Native Stores of the United States Indian Service have been utilized to the fullest possible extent in carrying additional emergency supplies wherever such stores are in operation. Recently it has been found advisable to place in normal consumption channels or sell to the military forces practically all of the food supplies which were sent to the Territory last year. This has been accomplished in a satisfactory manner and replenishing the stock piles with fresh supplies has been moving forward for several months and will continue. In addition, every assistance possible has been rendered to the exporters to Alaska in the obtaining and shipping of food and other supplies in order that normal consumption requirements of the Territory could be met in a satisfactory manner.

The influx of Army, Navy, and civilian workers into Alaska has made a heavy drain on local resources already strained to capacity as a result of military operations. Labor turn-over has been heavy with the various agencies competing for the available supply. The Alaska Railroad particularly has suffered as a result of the shortage and recruitment of qualified personnel has been carried on with the help of the War Manpower Commission. In spite of these handicaps and the added fact that the winter was one of the most severe in the history of Alaska, the railroad maintained its schedules almost without interruption and kept the flow of supplies and military equipment moving steadily.

As the possibility of a Japanese attack on Hawaii appeared to become more remote, consideration was given to the return to civilian control many functions that had been taken over by the military in Hawaii when martial law was declared immediately after the December 7 attack. Accordingly, in August this Department joined with the Department of Justice in opening negotiations with the War Department for the restoration of civil jurisdiction and the distribution of governmental functions in the Territory of Hawaii as between the civilian and military authorities. All angles of the problem were thoroughly explored and an agreement reached as a result of which, on February 8, 1943, proclamations were issued in Hawaii simultaneously by the Governor of Hawaii and the Commanding General of the Hawaiian Department restoring specific functions to civilian control.

The program of civilian defense protection in Hawaii continues to maintain a high degree of efficiency and progress. One of its outstanding accomplishments was the establishment of an emergency poliomyelitis hospital. In the operation of the hospital the U. S. Army cooperated to the fullest extent by detailing 22 nurses and 13 Medical Department soldiers to comprise the staff of the unit. The people

of Hawaii have maintained splendid morale and continue to work at the grim business of war with high courage and devotion to duty.

Steady progress has been made in the adjustment of the Puerto Rican hurricane relief loans made by the former Hurricane Relief Commission from 1929 to 1933. Loans adjusted to June 30, 1943, number 852. The total amount collected is \$706,213.12. Much opposition encountered in the past to the settlement of these loans has now almost disappeared and with better cooperation from the borrowers it is expected that the number of adjustments will rapidly increase. Minor crops are being raised in connection with the war program for which the farmers are receiving better prices, and it is a good sign to observe that this increased income is being used in liquidating old debts and the freeing of their properties from the mortgages held by the Government.

A more detailed report of activities in each area follows:

### TERRITORY OF ALASKA

War is still the overshadowing fact in Alaska. The inhibitions which existed a year ago against detailed discussion of the great transformation wrought by military requirements still prevail to a considerable degree. This much, however, may be said: with the recapture of Attu and the isolation of the Japanese on Kiska, the defensive stage of war in Alaska has ended. The initiative is now wholly with the United States. The destruction of the enemy on Kiska is as much of a certainty as any future event in war may be deemed to be. The only important question remaining in regard to Kiska relates to the time when the high naval command, to which has been delegated the responsibility of expulsion of the Japanese from the Aleutians, decides to take the necessary action. Kiska is isolated and completely neutralized and Alaska has become a thoroughfare for offensive action further west. This dramatic and important change may be said to coincide with the termination of the fiscal year 1942.

In the development of the campaign to drive the Japanese invader from North America, the Aleutian islands, previously almost uninhabited (west of Umnak the only settlements were on Atka and Attu) have been galvanized into great activity. The offensive power of the United States in the Pacific has been greatly strengthened thereby and extended farther west in the North Pacific than ever before. At the outbreak of the war, Dutch Harbor, at the inner (eastern) end of the Aleutians, represented the farthest west of our military establishments in the Pacific. Pearl Harbor, in the Hawaiian Islands, is on the 158th parallel of west longitude. Dutch Harbor is

between the 166th and 167th. Our fortifications now extend to the end of the Aleutian chain, and it has become the northern half of the Pacific pincers which will ultimately close on the Japanese enemy. Attu, astride the 173d parallel of longitude east, has now become our farthest west military base on American soil, and, with Amchitka, constitutes our first base on American soil in the eastern hemisphere in this war.

As the tide of military action has swept westward, the military bases on the Alaska mainland, originally constructed for defensive purposes, have diminished in activity and importance and have become increasingly depots for the transshipment of men, matériel, and supplies, to the western front. The requirements of transshipment and transportation have brought important changes to Alaska, the most striking of which is the Alaska Military Highway. This route, the construction of which was begun in the spring of 1942, connects Dawson Creek in British Columbia (northern terminus of our international continental railroad system) by highway with the Alaska system of roads. The chief value of this military highway to date has been in connection with the maintenance of an airway which passes from Minneapolis through Edmonton and Whitehorse to Alaska. This airway has proved its value and establishes a new method of ingress and egress from Alaska—formerly all Alaska traffic passed through Seattle. Of considerable potential significance for Alaska is the 151-mile branch road destined for completion during 1943 from Haines at the upper end of the Inside Passage to meet the Alaska Military Highway 108 miles west of Whitehorse. A road 42 miles in length already extended from Haines to the Canadian boundary. Its extension by 109 miles over the Chilkat Pass and the historic Jack Dalton Trail links the southeastern Alaska "panhandle," hitherto unconnected, with the new international highway system and should constitute the most direct and least costly route from the United States to interior Alaska. A direct overland telephone system from Alaska to the United States is an important accompaniment of this highway construction.

Immediately after the outbreak of war the Governor requested legislation of the Congress to permit the organization of a Territorial Guard, the four companies of the Alaska National Guard organized in 1940 having been inducted. It was his belief that as far as possible there should be no civilian spectators, no passive noncombatants, in Alaska, and that in the event of invasion, which was deemed a distinct possibility at that time and for a year thereafter, every able-bodied person should be prepared to fight. The authorized strength of the Alaska Territorial Guard is 6,000. One hundred and three units have



been organized, and the enrollment, in proportion to population, appears to be the largest of any State or Territory.

In the sale of war bonds, Alaska has consistently exceeded its quotas substantially. In the final month of the fiscal year 1943, Alaska was one of 5 States and Territories to do so. In that month Alaska ranked second in the Nation, exceeding all of the 48 States with a percentage of 114.5 and being second only to Hawaii.

An important concomitant of war has been the search for strategic minerals in Alaska, whose mining hitherto was largely devoted to gold. Gold mining has been suspended for the duration except in those cases where its extraction is accompanied by the recovery of strategic minerals. The United States Bureau of Mines, in collaboration with the Territorial Department of Mines, is carrying on a search for strategic minerals which has already resulted in the production of chrome, antimony, tungsten, and mercury. The development of deposits of coal, designed to stop the wasteful importation of coal from the United States to satisfy Alaska's needs, is now under way.

### THE ALASKA RAILROAD

The Alaska Railroad experienced one of the most difficult operating years in its history. This was due to a number of factors, including the following:

The winter of 1942-43 was one of the most severe in the history of the Territory of Alaska. Intense cold prevailed for long periods; there was an unprecedented snowfall; severe floods occurred on several occasions causing considerable damage to roadbeds and bridges; and a fire in a tunnel interrupted traffic for several weeks. Many experienced employees were lost during the year whom it was impossible to replace. Despite these difficulties the railroad was called upon to transport an increased amount of supplies and equipment and move additional personnel in connection with military activities.

The employee problem was solved in part through the cooperation of the War Department, which assigned a railway operating battalion of enlisted men to assist in operation and maintenance. The War Department also rendered invaluable assistance in the securing of additional rolling stock to move the increased volume of freight which was transported.

The construction of the new railroad cut-off, 14 miles in length, between Portage and Whittier, including two long tunnels, was completed during the year, and this new line was put into full operation. The necessary facilities at Whittier, including docks, railroad sidings and utilities that are required for the transfer of freight from ships

to railroad cars, were completed and put into operation. Construction of a new concrete depot and office building at Anchorage, was also finished during the year.

The coal mine at Eska, operated by the railroad, was improved to such an extent that it was possible to increase materially the production of coal from this mine.

Freight and passenger service between Seward and Fairbanks, and on branch lines serving the Matanuska farm colony and the coal fields, was furnished throughout the year, and river boat service was maintained on the Yukon and Tanana Rivers during the season of river navigation.

## TERRITORY OF HAWAII

The fiscal year ending June 30, 1943, saw the Territory of Hawaii make great advances in fortifying the civilian population against every possible consequence of the war.

Hawaii is in the Pacific theater of World War II; it is the most important United States outpost in this area. As such it must expand and enlarge its facilities to accommodate the thousands of armed personnel and defense workers that have come here; it must take steps to educate and protect the resident population against enemy activities, both from within and without; it must cooperate with military, naval, and other agencies to make Hawaii impregnable and secure against every emergency. All these, and more, Hawaii has contributed and accomplished during the past 19 months.

Every man, woman, and child is aware of the importance of Hawaii as a base for our forces; everyone has willingly gotten behind the war effort and has made it possible, in such a short period of time, to put our area in readiness for the great offensive against Japan.

Under the direction and supervision of the Office of Civilian Defense, the whole territory is now honeycombed with bomb shelters and all vital civilian installations have been protected against damage by splinter and bomb-proof shelters. Emergency hospitals and auxiliary first-aid stations, manned by hundreds of volunteer nurses and aides, have been constructed throughout the Territory. Emergency evacuation camps, kitchens, and food storage places have likewise been erected in areas removed from military objectives.

The civilian population has been immunized, finger printed, and furnished gas masks and has been trained for fire fighting, first aid, gas defense, block patrolling, etc. The populated areas of Hawaii have been supplied with air-raid sirens, the water supply has been chlorinated against bacterial contamination; utility installations are under

constant guard; emergency police and fire reserves supplement the regulars.

The production of food has been increased to make Hawaii more nearly self-sustaining. The sugar and pineapple plantations have turned over thousands of acres of land for production of food for local consumption. This has relieved shipping space for other essential commodities and supplies. Hawaii, prior to the war, did not produce sufficient fresh vegetables to supply local needs. A monthly production of about 4,000,000 pounds before the war has been increased to approximately 8,000,000 pounds. Poultry, pork, and beef cattle production, though handicapped by shortage of feed, has nevertheless been able to hold its own through local feed production.

Mass influx of workers, overcrowding, black-out restrictions, and general inability to live normally under present conditions have created numerous problems of housing, hospitalization, sanitation and garbage disposal, disease control, juvenile delinquency, crime prevention, etc. The Territory is making every attempt to handle and alleviate these conditions.

Evacuation camps have been opened to homeless and distressed families. Approval for construction of some additional 1,000 housing units has been obtained but unless lumber and other essential materials are made available this project will fail.

During the past year four diseases—mumps, whooping cough, poliomyelitis, and influenza—became epidemic. These were quickly controlled and the casualty rate was low. Venereal diseases have also been satisfactorily controlled, the rate dropping to an unprecedented low of 4.5. Tuberculosis, however, due to living conditions, is on the increase with over 2,000 cases for the past year as against an average of 1,500 for prior years.

The Territory is on guard against the outbreak of tropical diseases. This is a constant threat on account of contact with armed personnel passing through from other Pacific areas.

Business has had a prosperous year. This is reflected in an increase of tax revenues, both Territorial and Federal. Defense jobs and the presence of thousands of armed personnel have accounted for increased purchasing power. Inflation, however, has been kept down by price fixing and rationing under the Office of Price Control and the Office of Civilian Defense.

There has been an acute shortage of labor in Hawaii. Defense activities, with higher levels of wages, attracted labor from local industries. Hawaii was designated a "critical labor area" with a net shortage of 14,000 workers, the bulk being required for agriculture and for Army and Navy agencies.



All governmental agencies of the Territory devoted their resources and personnel to aid and cooperate with military, naval, and Federal agencies. This will continue until victory is achieved.

The restoration of civil affairs to civil authorities on March 10, 1943, has had a healthy reaction on the community. It has relieved military personnel for military duties; it has returned to civilians the responsibility of administering their own affairs. Hawaii can well be proud of its record of accomplishments. It is eager to demonstrate that its people are capable of carrying their share of any responsibility and of performing any task necessary to assure the fullest safety of the islands.

## PUERTO RICO

### SHIPPING AND SUPPLY SITUATION

Other important developments during the year were overshadowed by the shipping shortage and its serious effects on the island's economy.

With its 2 million population the island normally is dependent upon the continent for a third of its food (by weight) and for almost all of its clothing and other essential commodities.

Puerto Rico's shipping first began to feel the effects of the war as early as March 1942. In June incoming civilian cargo fell to less than a quarter of normal receipts. The situation became extremely critical in September 1942 when civilian tonnage reached an insignificant level—7 percent of the 1940 monthly average.

The strenuous efforts of the Insular Government and the Federal Department of the Interior averted the disaster which appeared inevitable. Representations of the island's minimum shipping needs were made to the War Shipping Administration with the result that additional tonnage was made available. An agreement was reached between the Department of the Interior and the Department of Agriculture whereby these agencies undertook to supply the island with basic foods.

Before the tide finally turned, however, the economy of the island sank to a level not far above the point of disintegration. For a considerable period basic foods such as rice and codfish were virtually unobtainable. Wholesalers and retailers generally were threatened with bankruptcy by the depletion of stocks. Employment, according to data obtained by the Insular Department of Labor, was 40 percent less in January 1943 than in June 1942.

Improvement in the supply situation, which began to be noticeable in December 1942, continued at an increasing rate to the end of the fiscal year. As a result, our position at the end of the year was in general the reverse of that in which we found ourselves at the begin-

ning of the year. Instead of critical shortages we had substantial surpluses of most basic commodities. Industry and business had revived, and this revival was reflected in employment figures. Employment in our manufacturing industries, for example, was only 5 percent less in June 1943 than in June 1942. The increase in shipping during the last half of the year also resulted in an export total for the year only slightly below normal.

#### CONGRESSIONAL COMMITTEES

During the year Puerto Rico was visited by two congressional committees—the Chavez Committee of the Senate and the Bell Committee of the House. Both committees held extensive hearings and made first-hand inspections of various phases of insular life. After returning to Washington the Chavez Committee continued to take an active interest in the island's problems and was extremely helpful in the solution of some of them, notably the shipping problem. The Bell Committee came to the island late in the fiscal year, and, therefore, it is not yet known what the results of its investigations may be.

#### RELIEF REQUIREMENTS

Due to Puerto Rico's lack of war industries, and to stagnation of business and industry as a result of inadequate shipping, the need for relief increased drastically. The work relief program carried on by the WPA was increased; the free food distribution program of the FDA was stepped up and, in addition, the insular legislature established an insular emergency program and appropriated \$16,000,000 to that agency for direct and work relief.

#### TREASURER

Despite the dark prospect at the beginning of the year, the Treasurer cautiously estimated probable receipts at \$28,000,000. The auditor gloomily estimated \$14,000,000. Actually, over \$41,000,000 was collected. This was an all-time peak, over \$4,000,000 more than the previous year. Income taxes accounted for much of the increase, collections rising from \$7,635,383 the previous year to \$11,312,371. During the year, the insular public debt was reduced from \$23,700,000 to \$16,398,000, the lowest level in 20 years.

#### DEPARTMENT OF JUSTICE

The Department of Justice had a busy year in the courts. There were a number of cases, involving income taxes, brought against the treasurer. The Department also cooperated with the Land Authority

in cases which sprang from enforcement of the 500-acre law. One important case led to a consent decree between the Government and the South Porto Rico Sugar Co., which was approved by the supreme court of Puerto Rico. Under its terms, some 22,000 acres of land will be conveyed to the Land Authority. Other consent-decree cases with large sugar companies are being negotiated.

### LABOR

During the year there were numerous labor disputes due chiefly to economic pressure resulting from increasing living costs in the face of nearly static income. The Federal Conciliation Commissioner, who worked in close harmony with the Insular Department of Labor, intervened in 97 cases, and had remarkable success in effecting settlements. The Insular Conciliation Commissioner, who took office on March 8, handled 47 cases between that time and the end of the fiscal year.

The most serious dispute of the year involved 1,300 railroad workers. When these workers struck, the Governor immediately immobilized traffic for 48 hours and, thereafter, the ODT took over the management of the road under an Executive order of the President of the United States. The War Labor Board appointed a panel to arbitrate the dispute.

### EDUCATION

Enrollment in the public schools continued to increase, totaling for 1942-43 321,568, or 9,232 more than in the previous year. The language problem was given serious attention. Experts from the continental United States were brought to the island to study the effect of teaching in two languages.

The University of Puerto Rico underwent a major change. Under the new University Law, which became effective during the year, the old Board of Trustees was superseded by a Superior Council of Education. A new Chancellor was appointed and he immediately instituted basic reforms, the efficacy of which remain to be determined.

### HEALTH

The Department of Health reports an increase in the birth rate for 1942 of 1.2 percent over the previous year. The death rate was 16.6 percent as compared with 18.4 percent the previous year. The leading causes of death were: (1) diarrhea and enteritis; (2) tuberculosis; (3) pneumonia and heart disease.

Strenuous efforts were continued to combat venereal disease. Two special hospitals for the treatment of venereal disease were opened,



and plans were made for several more. Malaria control work was also pushed.

### DEPARTMENT OF AGRICULTURE

War-time conditions produced special problems in the field of agriculture. The securing of seed and fertilizer was very difficult. This situation eased toward the end of the year, however.

One serious problem, which remains unsolved, is the disposal of molasses. Because no tankers were available, none of the 1943 production was moved from the island.

The Insular Department of Agriculture inaugurated an extensive seed-production program, under an agreement with the Federal Department of the Interior. This program, together with the price-support program of the Food Distribution Administration, has already increased local food crop production and is expected to step it up even further.

### PLANNING BOARD

The Puerto Rico Planning, Urbanizing, and Zoning Board began work in 1942. Cooperating with the emergency program, the planning board classified and reviewed all work-relief projects of the program.

As part of its regular activities, the planning board held public hearings on its master plan of major thoroughfares in the San Juan metropolitan area. It made various studies, including a special investigation of conditions on the island of Vieques, which has been seriously affected by war conditions.

### LAND AUTHORITY

During the year, the Land Authority acquired 16,101 acres of land in 30 different municipalities at a total value of \$2,051,801.08, an average of \$125.21 per acre. A total of 4,212 families (about 22,000 people) have received parcels of one-fourth to one cuerda each. Six proportional-profit farms, comprising 5,371 cuerdas, are being operated on land bought from Central Cambalache.

### WATER RESOURCES AUTHORITY

It seemed necessary under war conditions to unify all sources of power in the island. As a result of condemnation proceedings under the Lanham Act, the properties of the Porto Rico Railway Light & Power Co. and the Mayaguez Light, Power & Ice Co. were delivered to the Federal Works Administrator, who entered into a contract with the Water Resources Authority to operate them. Suits to determine the final disposition of the properties are still pending.

The Garzas plants, which had been operating from low-stage reservoir storage since November 1941, became full-stage producers. Dos Bocas, which was 98 percent completed at the end of the previous fiscal year, came into production.

#### TRANSPORTATION AUTHORITY

The Puerto Rico Transportation Authority acquired the White Star Bus Line, serving the metropolitan area of San Juan, in November 1942. When the Authority took over, not more than 40 of the 229 busses belonging to the company were fit for service. Lack of repair parts and tires presented special difficulties. By March, however, the Authority had 65 busses moving. Sixty more will be put into service upon arrival of new motors which have been ordered with War Production Board approval.

#### DEVELOPMENT COMPANY

The Puerto Rico Development Co., established for the purpose of stimulating the growth of industries, made substantial progress. A glass factory to produce bottles is now under construction, and is expected to begin operation before the end of 1943. Plans are being studied for the construction of a wallboard factory which would utilize bagasse, a waste product of sugarcane. The possibility of establishing a textile factory, a paper mill and a yeast plant are also being studied.

The company has contracted with local manufacturers for the production of bamboo furniture from designs furnished by the company. It has made a similar contract for the manufacture of white ware and pottery. These products are already being successfully sold on the local market.

#### VIRGIN ISLANDS

The war has been the dominating factor in Virgin Islands economy, and its effects have been demonstrated in all phases of community life. Although the danger of attack by air or surface raider became more remote after the occupation of North Africa by the United Nations, the program of civilian defense initiated with success in the preceding fiscal year was prosecuted with vigor. Fire defenses were improved, raid drills and blackouts were carried out, home guards were trained intensively and the American Red Cross extended its facilities and activities supported by financially successful campaigns. During the past year the armed forces have been a large element in the life of the communities in the Virgin Islands.

As the Virgin Islands were early to feel the economic uplift of the war, so they are among the first American communities to experience the inevitable retrogression. During the year under review, defense construction operations gave employment on the island of St. Thomas to every employable male worker, and the shortage of native labor to meet the abnormal demand resulted in heavy importations of labor from neighboring British islands. With the reduction of defense construction, as the year grew to a close, a great many of the imported aliens were repatriated.

However, unemployment undoubtedly will be the most serious consideration in the Virgin Islands in the immediate future. Projects for water storage in St. Croix, for the extension of water supply facilities in St. Thomas, and the construction of highways in both islands, commenced in earlier periods, must be prosecuted vigorously to relieve unemployment as well as to provide basic improvements in the communities. These projects can be expanded without detriment to the larger interests of the national war effort because critical material is not involved. Projects for construction of new hospitals, extension of sewerage systems, sanitation facilities and many other projects of like nature, which are absolutely essential to the health and general welfare of the people of the islands must, of necessity, be deferred.

The attention of the administration has been largely directed to the connected problems of food and shipping. Early in the year, the Department of the Interior, through its special defense appropriation, established civilian food reserves to insure that basic food commodities would be available to the people of the islands in spite of disruption of commercial trade and shipping facilities. The Food Distribution Administration of the Department of Agriculture now acts as the agent of the Department of the Interior in the purchase of foods requisitioned by that Department and in their distribution through sale to the merchants in the islands. Steamship space for shipment of both food and general supplies required in the islands is made available by the Department of the Interior in vessels assigned by the War Shipping Administration. These supply agencies function successfully with the result that a sufficient supply of foodstuffs is available.

On the island of St. Croix, the Work Projects Administration developed an extensive project of vegetable production for the public institutions. On the island of St. Thomas, municipal appropriations were used to provide a direct labor subsidy to encourage an increase in the production of vegetables and other locally grown products. The problems of price adjustment and rationing were met by the



Office of Price Administration which extended its activities to the islands.

The abattoir on the island of St. Croix, constructed in a prior period from Federal funds, furnished dressed meat to the new Cold Storage Market in St. Thomas, likewise constructed from Federal appropriation. The profitable operation of the abattoir on a commercial basis appears to be doubtful because of its size and the unavailability of sufficient livestock. The Cold Storage Market at St. Thomas, on the other hand, gives hope of profitable operation and will be an increasingly important factor in the life of the community here by providing refrigerating facilities.

The Federal Works Agency, which late in the preceding fiscal year acquired a 1-year leasehold of the docks of The West Indian Co., Ltd., at St. Thomas, and acquired title in fee simple to its electric light and power station, operated these public utilities until March 1943. After the end of one year's operation it returned all of the properties to the former owner, The West Indian Co., Ltd.

The increase in income taxes on general business as well as the increased rates and lower exemptions yielded income taxes of \$465,000 in the municipality of St. Thomas and St. John as compared with \$316,000 in the preceding year, an increase of 47 percent. The municipality's total revenues for the year totaled \$693,000 as compared with \$599,000 in the preceding year.

In the municipality of St. Croix, total income tax collections were \$46,900 as compared with \$30,000 in the preceding year, an increase of 55 percent. The total revenues of the municipality of St. Croix were \$194,000 as compared with \$196,000 in the preceding year.

The municipality of St. Thomas and St. John not only operated without a Federal deficit appropriation for the second successive year but, by June 30, 1943, the Treasury of this municipality had collected a surplus of approximately \$80,000 in revenue over budgeted obligations. The municipality of St. Croix operated with a Federal deficit appropriation of \$114,800 which was supplemented by a deficiency appropriation of \$45,000.

There has been little improvement in hospitalization and sanitation conditions in the islands. All medical institutions of the islands continue to be in dire need of rehabilitation and modernization of equipment. The disgraceful system of nightsoil disposal continues to be a most serious menace to the health of the civilian population as well as of the armed forces. The open gutters and sewers in all towns are shockingly offensive. Unfortunately, the correction of most of these conditions must be deferred.

## THE PHILIPPINE ISLANDS

The Philippines continued to suffer the effects of enemy invasion. The proclamation of occupation issued on January 3, 1942, Manila time, was followed by the internment of citizens of the United States, Great Britain, and the Dominions, the Netherlands, and most of the Latin-American republics and by the seizure of their property. Philippine citizens and Chinese were allowed comparative freedom of residence, and Japanese were accorded civil rights equal to those of Filipinos.

On January 23, Jorge B. Vargas and some 30 other members of the pre-war cabinet, courts, and legislature, together with prominent Filipino citizens were authorized to form a provisional council of state, and an Executive Commission. The Executive Commission set up a central government under the chairmanship of Mr. Vargas. A considerable number of former bureau chiefs and other governmental personnel appear to have joined the collaborationist movement, undoubtedly in many instances under circumstances of heavy duress.

Intercepted broadcasts revealed that guerrilla warfare was being waged in all the larger islands and that the mass population continued in its loyalty to the United States and to the Commonwealth Government-in-Exile. Japanese and collaborationist efforts to control the economic and social life appear to have met with indifferent success. In May 1943 the Japanese government promised to grant the Philippines "independence within the Greater East Asia Sphere" before the end of the year. In preparation for this step a preparatory committee was nominated. At the same time the liberty of the people was carefully restricted through the organization of neighborhood and district associations under petty native tyrants of Japanese affiliation. All liberal elements were subjected to control and persecution, and efforts were made to crush opposition to the proposed "independence."

The Commonwealth Government-in-Exile under the leadership of President Quezon and Vice President Osmena continued to function in Washington. In line with assurances given in January 1942 from Corregidor, all current financial obligations including interest on the public debt were acquitted. The currency reserve funds on deposit in the United States were kept intact at more than 100 percent of immediate pre-war circulation.

The functions and duties of the High Commissioner to the Philippine Islands were transferred to the Secretary of the Interior by Executive Order No. 9245, September 16, 1942. President Roosevelt accompanied the order with a letter to the Secretary reading as follows:

MY DEAR MR. SECRETARY :

Having decided that under existing conditions Philippine matters can best be administered by a member of the Cabinet in close consultation with me, and that for the present the appointment of a new High Commissioner is inadvisable, I have today signed an Executive order transferring to you for the time being the functions, powers, and duties of the United States High Commissioner to the Philippine Islands, together with the personnel, records, property and funds of the said office.

While the work of the High Commissioner's office has been materially changed in character as a result of military action and the occupation of the Philippines by Japanese forces, we must be ready to deal with the many new problems that will confront us when the enemy is ousted from Philippine soil and final victory is achieved by our forces with the aid of the gallant Philippine people. It may be expected, for example, that transportation will be disrupted, food supply lacking, the money and banking system disorganized, and in many places civil government broken down. Foreign and domestic trade will have to be revived. American and other outside investments in the islands will present complex problems. In short, our duties and responsibilities in the Philippines will be multiplied by enemy invasion and will increase with every month of occupation.

It will be your duty to undertake the conduct of such studies and investigations as may be necessary to enable us to deal with these problems when the time arrives, and to submit recommendations or take such action as may appear necessary as a result of your inquiries. In particular, there should be an immediate inquiry into the financial problems which have ensued as a result of Japanese occupation.

In the conduct of your studies and investigations you will consult with the President of the Philippines and other officials of the Philippine government to the extent that you find it necessary or advisable. You may also call upon other agencies of this Government for advice and assistance.

Under the terms of the foregoing letter, the Office of the High Commissioner was reorganized with a considerable reduction in personnel and assigned the duty of preparing in consultation with Commonwealth officials a generous and effective program for the economic and financial rehabilitation of the Philippines. It is anticipated that upon the defeat of enemy forces much of the physical property of the government will have been destroyed or damaged, the provincial and municipal treasuries will be empty, banks and credit institutions insolvent, the basis of public tax and revenue impaired for several years, and the schools and health service abandoned. The sympathetic and effective assistance of the United States will be required to reestablish the normal political, economic, and social life of the Philippine Commonwealth.





# Puerto Rico Reconstruction Administration

BENJAMIN W. THORON, Administrator<sup>1</sup>

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THE principal contribution of the Puerto Rico Reconstruction Administration to the war program during the year has been the planting of more than 15,000 acres of lands owned by the Government in food crops. Vegetable marketing cooperatives which were financed and supervised by the PRRA, supplied fresh produce to the armed forces in the island in ever increasing amounts in addition to providing much needed subsistence for the inhabitants of the island. A cotton cooperative has provided substantial quantities of Sea Island cotton required for war purposes. The butyl alcohol plant of the Lafayette Sugar Mill Cooperative has exported more than three and a half million pounds of solvents to the States for the exclusive use of concerns having direct or indirect war contracts. In general, the funds available have required limitation of PRRA activities to the preservation of the social and economic progress achieved and to the protection of investments of the Government, which are valued at approximately \$20,000,000, and were produced by programs of previous years.

## FUNDS AVAILABLE

For such purposes the President authorized expenditures by the PRRA during the fiscal year 1943 out of the Puerto Rico Revolving Fund (49 Stat. 1135) on the following projects:

Operation and maintenance of housing projects and facilities-----	\$165,000.00
Management of lands and leases connected with Lafayette project---	87,000.00
Operation of Castaner farm project-----	50,000.00
Supervision of and making and servicing of loans to cooperatives---	250,000.00
General administration-----	109,180.00

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<sup>1</sup> By Executive Order No. 9278 of December 4, 1942, Benjamin W. Thoron, Director of the Division of Territories and Island Possessions, was appointed Administrator to serve without additional compensation vice Guy J. Swope, resigned. Guillermo Esteves as Assistant Administrator was continued in active charge of the work in Puerto Rico.

1942 unobligated balance Eleanor Roosevelt Development-----	\$18,412.76
Construction of approximately 600 farmers' houses-----	400,000.00
Operation Central Service Farms-----	89,200.00
To complete certain land purchases-----	5,000.00
Subdivision and sale of 900 acres Lafayette grazing lands-----	4,600.00
Total-----	1,178,392.76

Adjustments in the amounts of the respective project authorizations were later approved by the President to meet requirements of the overtime pay acts, without changing, however, the aggregate amount of available funds. In addition to the Federal funds, the legislature of Puerto Rico appropriated \$50,000 to the PRRA to assist in the operation of its Central Service Farms.

A summary of the year's principal activities follows:

### HOUSING MANAGEMENT

In addition to 1,210 family dwelling units in its 5 low-cost urban housing projects, PRRA has 5,783 rural houses on small subsistence tracts, and 5,326 3-acre parcels without houses which are leased for cultivation to farm laborers at nominal rentals. Most of the rural houses are of concrete construction and termite and hurricane proof; some are brick and concrete; some galvanized iron and some principally of rammed earth. About 200 of the latter type of block houses were constructed during the year. Difficulties in procuring delivery of noncritical materials prevented construction of the 600 contemplated, but the remainder will be built during the fiscal year 1944 out of the unobligated balance in the project which the President has continued in availability for that purpose. Construction during the fiscal year 1943 included completion of 159 units for national defense workers at the Eleanor Roosevelt urban development. As of June 30, 1943, occupancy of urban projects was 100 percent; occupancy of 99.08 percent in 7 rural resettlement areas and 96.11 percent in the remaining scattered rural units. Total rental collections amounted to \$301,600, leaving a substantial net return over and above management, repairs, and other expenses totaling approximately \$180,000.

### LOANS TO COOPERATIVES

Supervision, organization and financing of cooperatives has been continued, with particular attention to stimulating activities of the vegetable and cotton cooperatives and to increased production of the butyl alcohol plant previously mentioned. Production of sugar by the Los Canos and Lafayette Sugar Mill Cooperatives will probably



fall 17 percent below the previous year's processing due to lesser cane production attributed principally to shortage of necessary supplies and facilities. Pending regulations of the Public Service Commission of Puerto Rico have also increased obligations by mills to growers for cane transportation charges. Despite other difficulties incident to war conditions, the Los Canos Cooperative promptly met at maturity the installments due June 30 on its loans from the Government, but at this writing the Lafayette Mill has not completed similar arrangements. The Sociedad Agricola which purchases farm supplies for over 3,700 members and patrons sold fertilizer, insecticides, animal feeds, seeds, and other farm supplies amounting to over \$350,000. This cooperative under new management is expected to become an important factor in meeting farmers' needs at reasonable prices. The Vanilla Cooperative has been particularly valuable to growers in the Coffee District by curing and marketing at a favorable price more than 3,275 pounds of vanilla beans.

### RURAL REHABILITATION

Operation of the Central Service Farms project with \$89,200 out of the revolving fund and \$50,000 appropriated by the insular legislature, made it possible for PRRA to plant 500 acres in seed beds of subsistence crops. PRRA furnished the land, working animals, machinery, agricultural implements, warehouse and other facilities, and the Work Projects Administration furnished technical direction, laborers, fertilizer, and insecticides. Of the total seed production 10 percent was turned over to PRRA for its planting program, and the balance was used by WPA both for planting and for its school lunch program. In its planting program, PRRA accomplished the planting of approximately 15,000 acres in food crops and 3,000 acres in cash crops in the various small subsistence farms occupied by its resettlers. Thirty-four rural waterworks were operated, furnishing potable water to more than 100,000 persons. Seventeen community centers were operated for the benefit of PRRA resettlers, small farmers and laborers of the surrounding districts. Technical advice and help was given to resettlers to encourage maximum production of foodstuffs. Insular authorities have evidenced their appreciation of the value of PRRA's rural rehabilitation program by a legislative appropriation of \$60,000 and by an allotment of \$212,790 to the PRRA for its planting program from the Insular Emergency Council for the fiscal year 1944.

In the Castaner project 1,200 acres were cultivated in coffee, sugarcane, citron, vanilla and various subsistence crops. The sale of agri-

cultural products brought in more than \$60,000, more than \$10,000 in excess of the amount allotted for operation. Some 200 resettlers' families on 1-acre subsistence plots were provided with work. At Castaner the Director of Selective Service established a Civilian Public Service Camp for emergency medical aid and health education under the direction of the National Service Board for Religious Objectors, with technical supervision of the planning and direction of the work program by the PRRA. The 25-bed hospital which the board established is making a fine contribution to the welfare of PRRA resettlers and their neighbors in both preventive and curative health treatment.

### CONCLUSION

For continuation of projects similar to those herein reported, the President has authorized the PRRA to expend \$801,000 in new allotments and unobligated balances of approximately \$250,000 more out of the revolving fund during the fiscal year 1944. This, like authorizations for the fiscal year 1943, will be barely sufficient to protect temporarily the large investments of the Government produced by previous PRRA programs, and to conserve some of the social and economic progress which would be completely lost if the program was entirely terminated. However, if like expenditures should be made in succeeding years, it would not be long before the revolving fund was exhausted. Before that time comes, consideration will be in order as to whether the PRRA should be liquidated or whether other financing should be provided for continuation of the most essential activities in which it has been engaged. In view of the ever-present problem of the island's distressed economy, and the questionable benefit of mere palliative relief expenditures, PRRA's experience has probably demonstrated the advisability of devoting emergency funds, whether Federal or insular, to projects with long-range reconstruction possibilities.

# General Land Office

FRED W. JOHNSON, Commissioner

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**T**HE mobilization of millions of acres of public lands whose natural resources today furnish vital weapons for the fighting machine of the United Nations and tomorrow will constitute an important segment in the economic life of the United States after peace has been won, was the major objective attained by the General Land Office during the 1943 fiscal year. Under its supervision, tracts of the public domain with a total acreage equalling that of several States, were made available for troop training, aerial bombing and gunnery practice and other military purposes, and more than 70,800,000 additional acres were withdrawn to insure the development and production of strategic war minerals. Still more acres furnished petroleum and other mineral products for military use under the system of public domain leases maintained by the Office.

Valuable timber supplies were provided from 2,500,000 acres of forest lands under General Land Office administration in western Oregon, and the meat ration of combat troops and civilians was augmented by the livestock raising operations and range development work upon grazing sections of the public domain under its jurisdiction.

At the same time, the organization, geared to meet wartime demands for efficiency, carried forward important though less spectacular operations involving the public domain, originally entrusted to it by Congress in 1812. In this field, the identification, recordation, and administration of the public lands in accordance with more than 5,000 public land laws, are performed by the Office as the official real estate agent of the Federal Government.

Despite the increasing volume of these routine duties, many of which were undertaken at the request of other governmental agencies and for their benefit, and despite the added work-load of war-connected activities, the General Land Office during 1943 maintained its position as one of the few executive agencies which operates at a profit to the Federal Treasury. Cash receipts from its activities



totalled \$9,758,066, as against expenditures of \$2,304,416. This ratio of a return of approximately \$4.25 for each \$1 of expenditures, moreover, was achieved in spite of the added costs involved in the establishment and operation of a Branch of Field Examination in the General Land Office, and without taking account of activities which produced no cash return, such as surveying and other tasks performed as utility services for other government agencies and the public. Incidentally, the total cash receipts were the greatest since 1926, and represented the second consecutive year in which the aggregate volume reached more than \$9,000,000.

## HISTORIC LAND USE POLICY

The use of the public lands as an auxiliary weapon in time of war and a potent factor in national development in time of peace, conforms to a traditional policy of the United States as old as the Republic itself. After the Revolutionary War, cash sales of such lands helped meet the cost of that war and large tracts were utilized as a bounty payment for military service, in parcels ranging from 100 acres to private soldiers to 1,100 acres for major generals. Generally speaking, similar provisions were made for recognition of military services after the War of 1812, the War with Mexico, and the Indian Wars. Altogether, approximately 61,000,000 acres of the public domain were devoted to the satisfaction of claims based upon military service in these wars.

Although the enactment of the first homestead law in 1862 terminated the era of military land bounty payments, the public domain retained its significance in connection with the Nation's military efforts. Certain settlement preference rights on public lands were extended to ex-servicemen after the Civil War, and that policy consistently has been followed through each subsequent conflict, including the First World War.

Fortified by almost a decade of national conservation, during which the natural resources on the public lands were protected from wasteful dissipation, the United States at the outbreak of the present global war found itself able to contribute more from its public domain treasure houses than ever before in history. While working still within the conservation framework to insure every possible safeguard against misuse of elements needed for the welfare of future generations, the public domain again has been mustered into active service.

As was to be expected, the most immediate contribution from the public domain was in the form of land areas for training soldiers and for the other many uses in modern warfare. Under a program which

was begun before the United States entered the war, more than 15,270,000 acres had been set aside for combat training and other military use at the close of the fiscal year. Including many tracts whose scope and identity still are closely guarded military secrets, a total of 4,703,762 acres were withdrawn for military purposes during the 1943 fiscal year.

In addition, smaller portions of the public domain were made available as sites for defense plants, and to provide housing facilities for war workers. In the latter category, these projects located on public lands in Nevada, California, and New Mexico, made available more than 1,000 units of essential dwelling, dormitory, or trailer housing accommodations.

Studies relating to the post-war administration of these areas and of lands acquired by the Federal Government by purchase, exchange, or other negotiations, for war purposes, were set under way by the General Land Office during the year.

#### MINERALS MAKE MILITARY MIGHT

Furnishing an increasing and continuous flow of mineral resources from the public domain into the fuel tanks, the ammunition boxes, and the arsenals of the United States was another task confronting the General Land Office during the 1943 fiscal year. Extending beyond the present conflict, its activities embraced steps for self-sufficiency in supplies of the vital mineral products during the Nation's reconstruction period.

An increase by about one-third in the amount of gasoline and butane produced under leases on the public domain was recorded during the year, while the production of oil also was greater than the previous year.

The total cash returns to the United States in 1943 from the Mineral Leasing Act were the highest in 17 years and receipts from all mineral leasing operations reached \$7,790,473, an increase of \$397,427 over last year.

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.

As a further aid to the procurement of necessary mineral supplies, plans were formulated and embodied in an order issued by Secretary Ickes on June 9, 1943, for the wider development of potash deposits in the United States. Designed to meet the current and future needs for potash and its associated compounds, previous restrictions upon the

issuance of potash leases were removed to permit the decentralization of sources of potash through production in different areas. The order also facilitates the maintenance of competitive enterprise in the potash industry, and the utilization of this natural resource along safe conservation principles.

### O. & C. LANDS FURNISH TIMBER

War demands for specialized types of forest products ranging from heavy timber for piling and shipyard construction to wood for airplane building were partially met in 1943 from the 2,500,000 acres of public domain in the Pacific Northwest which comprise the Oregon and California revested railroad grant lands under the jurisdiction of the General Land Office. Timber sales from these areas, including tracts of Oregon and California lands within national forest boundaries, totaled 485,029,000 board feet, valued at \$1,915,964.

One of the world's largest testing grounds for scientific forestry methods, the Oregon and California lands are administered under policies of sustained-yield management which insure, through reforestation and limitations on timber cutting, a continuous supply of timber for the support of the lumbering communities and industry of the region. At the same time, the program calls for payments of a large part of the proceeds from the timber sales to the 18 Oregon counties in which the Oregon and California lands are located. Under this arrangement, approximately \$976,000 will be paid to these counties from the returns on 1943 sales. Part of this payment constituted final liquidation of a \$2,000,000 debt of back payments owed the counties under earlier legislation involving the O. & C. railroad grant. Original estimates called for the liquidation of this debt over a 10-year period, but so successful have been the financial operations under the O. & C. Revested Lands Administration, that it was wiped out in 1943—4 years ahead of schedule. The amount formerly paid to the counties as back taxes now will be used to liquidate Federal Treasury demands upon the O. & C. lands; eventually, the Oregon counties will receive 75 percent of the proceeds from timber sales in the O. & C. area. Costs of administering these lands continue to be less than 25 percent of gross receipts.

### LAND FOR LIVESTOCK

Contributing its share to the supply of food, fiber, and leather for fighting men and civilians, the public domain during 1943 afforded opportunity for the grazing of livestock upon 11,984,939 acres of land outside Federal grazing districts in continental United States and Alaska. These operations carried on under the jurisdiction of the



General Land Office involved 10,151 leases of lands for grazing purposes requiring an annual rental of \$216,485. Of the total, 1,168,954 acres of the leased public domain areas were in Alaska—some in regions now affected by military operations—the remaining 10,815,985 acres being within the continental limits of the United States.

The solution of problems of improvement and maintenance of the range in order that maximum production may be secured for war purposes, also was included within the scope of public domain administration during the 1943 fiscal year. For example, on the Oregon and California Revested Lands, where timber cutting is the primary concern, special effort was made to lease all areas adaptable for grazing use.

Although handicapped by a shortage of manpower and wartime priority restrictions on materials, the Range Development Service of the General Land Office continued work on 139 projects in 10 Western States, involving range improvements, fence construction, development of springs, wells and other stock-watering facilities, and soil and moisture conservation on the public lands. Working in cooperation with the stockmen, the States and counties, and with other Federal agencies, the Service program last year brought substantial benefit to 1,736,917 acres of land. A "work-shelf" of projects which provides for wider development of watering facilities, the reseeded of forage acres, and rodent control work, was planned during the past year and will be begun by the Range Development Service on the public domain as soon as the labor and material supply situation will permit.

#### LAND CLASSIFICATION AND RESEARCH

One of the features of the national conservation policy which contributed substantially to the accumulation of natural resources available at the outbreak of the war was the stipulation that no disposal would be made of tracts of the public domain until after they had been classified as to the best use to which they could be put. Thus, the identification, classification, and examination of the portions of the public lands which enter into the Nation's military or economic structure forms an important element in General Land Office activities. Although lacking the spectacular aspects of other forms of war work, these activities nonetheless are equally essential to public land administration in war or peace.

Working in close cooperation with the Congress in the study of public land administration problems, we frequently placed the research and statistical facilities of the General Land Office at the service of the Senate and House during the year. Tabulations and textual information were prepared and submitted at the direct request of committees

dealing with public land matters. Included in this material were an inventory of all public lands in Federal ownership in 13 Western States and a detailed report on public land withdrawals which was compiled for the Senate Committee on Public Lands and Surveys.

In addition to its analytical operations, carried on in response to demands from the Congress, the Office rendered expert assistance to other governmental agencies in their consideration of many land management aspects of their work. This form of collaboration was particularly prominent during the year in Alaska, where several bureaus of the Department of the Interior, including the National Park Service, undertook a joint study of administrative problems growing out of the completion of the Alaska Highway.

More specifically, land classification work closely related to the war included assistance to military agencies in connection with land acquisitions and the making and adjustment of withdrawals of public lands for military uses and for air navigation sites both in the United States and Alaska.

Statistical research and analytical studies of paramount importance in evaluating military and post-war problems and their solution were made by the General Land Office during the year. Among these were special tabulations on lands withdrawn for military purposes for the War and Justice Departments, and studies designed to determine the probable food production on the public domain and ways of increasing it in furtherance of the national food-for-war program.

Moreover, methods for carrying resource protection through the war and into the reconstruction period constituted a major task confronting the research and classification branches of the Office. With the trend of national legislation placing particular emphasis upon scientific administration of the public domain, this work, involving such features as townsite and land use planning, and other technical studies, is expected to play a role of ever-increasing importance in the solution of post-war problems.

#### CADASTRAL ENGINEERING SERVICE

Because no tract of land properly may be set aside for any purpose until its location and boundaries have been accurately determined and permanently recorded, the Government's cadastral surveys have been the basic foundation in negotiations for the disposal, exchange, withdrawal, or other change in the status of the public domain areas since 1796. 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 land areas on the ground, 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. First undertaken by the General Land Office when the system of public land surveys decreed by the Continental Congress was transferred to its jurisdiction in 1812, maintenance of a cadastral engineering service has been a continuing responsibility of this Office.

During the 1943 fiscal year, 14 separate agencies of the Federal Government called upon the Service for accurate field surveys of land areas under their jurisdiction, and a total of 2,026,119 acres was covered in the annual work schedules, in addition to many other projects of survey not measurable on a quantitative basis. Surveys conducted at the request of the Army and Navy, the Defense Plant Corporation, Civil Aeronautics Administration and other war-connected agencies resulted in acceleration of the war program. Development of production of potash and sodium in California, magnesium in Nevada, coal in Utah and Wyoming, and timber in Oregon was facilitated by the work of the Service during the year, and housing facilities were made possible for defense workers through townsite surveys in California.

Substantial aid in protecting the public domain from fire losses is afforded by these cadastral engineering activities, because standardized Federal rectangular survey designations enable speedier and more accurate identification and location of threatened areas than metes and bounds measurements.

#### BRANCH OF FIELD EXAMINATION

The rendering of technical assistance to many agencies of the Government in the solution of their land administration problems brought a heavy 1943 workload to the Branch of Field Examination. This branch completed its first fiscal year as an agency of the General Land Office, following its reorganization by order of the Secretary from its previous status as a departmental division.

Maintaining regional offices in San Francisco; Billings, Mont.; Salt Lake City, Utah; and Albuquerque, N. Mex., with an office at Anchorage, Alaska, the organization includes engineers, geologists, timber and range specialists, experts in land laws and regulations, and other types of experienced personnel.

The war materially affected the field work, and in some regions approximately 50 percent of the problems were of a military nature, and also involved observance of the land laws. Much of this work consisted of investigating the validity of mining claims on sites selected by the Army or Navy for military purposes, and securing the can-



cellation of invalid claims, thus saving the expenditure of funds which otherwise would have been spent in purchasing such lands. In one region these investigations involved a total of more than 4,000 mining claims.

## ALASKA

The problem of Alaskan development presents both an immeasurable opportunity for the advancement of civilization along the Nation's only remaining pioneer frontier and a challenge to use of the highest possible standards of public land administration in such development. Because the Territory's total area consists almost in its entirety of public domain, the General Land Office occupies a position of direct responsibility for the proper solution of this problem.

First undertaking that responsibility more than a half century ago with the establishment of the first office in Sitka in 1885, today District Land Offices are maintained in Anchorage, Fairbanks, and Nome, while the District Cadastral Engineer for Alaska is stationed at Juneau. In addition, the headquarters of the Alaskan Fire Control Service and an office of the Branch of Field Examination are located at Anchorage.

Some idea of the problem presented in the Territory may be gained from the fact that the total land area of Alaska, as recomputed for the 1940 Decennial Census is 571,065 square miles or 365,481,600 acres. Of this total, 2,321,304 acres have been surveyed, leaving an unsurveyed area of 363,160,296 acres. The surveyed area represents only 0.6 per cent of the total land area.

Based on the latest computation, the area of vacant, unappropriated and unreserved public domain in Alaska is about 225,000,000 acres. In addition 6,940,698 acres are embraced in national park and monument areas and 20,849,187 acres in national forests. Of the remaining 112,691,715 acres, only a very small portion is in private ownership. The rest is embraced in other forms of public reservations.

## ALASKAN SERVICE FIRE CONTROL

The wider development of Alaska will of necessity carry with it broadened responsibilities for fire protection and suppression on the far-flung areas of the public domain in the Territory. This task already has been undertaken by the Alaskan Fire Control Service of the General Land Office, although under financial handicaps greater than those imposed on any similar organization in the entire Government service, considering the fire problem involved.

The magnitude of the protection problem confronting the Service can better be realized by stating that the area under its supervision equals the combined area of the States north of the Mason-Dixon Line

and the Ohio River and east of the Mississippi, and is about 60 percent larger than all the Federal holdings in the national forests of the continental United States. It consists of approximately 40,000,000 acres of fairly dense forests of spruce and birch, 110,000,000 acres of open woodland and interspersed grasslands, and 100,000,000 acres of tundra vegetation in the extreme north and northwest sections of the Territory.

Despite the handicaps of restricted funds and manpower shortage, however, the Alaskan Fire Control Service was able to furnish creditable protective service during the 1943 fiscal year. Substantial cooperation in fire fighting was rendered by the Alaskan command of the U. S. Army.

The reduction in loss of natural resources is of tremendous importance to Alaskans as well as to the Nation as a whole. Besides the saving of valuable timber stands, decrease in burned acreage means less game and wildlife habitat destroyed with consequent less mortality of the wildlife and lessened migration from district to district within the Territory. This is particularly important because during these times of high living costs, sharply reduced transportation facilities, etc., the natives in the more remote sections of the Territory have become even more dependent upon wildlife for their food supply.

#### ALASKAN SETTLEMENT PROBLEMS

Interest in economic possibilities in Alaska has been increasing for a number of years, and a post-war acceleration of demand for land in the Territory seems inevitable. Not only will members of the armed forces and civilian construction workers become acquainted with the advantages of the Territory, but new road construction, including the international highway, has made Alaska more accessible.

One of the prime requisites for proper development in Alaska is a thorough understanding of the types of public land available for use and the maintenance of a system which will capably and adequately insure the fullest possible utilization of that understanding for the benefit of the Territory as well as for the benefit of the individual settler. Such a system is contemplated under plans which were perfected by the General Land Office during the year for the classification of the public lands in Alaska, and which can be put into operation at the will of Congress.

Classification of the individual tracts of the public lands sought in Alaska will be a significant contributory factor in their successful settlement. Notwithstanding the extent and variety of these lands and the wide opportunity for development, the amount of land in Alaska suitable for present intensive development is not large when

compared with the area of the Territory. Popular concepts of settlement possibilities in Alaska all too often are predicated on inadequate knowledge of widely varying physical characteristics and the sharp and critical climatic differences which exist, and fail to take into account the problem of adequate community services. Thus, classification would help insure the procurement by prospective settlers of lands suited to their needs and guard against entry and selection for inappropriate uses.

Recognizing that this problem would be of immediate concern in connection with portions of the public domain adjacent to the new Alaska Highway, the General Land Office during the year began a series of special studies and field investigations by land classification experts to secure the most efficacious use of the tracts in the post-war period.

### POST-WAR PROBLEMS

The mobilization of landpower, like the mustering-in of manpower, brought with it definite problems of administration for solution when peace will have been restored. Many of these questions, obviously, have not yet reached the point of crystallization. However, their potentiality as factors in the post-war public land pattern was given recognition and consideration by the General Land Office consistent with the demands of its current tasks during the year.

Foremost among the subjects requiring careful consideration is that of post-war disposal or administration of lands which have been allocated to military uses. Many millions of acres of public lands withdrawn for military purposes are subject to restoration to the public domain within six months after the end of the war. The fitting of these areas into the peace-time land pattern of the Nation entails problems of administration which the General Land Office is laying plans to meet.

### RECOMMENDATIONS

The fighting of a war on the home front, no less than in the battle areas, often reveals inadequate technical procedure or equipment whose replacement or augmentation would be of material aid in both military and post-combat operations. Such a situation frankly exists with respect to some features of public land administration. With a view to assisting in bringing about the desired improved conditions, the following recommendations are made by the General Land Office, based upon its experience in land administration:

1. Developments in the field of mineral resources point to the desirability of revisions in old mining statutes which, while stimulating private enterprise and effort, will safeguard and strengthen the



public interest by providing for economical and efficient operation and the elimination of wasteful practice through effective administration. Mining activities on the public domain, in an effort to meet the war demands for critical and strategic minerals, have served to emphasize the need for the revisions pointed out in last year's report.

Among these revisions would be the enactment of a unified leasing system applying to all minerals not now subject to leasing both in the public domain and in other lands acquired by the Federal Government. These deposits are the property of all the people and should, under proper administrative authority, be made to serve the public weal, rather than be susceptible to wasteful exploitation, as has been possible under conditions as they now exist.

Moreover, new interest in the possibilities of producing strategic and other minerals from public-domain lands has arisen because of the requirements of the war and threats of post-war shortages. Some procedure should be made available, therefore, under which the Government would be enabled to assist private industry in conducting additional exploratory work for minerals on public-domain lands to alleviate these shortages and retrieve any gains from the discovery for the benefit of the public as a whole. Such a procedure would make it economically feasible to carry on much exploratory work not otherwise possible.

2. The increased demands for natural resources to meet military and post-war needs makes complete knowledge and understanding of the character and status of the public lands imperative factors in their proper development and efficient administration. The fact that at the present time evidence of the filing of thousands of unpatented mining claims is not made a matter of Federal record is a serious obstacle to such understanding. The enactment of legislation to enable the filing of such evidence in the General Land Office is urgently recommended.

3. At the present time there is no means available by which accurate, 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, as a logical supplement to data already in its custody, is recommended as a solution of this problem.

4. Legislative authority for the extension of the protection afforded by land classification to settlement activities in Alaska is of urgent concern. This need is particularly emphasized because of the Alaska highway and other developments which have increased the accessibility and desirability of the Territory to prospective settlers.

5. With world conditions imposing heavy burdens upon our stock of natural resources, fire protection on public-domain lands under the jurisdiction of the General Land Office, both in Alaska and in the continental United States, demands special consideration through the strengthening of present authority and organizational facilities.

6. Greater protection for the public lands and resources and greater efficiency in their administration would be brought about through the enactment of a uniform Federal trespass law.

7. Another year of operation under war conditions has only served to strengthen the need for a careful study, and restatement at the first opportunity, of the multifarious public-land laws under which military and peacetime administration is maintained by the General Land Office.

### THE PUBLIC LANDS

Of the total land area of 1,442,267,520 acres in the public-land States and of 365,481,600 acres in the Territory of Alaska, there had been surveyed at the close of the 1943 fiscal year 1,322,903,345 acres in the States and 2,321,304 acres in Alaska. This leaves 119,364,175 acres still to be surveyed by the General Land Office in the States and 363,160,296 acres in Alaska.

As of June 30, 1943, the area of public lands remaining in Federal ownership, including Indian reservations, amounted to about 400,000,000 acres in the public-land States and about 365,000,000 acres in Alaska. Of these, 394,000,000 acres were vacant and unreserved, as follows: 38,000,000 acres in the States outside Federal grazing districts; 131,000,000 acres within such districts; and 225,000,000 acres in Alaska.

The total acreage patented with minerals reserved to the United States increased during the year to 48,505,718 acres, as shown by the following table:

*Acreage of lands patented with minerals reserved to the United States, as of June 30, 1943*

Type of mineral reservation	Patented during fiscal year 1943	Total patented through June 1943
Reservation of all minerals:		
Under stock raising act.....	1 98,825	33,532,155
Under other acts.....	311,755	2,209,269
Total.....	410,580	35,741,424
Reservation of specific minerals:		
Coal.....	8,506	10,854,583
Others <sup>2</sup> .....	49,989	1,909,711
Total.....	58,495	12,764,294
Grand total.....	469,075	48,505,718

<sup>1</sup> Includes 2 Indian trust patents (166 acres). <sup>2</sup> Includes coal reserve in combination with other mineral

## LEASES AND PERMITS

During the year an additional area of 1,044,298 acres was brought under lease, including mineral licenses and permits, making a total of 15,319,561 acres under lease at the end of the year. The types of leases in force as of June 30, 1943, are shown by the following tables:

*Mineral leases, permits, and licenses outstanding as of June 30, 1943*

Mineral	Leases		Permits		Licenses		Total	
	Number	Acres	Number	Acres	Number	Acres	Number	Acres
Oil and gas:								
Producing.....	1,492	689,654.93					1,492	689,654.93
Prospecting.....	2,040	2,014,575.26					2,040	2,014,575.26
Total.....	3,532	2,704,230.19					3,532	2,704,230.19
Coal.....	363	74,386.08	138	108,780.66	101	3,363.20	602	186,529.94
Phosphate.....	9	6,464.24					9	6,464.24
Potash.....	19	44,532.10	1	2,538.68			20	47,070.78
Sodium.....	4	1,872.88	124	203,192.93			128	205,065.81
Grand total.....	3,927	2,831,485.49	263	314,512.27	101	3,363.20	4,291	3,149,360.96

*Leases other than mineral leases outstanding, as of June 30, 1943*

Type of lease	Number	Acres	Annual rental
Aviation.....	43	28,192.20	535.00
5-acre tracts.....	300	1,500.00	1,490.00
Fur farm (Alaska).....	21	136,080.00	850.00
Grazing (Alaska).....	9	1,168,953.93	1,269.35
Grazing (O & C).....	158	268,678.86	4,735.60
Grazing (Taylor Act, sec. 15).....	9,984	10,547,306.22	210,480.07
Recreational.....	19	18,895.82	<sup>2</sup> 1,366.63
Water well.....	11	440.00	460.50
Others.....	3	153.01	10.00
Total.....	10,548	12,170,200.04	221,197.15

<sup>1</sup> Does not include rentals of 2 business site leases, the rentals of which are based on gross receipts.

<sup>2</sup> Does not include rental of 1 lease, the rental of which is based on receipts.

### Homesteads, Sales and Other Entries

Continued decrease in the area of public lands entered and patented is shown by the tables which follow. The totals given indicate a decrease over last year of 53 percent in the area represented by original entries, of 33 percent in the area embraced in entries finally approved, and of 40 percent in the area patented and certified. The number of entries involved, however, declined only 32 percent for original entries and only 1 percent for final entries. The small decreases in final entries as compared to original entries reflects the increasing relative importance of cash entries, most of which are not reported as original entries when initiated. The number of patents issued increased 10 percent over last year, indicating the increasing volume of work involved in the issuance of special types of patents.



The decrease in the number and area of entries did not diminish materially the great variety of cases adjudicated during the year.

*Original entries and selections <sup>1</sup> fiscal year 1943*

Type of entry of selection	Public lands		Ceded Indian lands		Total	
	Number	Acres	Number	Acres	Number	Acres
<b>Homestead entries:</b>						
Stock raising.....	14	6,944.76			14	6,944.76
Enlarged.....	8	2,080.45	1	200	9	2,280.45
Reclamation.....	37	4,707.52	(?)	100	37	4,807.52
Forest.....	1	56.69			1	56.69
Sec. 2289 R. S., et al.....	151	15,169.34	1	40	152	15,209.34
<b>Total homestead entries.....</b>	<b>211</b>	<b>28,958.76</b>	<b>2</b>	<b>340</b>	<b>213</b>	<b>29,298.76</b>
<b>Other entries and selections:</b>						
Desert land entries.....	11	1,798.90			11	1,798.90
State selections.....	57	24,914.70			57	24,914.70
Timber and stone applications.....	4	359.80			4	359.80
Mineral applications and adverse claims.....	85	6,493.54			85	6,493.54
Town lots <sup>3</sup> .....	19	(?)			19	
Lieu selections.....	2	241.21			2	241.21
<b>Total other entries and selections.....</b>	<b>178</b>	<b>33,808.15</b>			<b>178</b>	<b>33,808.15</b>
<b>Grand total.....</b>	<b>389</b>	<b>62,766.91</b>	<b>2</b>	<b>340</b>	<b>391</b>	<b>63,106.91</b>

<sup>1</sup> An 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.

<sup>2</sup> Two entries amended.

<sup>3</sup> Town lots upon which only part payment was made.

<sup>4</sup> Area not tabulated.

*Final entries <sup>1</sup> fiscal year 1943*

Type of entry of selection	Public lands		Ceded Indian lands		Total	
	Number	Acres	Number	Acres	Number	Acres
<b>Homestead entries:</b>						
Stock raising.....	140	70,848.40	14	6,568.67	154	77,417.07
Enlarged.....	12	3,044.73	6	1,042.23	18	4,086.96
Reclamation.....	159	16,705.80	24	2,372.94	183	19,078.74
Forest.....	6	367.08			6	367.08
Commutated.....	4	520.00	14	920.00	18	1,440.00
Sec. 2289 R. S., et al.....	101	10,563.18	19	1,528.51	120	12,091.69
<b>Total homestead entries.....</b>	<b>422</b>	<b>102,049.19</b>	<b>77</b>	<b>12,432.35</b>	<b>499</b>	<b>114,481.54</b>
<b>Other entries:</b>						
Desert land entries.....	39	4,988.53			39	4,988.53
Public auction sales <sup>2</sup> .....	256	22,025.46			256	22,025.46
Timber and stone entries.....	4	359.80			4	359.80
Mineral entries.....	93	7,520.96			93	7,520.96
Town lots.....	245	(?)	24	(?)	269	
Miscellaneous cash entries.....	146	9,511.26			146	9,511.26
Other.....	69	8,687.76	1	<sup>4</sup> 71.50	70	8,759.26
<b>Total other entries.....</b>	<b>852</b>	<b>53,093.77</b>	<b>25</b>	<b>71.50</b>	<b>877</b>	<b>53,165.27</b>
<b>Grand total.....</b>	<b>1,274</b>	<b>155,142.96</b>	<b>102</b>	<b>12,503.85</b>	<b>1,376</b>	<b>167,646.81</b>

<sup>1</sup> A 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.

<sup>2</sup> Isolated tracts.

<sup>3</sup> Area not tabulated.

<sup>4</sup> Indian tribal lands.

Patents and certifications,<sup>1</sup> fiscal year 1943

Type of patent	Public lands		Ceded Indian lands		Total	
	Number	Acres	Number	Acres	Number	Acres
<b>Homestead patents:</b>						
Stock raising.....	*186	97,329.58	6	1,329.70	192	98,659.28
Enlarged.....	21	6,233.39	3	240.00	24	6,473.39
Reclamation.....	213	21,343.90	9	835.17	222	22,179.07
Forest.....	7	521.91	-----	-----	7	521.91
Commuted.....	5	600.70	-----	-----	5	600.70
Sec. 2289 R. S., et al.....	121	13,259.98	4	240.00	125	13,499.98
<b>Total homestead patents.....</b>	<b>553</b>	<b>139,289.46</b>	<b>22</b>	<b>2,644.87</b>	<b>575</b>	<b>141,934.33</b>
<b>Other patents:</b>						
Desert land.....	45	5,045.49	-----	-----	45	5,045.49
Public auction <sup>2</sup> .....	289	24,896.92	-----	-----	289	24,896.92
Timber and stone.....	5	397.09	-----	-----	5	397.09
Mineral.....	170	14,026.92	-----	-----	170	14,026.92
Indian.....	12	369.92	627	<sup>3</sup> 62,951.65	639	63,321.57
Miscellaneous cash sale.....	290	16,797.67	-----	-----	290	16,797.67
Exchange.....	191	233,491.15	-----	-----	191	233,491.15
State grants.....	22	110,108.83	-----	-----	22	110,108.83
Curative and supplemental.....	518	( <sup>4</sup> )	-----	-----	518	-----
Other.....	74	4,358.77	2	<sup>3</sup> 71.72	76	4,430.49
<b>Total other patents.....</b>	<b>1,616</b>	<b>409,492.76</b>	<b>629</b>	<b>63,023.37</b>	<b>2,245</b>	<b>472,516.13</b>
<b>Total all patents.....</b>	<b>2,169</b>	<b>548,782.22</b>	<b>651</b>	<b>65,668.24</b>	<b>2,820</b>	<b>614,450.46</b>
Certified to states.....	-----	22,455.41	-----	-----	-----	22,455.41
<b>Grand total.....</b>	<b>2,169</b>	<b>571,237.63</b>	<b>651</b>	<b>65,668.24</b>	<b>2,820</b>	<b>636,905.87</b>

<sup>1</sup> 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.

<sup>2</sup> Isolated tracts.

<sup>3</sup> Indian tribal lands.

<sup>4</sup> Acreage not counted because previously reported.

### Land Grants

Pursuant to public policy under which more than 300,000,000 acres of public lands, in addition to rights-of-way, have been granted to local governments and corporations for internal improvements and other public purposes, the General Land Office during the year conveyed title to 134,722 acres of grant lands. Grants to States included 320 acres of desert land (Carey Act), 217 acres of swamp land, 15,788 acres of indemnity school land selections, 109,572 acres of State park selections, 160 acres of reform school selections, and 6,508 acres selected for miners' hospitals. Under the Transportation Act of 1940, which provides for the issuance of patents to railroads to cover grant lands sold by them to innocent purchasers for value prior to September 18, 1940, 2,157 acres were patented to the Northern Pacific Railroad. In addition to these grants, 13 patents were issued to States to give them additional evidence of title to 5,291 acres of previously granted school sections.

Of the 336 applications for rights-of-way for railroads, irrigation, telephone and telegraph lines, public roads, pipe lines, and other purposes approved during the year, 163 involved permits or easements with an annual rental of \$3,690 and 12 were temporary rights-of-way over O. & C. lands producing an annual rental of \$140.

### Land Exchanges

Exchanges of land with private owners resulted in the addition of 79,910 acres to grazing districts in exchange for 22,415 acres of Federal land, 2,773 acres to a migratory bird refuge in exchange for 3,121 acres; 721 acres to Indian reservations in exchange for 680 acres, and 223,795 acres to national forests in exchange for 24,202 acres of land plus sufficient timber to equalize the values involved.

Exchanges of lands with States under the Taylor Grazing Act made on an equal basis amounted to 183,073 acres.

### Receipts and Expenditures

Receipts during the year totaled \$9,758,066, the highest since 1926, while expenditures from appropriations amounted to \$2,304,416. Rentals, royalties, and bonuses from mineral leases and permits accounted for 80 percent of the total receipts and sales of timber from O. & C. and Coos Bay lands for an additional 16 percent. Fees and commissions and sales of public and Indian lands which prior to the Mineral Leasing Act constituted the bulk of receipts from the public lands, amounted to less than \$200,000.

Pursuant to the provisions of various laws, 40 percent of the total receipts will be distributed to the various States and counties and 43 percent will be credited to the Reclamation fund. Indian trust funds will be credited with \$8,901.

The following table shows the receipts earned during the year, by sources and by Treasury accounts.



Disposition of receipts of the General Land Office,<sup>1</sup> fiscal year 1943

Source of receipts	Covered in the Treasury earmarked for—				
	General fund	Reclamation fund	States and counties	Indian trust funds	Total
Sales of public lands.....	\$26,251.48	\$97,654.20	\$4,493.99	-----	\$128,399.67
Fees and commissions.....	11,290.77	37,664.06	-----	-----	48,954.83
Mineral leases and permits:					
Mineral Leasing Act.....	717,612.80	3,767,467.18	2,691,047.98	-----	7,176,127.96
Red River oil and gas lands.....	-----	-----	2,488.13	\$4,146.87	6,635.00
Potash.....	42,993.55	<sup>2</sup> 269,362.38	161,225.83	-----	473,581.76
Other.....	<sup>3</sup> 134,128.22	-----	-----	-----	134,128.22
Total mineral.....	894,734.57	4,036,829.56	2,854,761.94	4,146.87	7,790,472.94
Oregon and California grant lands..	410,303.40	-----	<sup>4</sup> 950,423.47	-----	1,360,726.87
Coos Bay grant lands.....	130,361.51	-----	<sup>5</sup> 26,000.00	-----	156,361.51
Taylor Act grazing leases.....	48,477.82	<sup>6</sup> 48,477.82	96,955.64	-----	193,911.28
Rights-of-way leases.....	30,044.39	-----	-----	-----	30,044.39
Sales of Reclamation town lots.....	-----	6,758.17	-----	-----	6,758.17
Sales and lease of Indian lands.....	-----	-----	-----	4,754.12	4,754.12
Copying fees.....	16,923.65	-----	-----	-----	16,923.65
Miscellaneous.....	20,759.05	-----	-----	-----	20,759.05
Grand total.....	1,589,146.64	4,227,383.81	3,932,635.04	8,900.99	9,758,066.48

<sup>1</sup> Before final settlement of all accounts by the General Accounting Office.

<sup>2</sup> Includes \$43,646.22 collected in California under act of Oct. 2, 1917 (40 Stat. 297).

<sup>3</sup> Includes \$17,076.59 collected in Wyoming under act of June 26, 1926 (44 Stat. 1621), \$10,107.15 collected in Alaska, and \$106,944.48 collected in California under Executive Order No. 9087 dated March 5, 1942.

<sup>4</sup> Includes \$270,060.04 as final payment under act of July 13, 1926 (44 Stat. 915).

<sup>5</sup> Estimated.

<sup>6</sup> Range improvement fund.



# Office of Land Utilization

LEE MUCK, Assistant to the Secretary

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**T**HE Office of Land Utilization is charged, under Administrative Order 1466, dated April 15, 1940, with the responsibility of coordinating and integrating the land-use and land-management activities of the several bureaus and agencies of the Department; the establishment and development of sound forestry practices; the general administration of soil and moisture conservation work; and the maintenance of cooperative relations with the Federal, State, and private agencies concerned with the protection, conservation, and prudent use of the land and natural resources of the United States and Alaska.

The advent of the war necessitated a reorientation of the activities of the agencies of the Department having control over natural resources. Without endangering gains already made in the management of the Federal estate or in any way compromising the conservation aims of the Department, the Office of Land Utilization has, during the fiscal years 1942 and 1943, given first attention to directing coordinated land-management programs so as to increase timber production and to augment the quantity and quality of products from western range lands. Increased amounts of timber, food, and other raw materials now are flowing directly into war channels from forest, range, and other types of lands under the supervision of the Department of the Interior.

In recognition of the requirements of the war, action has been taken toward the restriction of developmental activities to those that are urgently essential to a maintenance of existing values and to the highest possible contribution to the effective prosecution of the war. A discussion of the principal programs in progress on Department of the Interior lands, with which the Office of Land Utilization is directly concerned, follows.



## FOREST MANAGEMENT

The forest resources under the jurisdiction of the Department of the Interior are so located and so well developed that substantial contributions to the prosecution of the war were made possible during the fiscal year 1943. Shortly after Pearl Harbor, the Department of the Interior set up a production goal of 1 billion feet board measure of timber to be utilized from the Oregon & California Railroad and Coos Bay Wagon Road grant lands and from the Indian forests. Timber-cutting was increased immediately, and the sale of additional timber was authorized both from Indian and from O. & C. lands.

During the year a total volume of 432,302,000 feet board measure, having a value of \$1,315,541, was cut from the O. & C. forests. Thus, for the second consecutive year, the sustained-yield capacity of 500 million feet board measure per annum, prescribed by the act of August 28, 1937 (50 Stat. 874) was approached. One hundred and seventy-one new timber sale contracts on the O. & C. lands were entered into during the fiscal year 1943 covering a total volume of 485,029,000 feet board measure, for which purchasers contracted to pay a total of \$1,915,964. The cost of administration and protection on the O. & C. lands for the fiscal year 1943 was \$262,463, which, compared with the cash receipts for that period of \$1,580,323, reflects a ratio of cost to income of about 17 percent.

This contribution to the prosecution of the war was accomplished without deviating from the departmental policy of preventing destructive methods of logging and by providing for early restocking of areas in the process of development and the furtherance of the ideal of cooperative sustained-yield management between the O. & C. lands, the private owners of adjacent lands, and local mills.

The sales of timber from Indian forests also were increased during the fiscal year 1943, thereby providing a substantial increase in the income received from these forests. As on the O. & C. lands, the operations on Indian lands were conducted in full accordance with the departmental conservation policies. The conservation aspects of good forest management were in no way subordinated to the utilization program.

## SOIL AND MOISTURE CONSERVATION OPERATIONS

The Soil and Moisture Conservation Operations of the Department of the Interior are conducted pursuant to the provisions of the Soil Conservation Act and Reorganization Plan No. IV. The program is coordinated by the Office of Land Utilization with a view to obtain-

ing a unified objective and eliminating overlapping and duplication of effort. However, in recognition of the principle that this function can be best performed by the agencies administering the land, field operations are conducted by the six land-management agencies of the Department.

An appropriation of \$1,340,000 was authorized for the fiscal year ended June 30, 1943, and since this was substantially less than the amount of \$2,178,700 authorized for the fiscal year 1942, soil and moisture conservation operations on the Federal estate were greatly reduced. As a result the program was entirely reorganized with a view to concentrating upon the more critical areas and promoting the highest possible degree of production consistent with the limited funds available for the vast area in need of rehabilitation.

The state of erosion which exists on lands administered by the Department of the Interior requires corrective action on approximately 60 million acres, or about 21 percent of the total area under management. Extensive areas have been depleted of their natural vegetative cover and sheet erosion has, in many cases, removed a large volume of the top soil. Restoration of the vegetative cover through range reseeding operations and control of the use of the land through water development, fencing, and the application of sound land-use management practices constitute the principle measures being applied. However, some of the areas have been so seriously eroded that the application of more intensive methods of control are essential, regardless of the inadequacy of the appropriation made available.

Since the lands under the jurisdiction of the Department of the Interior are being intensively used for grazing and other purposes, it has been the policy of the Department to promote a high degree of cooperation with the users of the land. The great majority of these permittees and lessees are fully aware of the need for soil and moisture conservation work on the public lands and have cooperated to the fullest possible extent in the prosecution of the program. The cooperation received has resulted in the contribution of money, services, labor, and materials from private individuals; the contribution of funds by the States; adjustments in operations on intermingled privately owned lands; and the assumption of responsibility for the maintenance of the projects by the users of the land. The value of the contributions received has been estimated at approximately one-quarter of a million dollars for the fiscal year 1943, which amount when considered with the value of the good will secured in the promotion of conservation practices, reflects a substantial accomplishment.

The approved work program of the Department for the fiscal year 1943 covered operations on 267 projects in 18 States. Extensive areas

were reseeded to species of adaptable vegetation, and a large number of water facilities were installed to insure an even distribution of the livestock on the range; diversion ditches were constructed with a view to providing flood-water irrigation; rodent-control operations were performed on thousands of acres; drift and division fences were constructed where absolutely necessary, and gully-control measures applied above irrigation projects. The results accomplished, when considered in the light of the limited funds available, can be viewed with a high degree of satisfaction and clearly demonstrate that the application of practical low-cost measures can be made highly productive.

### WHITE PINE BLISTER RUST CONTROL

There are within the lands administered by the Department of the Interior 682,583 acres of valuable white pine stands which require protection from the white pine blister rust—a fungus disease of foreign origin which became established in this country 30 years ago. This disease is fatal to white pines, including three of the most valuable timber trees in the United States, namely: the eastern white pine, the western white pine, and the sugar pine. The purpose of white pine blister rust control operations is to protect these valuable pines by the eradication of *Ribes* (currant and gooseberry bushes), the alternate host of the disease.

Under the provisions of the act of April 26, 1940 (54 Stat. 163, 169), all white pine blister rust control appropriations for Federal lands are combined in one appropriation item carried in the annual appropriation for the Department of Agriculture. For the fiscal year 1943, \$174,910 was appropriated for this work on Department of the Interior lands and made available to the National Park Service, the Office of Indian Affairs, and the O. & C. Lands Administration of the General Land Office.

Progress of the control work on Department of the Interior lands has been slow and barely has kept abreast of the spread of the disease. During the calendar year 1942, 24,671 acres were worked for the first time and 6,481 acres were reworked. As of January 1, 1943, 360,630 acres had received initial eradication, or 53 percent of the total acreage requiring protection.

### PROTECTION OF FORESTS, FOREST INDUSTRIES, AND STRATEGIC FACILITIES

With \$779,600 provided by the Sixth Supplemental Appropriation Act of 1942 and \$95,900 by the Interior Appropriation Act of 1943, the



emergency fire protection program of the Department was continued during the year. This program, made necessary by the war, provides emergency fire protection for the forest and range resources, forest industries, and strategic facilities situated on the forest, brush, and grasslands of the Department located within a 300-mile zone of the Atlantic and Pacific coasts and the Gulfs of Mexico and California.

It is estimated that there are 364 million acres of forest, brush, and grassland under the jurisdiction of the Department requiring protection from fire. Approximately 272 million acres (47 million in the continental United States and 225 million in Alaska) of this area need special protection by reason of the war. The lands requiring emergency protection are administered pursuant to congressional enactment by five agencies of the Department, namely: the Grazing Service, the General Land Office, the Office of Indian Affairs, the National Park Service, and the Fish and Wildlife Service.

These lands support some of the finest stands of virgin timber and a major portion of the best publicly owned range lands in the United States. On the lands under the administration of the Department in the 11 Western States are 2,608 military, industrial, transportation, communication, power, water, and mining facilities of strategic importance to the war.

It is a major responsibility of the Department to protect from fire, sabotage, and other hazards all forest, brush, and grass resources and associated strategic facilities located on or adjacent to lands under its jurisdiction. Forest or range fires not only would materially damage or utterly destroy the renewable natural resources but might interfere with the operation of strategic facilities, thereby becoming a real hazard and deterrent to the war program.

The emergency fire-protection program of the Department is not a duplication of existing protection activities afforded through regular appropriations but is an intensification of normal fire protection. The program provides for the employment of approximately 500 fire guards stationed in critical areas where past experience has indicated the fire risk was high and the hazards great and where quick fire-suppression action is imperative in the prevention of heavy losses and damage.

As a corollary to the main program, action was taken during the year to strengthen cooperative plans between the action agencies of this Department with action agencies of the Department of Agriculture. A formal memorandum of understanding providing for permanent coordinated action in fire control was approved by the Secretaries of Interior and Agriculture in January 1943.

The fire season for the calendar year 1942 was decidedly encouraging. Favorable weather played a relatively large part in holding losses to a minimum, but the fact that organized and trained guards were made available through the emergency fire protection program assisted materially in holding acreage losses to a low level. During the calendar year 1942 the action agencies of the Department reported 3,316 fires which burned over 1,879,613 acres of federally owned lands. This loss is approximately one-half of 1 percent of the total area requiring protection.

## JAPANESE RELOCATION COMMUNITIES

Acting pursuant to Executive Order 9102, dated March 18, 1943, which established the War Relocation Authority for the purpose of relocating Japanese evacuees, the Secretary of the Interior and the Director of the War Relocation Authority entered into agreements providing for the location of Japanese communities on lands under the jurisdiction of the Department of the Interior. Agreements were entered into covering lands within the Tule Lake Reclamation project, California; the Minidoka Reclamation project, Idaho; the Heart Mountain Reclamation project, Wyoming; the Colorado River Indian Reservation, Arizona; and the Gila River Indian Reservation, Arizona. The evacuee communities located upon these lands had a total evacuee capacity of 71,000 Japanese, and lands totaling approximately 122,000 acres were authorized to be made available for development by and the use of these people during the duration of the war.

The Assistant to the Secretary in Charge of Land Utilization was designated to represent the Department in its negotiations with the War Relocation Authority incident to the settlement of the Japanese evacuees upon lands under the jurisdiction of the Department. Land-use permits covering practically all of the projects were executed and approved by the Secretary during the fiscal year ended June 30, 1943, thus largely completing the liaison responsibility with the War Relocation Authority so far as the execution of agreements and permits for the use of Department of the Interior lands is concerned.

## CIVILIAN PUBLIC SERVICE CAMPS

Under date of March 12, 1943, the Secretary informed the Director of the Selective Service System that the Office of Land Utilization would henceforth represent the Department in all matters pertaining to the operation of work camps for conscientious objectors assigned to this Department.

Under the authority of the Selective Training and Service Act of 1940 (Public, No. 783, 76th Cong.), the Director of the Selective Service System was authorized to establish projects of national importance to which may be assigned persons found under section 5g of the act to be conscientiously opposed to participation in combatant and noncombatant training and service in the land or naval forces of the United States. Under this authority the Director of the Selective Service System authorized the organization of certain camps on Department of the Interior lands. At the end of the fiscal year there were 10 active camps assigned to the action agencies of the Department as follows: National Park Service, 5; Fish and Wildlife Service, 1; General Land Office, 1; and Bureau of Reclamation, 3. Of the three camps assigned to Reclamation projects, the camp at the Mancos project, Colorado, is the first fully Government-operated Civilian Public Service camp authorized by the Selective Service System. Entire responsibility not only for the work program but also for the feeding, housing, clothing, care, and discipline of the assignees has been assumed by the Bureau of Reclamation.

The work of these camps was slightly revised during the year to place more emphasis upon forest and range protection, a project of vital national importance. All camps are now being utilized principally for fire protection and for projects having a direct relation to the protection and conservation of the natural resources of the Nation.

### LAND-DEVELOPMENT PROGRAMS

Although the Office of Land Utilization has been concerned largely with activities directly related to the war during the past fiscal year, the large volume of work accomplished in that field has not prevented the carrying on of effective planning looking to the conservation and fuller utilization of the Federal lands under the jurisdiction of the Department of the Interior. Working in close cooperation with the National Resources Planning Board and the Department of Agriculture, a reservoir of land- and resource-development projects has been assembled; many of these have been carefully evaluated and given a high priority rating; and a well-rounded program will ultimately be available for prosecution in the event the construction of public works is authorized for the stabilization of employment after the termination of hostilities.

The formulation of post-war land and resource programs is largely the responsibility of the Departments of Agriculture and Interior, and steps have already been taken for the establishment of a high degree of cooperation and the securing of unified action in that field. The



work to be accomplished consists of: the completion of the 6-year programs and the analysis and consolidation thereof for budget purposes; the inauguration of surveys and investigations and the preparation of detailed plans which will make it possible to initiate construction when funds are made available; the establishment of project priorities and the development of alternative lists designed to meet varying conditions with respect to the size of projects, timing, and degree of employment to be provided; and the coordination of Interior Department programs with those of other Federal departments and States with a view to eliminating duplication and conflict.

A soundly conceived land- and resource-development program is an essential part of public works expenditures designed to stimulate a high level of employment and production. A substantial part of such a program will be largely self-liquidating through the establishment of a maximum degree of production and increased returns from the resources under management. The future is unpredictable, but it seems clear that the value of the land and its resources will continue to increase and that the maintenance thereof at a high level of production is essential to the future of the Nation. Consequently, the formulation of land-improvement programs, as briefly outlined above, is a major responsibility of management organizations, and the successful prosecution thereof is definitely in the public interest. •

# Grazing Service

R. H. RUTLEDGE, Director

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**P**EAK demands for meat, wool, hides, and mohair during the fiscal year 1943 confirmed the wisdom of range conservation principles fostered by the Taylor Grazing Act of 1934, and the Grazing Service pushed its program in every quarter to increase supplies of these products without overgrazing the range. In close cooperation with producers and with war agencies, the energy of the Service was shifted to activities that would help carry the fight to the enemy. One of the grazing district advisory boards expressed the feeling of the range livestock industry by a resolution in these words:

Be it resolved that as the progress and duration of the war make necessary additional and greater sacrifices in the lives of all, we stand ready to subordinate all to the prosecution and winning of the war, and with this high resolve we pledge full cooperation.

Range improvement work was cut to bare essentials, while the construction of access roads to strategic mineral deposits and land activities for military needs gained in momentum as the year advanced.

War is wasteful of resources, and to keep them in and on the ground merely for the purpose of saving them will not help to save lives, but when victory is won replenishment of resources will be in order. In giving principal attention to the immediate goal, consideration was also given to the job that lies ahead. Plans to repair and improve the range and to furnish post-war employment were revised and kept current.

Believing that more "home ranch" feeding will shorten the time between the range and the cooler and speed up consumer supplies, as well as bring livestock numbers down to the safe winter carrying capacity of range and ranch, the Grazing Service is encouraging the producer to finish for slaughter as much range stock as possible.

No public agency can hope to accomplish its broader objectives under changing conditions without the support and cooperation of

those who are most directly affected. Stockmen using Federal range supported the food program, and in many cases made drastic adjustments in order that adequate public land could be set aside for aviation and other military training.

Despite wartime difficulties, the livestock industry has undertaken its current task of greater production through increased weight and quality of livestock. Such means as improved methods, better range management, reduction of mortality losses, streamlined procedures, and labor-saving devices wherever feasible were employed, and the Grazing Service encouraged these efforts by liberalizing established rules and policies where that was necessary in order to attain this end.

A survey of the results to date indicates a prospect for increased meat supplies from the Federal range to the extent of 85 million pounds in the calendar year 1943 and of 124 million pounds in 1944. The turn-off of livestock products from the Federal range in 1942 was estimated at 800 million pounds of meat and 80 million pounds of wool. In addition there were produced large amounts of mohair and horse meat.

*Funds.*—Congress appropriated \$839,300 for Grazing Service salaries and expenses. Funds allotted for range protection and improvement totaled \$830,776; for construction of access roads, \$924,500; for liquidation of CCC, \$121,000; for miscellaneous purposes including advisory board contributions, \$210,802.86. This represents a decrease in operating funds of \$651,951.08 from the previous year.

*Liquidation of CCC.*—Grazing Service CCC camps were closed and the Corps was liquidated during the year. Many of the experienced foremen and engineers were reemployed on the construction of access roads.

*Grazing fees.*—Earned grazing fees totaled \$785,140.77 in 10 States, of which \$329.22 is for the credit of Indians and \$392,405.78 is made available to the States affected under the provisions of the Taylor Grazing Act. State revenues from this source for the 8-year period, 1936-43, now total \$2,655,117.47. Distribution of 50-percent fund payments to 10 States for the fiscal year 1943 and for the years 1936-43—the latter in parentheses—are: Arizona, \$17,662.09 (\$131,019.12); California, \$10,314.80 (\$83,822.83); Colorado, \$22,544.41 (\$160,280.21); Idaho, \$35,035.80 (\$264,794.00); Montana, \$26,587.53 (\$109,521.73); Nevada, \$65,285.42 (\$407,841.92); New Mexico, \$59,699.58 (\$419,887.04); Oregon, \$27,795.21 (\$193,770.43); Utah, \$71,286.55 (\$509,653.54), and Wyoming, \$56,194.39 (\$374,526.65). The above States contributed \$107,617.35 to the Secretary in 1943 to be used for range improvements under State and Federal law, bringing the amount contributed to date for such purposes to \$504,660.98.



*Personnel.*—Despite a 48-hour week occasioned by the overtime act, considerable unrecorded additional hours both in field and office were necessary to keep pace with expanded war activities and added work load occasioned by unprecedented personnel turn-over. Reduction in positions in conformance with Senate Joint Resolution No. 170 totaled 28. The number of positions voluntarily allowed to lapse as an economy measure was 36. Authorized positions were reduced from 462 to 398, a net reduction of 64. At the close of the year, the clerical, administrative, and technical staff, of whom 153 are women, totaled 385 employees, leaving 13 authorized positions temporarily unfilled. In addition, there were 595 district advisers intermittently employed at the call of the regional graziers. Three hundred eighty-five employees were engaged in the construction of access roads. In addition, 230 temporary and wage employees were engaged in other seasonal activities.

*Training.*—By means of staff conferences, discussions, and memoranda, an endeavor was made to familiarize employees, especially the younger groups, with policy and procedure, and to keep all employees in step with the tempo of war. In counseling programs three main points were stressed: (1) the job must be done, (2) no alibis, and (3) only victory workers can bring victory. Observing these principles, the organization advanced toward the main objective.

*Equipment and supply.*—Procurement of priority materials consistent with war needs was held to a minimum in conformance with the governmental requirements plan established by the War Production Board. About 70 percent of the former CCC property was transferred and distributed to the military. Much of the heavy equipment went to the Alaskan Highway. Certain equipment, not considered vital to the military, was retained on loan and used for access roads and fire control. As the year advanced it became increasingly necessary to rent a number of tractors, graders, jackhammers, and compressors from private sources.

Nonessential driving was eliminated, travel was minimized, and whenever possible, official trips were made by common carrier or by pooling of official cars. Passenger-carrying automobile mileage was reduced 45 percent from that of the previous year.

*Salvage.*—By gathering everything from obsolete rubber stamps to tractor parts, and by cooperation with local salvage committees in 200 counties, a total of 14 million pounds of rubber and scrap metal was turned over to appropriate authorities. Surplus top grade material turned over to the Treasury Department included 941 tires and 1,094 tubes.

*Office management.*—All regions suffered heavy losses in experienced personnel, especially in key positions such as accounting and property clerks. The turn-over of clerks in one region was 100 percent and averaged 50 percent in the field as a whole, resulting in reduced volume and quality of essential paper work. Field audits were completed in only 3 of the 10 regions. Fiscal work was kept current, but if all books, records, and reports are to be maintained and examined in accordance with standard requirements one additional auditor should be employed.

Analyses of 55 of the 58 grazing districts on a job load basis are now complete. The clerical work load was analyzed in two regional offices in order to furnish a basis for required reports to the Bureau of the Budget.

*Wartime use of the Federal range.*—Public Law 586, Seventy-seventh Congress, approved June 5, 1942, authorizes the Secretary of the Interior to dispose of timber and other products of the public lands through sale or lease, on terms prescribed by him, for use in connection with the manufacture of arms, ammunition, and implements of war or the production of equipment, supplies, and materials usable in such manufacture. To date approximately 400,000 acres have been affected by this legislation. The Grazing Service assisted war agencies in the solution of numerous land problems such as appraisal work under the act of July 9, 1942. Joint examinations of areas proposed for military use have resulted in withdrawals to date of 3½ million acres and the issuance of special-use permits on 12 million acres within grazing districts. Additional areas outside of grazing districts were examined upon request and the results were forwarded to the appropriate military authorities for consideration.

Several examples of special-use permits may be cited. One in Idaho is typical. In that State a certain range needed for gunnery practice is used part of each year by 175 ranchers operating 230,000 sheep and 1,000 cattle. The area was divided into two units, one being grazed by livestock during the period and the other used for gunnery range. At the proper grazing season the gunners and the stockmen exchanged areas, resulting in full service for both types of use. In this way normal production of livestock was maintained and trigger fingers were kept in shape for more serious business abroad.

Certain eliminations of livestock from scenes of urgent military operations were necessary. One such area affected 47 livestock operators and involved 8,421 cattle, 618 horses, 12,432 sheep, and 10,681 goats. In the aggregate, however, 484,000 sheep and 15,905 cattle still graze on Federal range that is also used for military purposes. The Grazing Service assisted the War Department in the

establishment of compensation values to ranchers, as provided by the act of July 9, 1942.

*Mine roads.*—Hidden in the ground are untold resources which are essential to the war program. Among these are minerals and other strategic materials. To stimulate the movement of such materials from mine to mill, Congress authorized the expenditure of 10 million dollars for the construction of access roads under the Defense Highway Act. The Grazing Service was among the agencies selected to do this type of work. Arrangements were made for regional officers to receive applications from owners and operators of small mines, and very soon thereafter 509 projects had been processed, and construction of roads leading to deposits of about 30 different types of strategic minerals was under way. At the end of the year 782 miles of access roads had been completed at a total cost of \$792,092.87. As a result, thousands of additional tons of copper, lead, zinc, manganese, vanadium, tungsten, chromium, and mercury had been mined, moved, stock-piled, and much of it milled and shipped to war industry plants. A certain road to vanadium deposits reduced travel time 300 percent and within 6 months the tonnage of ore delivered to reduction plants had been increased tenfold. New supplies of coal, iron, and timber were also tapped.

*Status of grazing districts.*—During the year 783 applications which involved action under sections 6, 7, 8, and 14 of the Taylor Grazing Act, the Five-Acre Lease and Homesite Act, and the Enlarged and Stockraising Homestead Acts were received. Eight hundred and twelve such cases were disposed of and 301 were pending on June 30. Six special motion-picture permits were granted, and permits to remove timber for domestic use were granted to 636 individuals. These authorized the removal of 62,000 fence posts and 5,500 cords of wood.

Despite the number of internal changes that took place in grazing districts during the year, there was no change in the gross area and but slight change in the total area administered by the Grazing Service. The statistical detail is shown on Table I.

*Range development.*—In modifying the program in the interests of war, no large range improvement projects were undertaken. Maintenance of existing improvements was stressed; all new structures were considered carefully before installation from the standpoint of increased meat production. Even small projects were postponed unless it was determined that they would contribute to more tons of livestock and its products, nor were projects undertaken if more than a nominal amount of critical materials was needed in their structure. It is estimated that through these activities 2 million acres of formerly



undeveloped grazing land were brought under economic use. Water development to facilitate range use and management, reseeding, maintenance of fences and trails to control and handle livestock, and control of predatory animals, rodents, insects, and poisonous plants, featured this part of the program. Fences and trails saved thousands of man-days of the producers' labor, an important factor in the solution of manpower shortages. Truck trails eliminating expensive stock drives enabled producers to put their livestock on the market faster and in better condition.

On table II are shown the major range improvements completed during the past year and the amount completed since the inception of this type of work in 1935.

*Range protection.*—Grazing districts are social and economic units occupied by 2 million persons who live on farms, ranches, and in towns, and who earn their livelihood from the land in the face of great odds. The chief range hazard is fire. Grass fires move fast requiring prompt attention. About 90 million acres in grazing districts are in high hazard zones. The danger to crops, buildings, forage, and watersheds is increasing because of more abundant grass on the Federal range and the intense activity, especially military. Many fires are caused by incendiarism or by carelessness. There is constant danger from fire on bombing practice ranges. Last year 1,128 range fires burned 1,734,992 acres in grazing districts, reducing precious tons of livestock feed to smoke and ashes. Seventy-seven percent of these fires were man-caused. Lightning-caused fires were largest and most destructive. To meet this situation every means of prevention and suppression is undertaken. The Grazing Service is steadily improving its fire-fighting technique through better communications, education, and cooperation. About 3,000 local per diem guards, who are paid only when called, are in active cooperation. Several dispatchers and lookouts, engaged during the fire season, are in close contact with field offices effectuating constant patrol in high hazard areas during periods of fire danger. Through cooperation with the Army within bombing areas, military ground crews are on the alert, equipped with tools and mobile units which enable them to get to a fire promptly. Trained fire bosses operate in each region under the general direction of a fire supervisor who is centrally located. Cooperation with States, agencies, and with the forest fire fighters service is effective and profitable.

*Miscellaneous service.*—The location of Army engineering units in Salt Lake City enabled the drafting office of the Grazing Service to contribute specialized work on the reproduction of plans for housing, airfields, sanitation, and other urgent military projects to

the extent of 37,500 square feet of process printing and 70,000 square feet of photocopy, at a great saving of time and money to the military.

*Post-war planning.*—The Six-Year Range Development Plan initiated 2 years ago was revised and enlarged to create a reservoir of useful work to help cushion the shock of sudden change from a wartime to a peacetime economy. This revised plan will enable the Grazing Service to implement work projects within 3 months after victory, which may employ 15 million man-days of labor on 50,000 small projects of 13 major types in 10 Western States. Distributed over 200 sparsely populated counties where small crews can be employed near their homes, the proposed plan will require largely common labor employed mainly on water development, erosion control, fencing, trail building, revegetation, and fire protection.

Preliminary studies have been completed in one State to integrate the Grazing Service plan with post-war State and Federal Works programs. Similar studies are now underway in 9 other Western States.

*Hearings and appeals.*—During the fiscal year 236 appeals from decisions of local administrators were filed, of which 103 were disposed of through local action. Ten decisions, after formal hearing, were appealed to the Secretary. These involved 41 grazing applications and licensees. One hundred thirty-three appeals were pending hearings at the close of the year.

*Food for war.*—Stockmen are thoroughly alive to their responsibility as producers of products for war, seeking every means to maintain production at a high level and to hold the conservation gains made during previous years. Labor difficulties and other conditions in certain localities caused a shift in livestock operations from sheep to cattle, but the grazing load on the Federal range was only slightly changed by this trend. Reports from permittees indicate a definite increase in weight and quality of animals marketed. Losses from predatory animals increased. More attention must be given to this problem.

As a part of the Secretary's "Food for War" program, the Grazing Service explored all possibilities in an effort to increase the amount of meat and wool for immediate and future needs. The methods adopted include better range management, reduction of death losses, harvest of surplus game animals, eradication of predatory animals, rodents, and poisonous plants; removal of useless horses, and increased grazing use wherever possible.

Rodent control was conducted on 1,726,300 acres; useless horses were removed to the extent of 25,273 head. Predatory animal control re-

sulted in saving about 3,000 calves and 85,000 sheep and lambs. Plans were laid to take 50,000 to 60,000 additional deer, elk, and antelope from grazing districts. This will account for an additional 5 million pounds of meat and will reduce winter death losses of game herds. Areas depleted by fire and other causes during the preceding years were reseeded to the extent of 166,292 acres.

*Soil and moisture conservation.*—This work, designed to benefit both public and private land, was carried forward under the President's Fourth Reorganization Plan on 51 projects initiated in previous years and on 11 projects initiated during the fiscal year 1943. Through this work large areas of range formerly underused or not used at all, were brought into beneficial and economic use, while congestion in other parts of the range was relieved to an equal extent.

*Range surveys and studies.*—Range surveys were completed on only 4,473,133 acres during the year, stress being given to other work more closely connected with war programs. Cooperative nutritional studies to encourage ranch fattening and better management of livestock were conducted in Oregon at the Squaw Butte Range Station and on selected areas in other States.

*Federal Range Code.*—The revised Federal Range Code, clarifying and simplifying administrative procedures dealing with the internal affairs of grazing districts, was approved by the Secretary September 23, 1942. The new code affords greater flexibility to meet widely varying conditions of the Federal range.

*Trespass.*—Steps were taken to eliminate from the range all useless and trespassing horses in conformance with the "Food for War" program and the Secretary's order of March 10, 1943. Stockmen are cooperating in gathering surplus horses prior to the effective date of the order. During the second half of the fiscal year out-shipments increased threefold over the same period of 1942. Sheep and cattle trespass increased slightly because of attractive livestock prices and an insufficient range-rider force.

*Wildlife.*—Big game in grazing districts increased approximately 13 percent over the previous year, totaling approximately 500,000 head. There was an increase in predatory animals, especially coyotes. To save vital food products and to reduce financial losses to the industry, advisory boards expended \$24,712.30 in 1943 for predator control in 14 grazing districts. A total of 47,194 predatory animals were eradicated during the fiscal year.

*Utilization checks.*—The system of utilization checks developed during previous years was maintained to check and record range use, and to guide the stockmen and administrators in the maintenance of



proper use on allotted ranges. A total of 12,367,233 acres was covered by such examinations during the year.

*Licenses and permits.*—The number of regular licensees and permittees increased from 21,249 to 22,019, a gain of 770, involving 10,777,-793 livestock of all classes. This represents a decrease of 190,343 head, but the grazing load was approximately the same as that of the previous year, due to the trend to fewer sheep and more cattle. The cattle numbers under licenses and permits increased 54,191 head, while the sheep decreased 201,084 head. The statistical detail is shown by States in Table III.

In addition, 1,655 temporary part-season War Emergency licenses were issued, involving 69,893 cattle; 3,888 horses; 197,314 sheep, and 150 goats; adding only 1.3 percent to the total grazing load while enabling owners to shape their plans for more meat production.

Ten-year term permits were issued to 4,490 operators during the year, bringing the total to 10,600, or about 50 percent of all users operating on a license basis a few years ago. Permits include definite range allotments which are agreed upon by all interested parties. This marks another forward step in the stabilization of the livestock industry.

TABLE I.—*Status of grazing districts, approximate acreages as of June 30, 1943*

State	Number of districts	Gross area	Vacant, unappropriated unreserved public land	Other public land	Total administered by Grazing Service	Other land
Arizona.....	4	18, 171, 400	9, 100, 688	819, 879	9, 920, 567	8, 250, 833
California.....	2	8, 050, 300	2, 867, 545	812, 399	3, 679, 944	4, 370, 356
Colorado.....	8	15, 903, 700	7, 192, 858	643, 601	7, 836, 459	8, 067, 241
Idaho.....	5	21, 837, 600	10, 998, 699	762, 200	11, 760, 899	10, 103, 701
Montana.....	6	31, 968, 700	4, 148, 375	923, 800	5, 072, 175	26, 896, 525
Nevada.....	5	48, 560, 200	35, 714, 325	549, 700	36, 264, 025	12, 296, 175
New Mexico.....	7	39, 747, 400	14, 552, 799	684, 369	15, 237, 138	24, 510, 262
Oregon.....	7	20, 346, 500	12, 255, 341	157, 763	12, 413, 104	7, 933, 396
Utah.....	9	37, 487, 800	23, 552, 444	2, 143, 828	25, 696, 272	11, 791, 528
Wyoming.....	5	22, 506, 100	12, 938, 929	1, 096, 329	14, 035, 258	8, 470, 842
Total.....	58	264, 609, 700	133, 321, 973	8, 593, 868	141, 915, 841	122, 693, 859

TABLE II.—Range improvement projects

Type of project	Unit	Completed fiscal year 1943	Total completed April 1935 to June 1943
Spring developments	Number	128	954
Reservoirs (stock water)	do	275	2,070
Wells (stock water)	do	70	369
Pipe and tile lines	Linear feet	6,030	282,168
Truck trails	Miles	650	9,916
Stock trails	do	54	1,314
Bridges (over 10-foot span)	Number	9	331
Fences	Miles	530	5,943
Corrals	Number	21	392
Rodent control	Acres	751,865	12,221,858
Insect pest control	do	186,820	656,332
Range revegetation (seeding)	do	166,292	514,338
Check dams (permanent)	Number		8,141
Check dams (temporary)	do		49,873
Tree planting (gully)	Square yards		11,580
Channel construction	Linear feet		27,973
Water spreaders	do		179,915
Riprap and paving	Square yards		153,128

TABLE III.—The following table contains the statistical detail pertaining to permitted livestock on the Federal ranges for the fiscal year 1943

Region	Number licensed operators	Number of cattle	Number of horses	Number of sheep	Number of goats	Total livestock
Arizona	615	82,236	2,763	103,130	24,625	217,754
Colorado	2,343	179,907	5,782	876,528	127	1,062,344
Idaho	3,327	186,098	18,142	1,258,717	55	1,463,012
Montana	3,100	197,491	24,890	1,056,321	56	1,278,758
Nevada-California	1,844	384,435	18,977	1,024,099	4,009	1,431,520
New Mexico	2,355	285,149	12,560	711,598	57,721	1,067,028
New Mexico No. 7	1,553	5,285	9,197	103,550	18,726	142,758
Oregon	1,506	206,686	14,501	402,320		623,507
Utah	3,787	175,605	9,274	1,535,129	5,615	1,725,623
Wyoming	1,589	161,545	13,160	1,590,534	250	1,765,489
Total	22,019	1,864,437	129,246	8,672,926	111,184	10,777,793

# National Park Service

NEWTON B. DRURY, Director

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THE reduced wartime staff of the National Park Service is engaged in the task of making definite contributions to the war program, and at the same time continuing to protect the irreplaceable cultural resources conserved within the national parks and monuments. Thoughts of America's future after the war may well be associated with the basic purpose of the National Park Service, which by mandate of the Congress is to "conserve the scenery and the natural and historic objects and the wildlife" in the areas it administers, and to provide for human enjoyment of them "in such manner and by such means as will leave them unimpaired for future generations." Justification for this purpose, which was well established before the Service was created in 1916, is found in the conviction that only by complete protection from commercial use or exploitation can these special areas fulfill their highest value to the Nation. They make up less than three-fourths of 1 percent of the land area of the United States.

To harmonize the Service's objectives with war uses of the areas for which it is trustee, the criteria cited in the 1942 annual report have been consistently applied. These tests involve the thought that inconvenience to park administration and to visitors, or remediable damage to park property, are not considered sufficient reason for denying uses of park facilities and resources that would not be considered appropriate under peacetime conditions. Only where proposed uses would do irreparable damage and entail destruction or impairment of distinctive features and qualities in the parks have the questions been raised: Have all reasonable alternatives been exhausted before invading the national park areas? Is the demand based upon critical necessity? The Service has cooperated to the full with war agencies in seeking the answers to these questions. The military authorities have shown full appreciation of the Service's position.



There are those who under the cloak of patriotism would reopen old issues as to the exploitation of lands which Congress and the American people have decreed should be held inviolate for the national good. But national park lands and policies have so far been fully protected from the activities of those who might, designedly or unconsciously, attempt to use the war as an excuse to raid them.

The national parks and monuments are vital American institutions that have their proper place in our national life. They are a segment of the Federal estate that has been chosen for preservation so that this and future generations will see the untamed America that was, and understand the compelling influence that built and strengthened this Nation. We cannot lightly abandon them, or the idea that gave them being, although we may have to sacrifice both in part at least if compelled to do so by the needs of war.

The importance of the national park areas to our people is attested by the fact that during the year 8,228,220 visitors, of whom more than 1,655,720 were members of the armed forces, turned to them for inspiration and relaxation, and to gain deeper appreciation of this land of ours.

### THREATS TO CONSERVATION

The necessity for forest products has intensified since last year's report. Particularly is this true in the Pacific Northwest where the supplies of Sitka spruce, the most suitable material for certain types of aircraft construction, are running short.

It appears evident that, if the war lasts several years, all of the readily available airplane spruce in Oregon and Washington will be exhausted. In that event, a more complete transition to the use of substitutes, or fuller use of more remote commercial stands of spruce, will have to be made. In view of the national importance of the last remnants of the once vast virgin spruce and fir forests of the Northwest, it may fairly be asked whether the alternatives should not be exhausted *before* rather than *after* the forests in Olympic National Park are destroyed and an outstanding natural spectacle lost to America forever.

Critical necessity rather than convenience should be the governing reason for the sacrifice of such an important part of the Federal estate. If Olympic National Park is opened to the logging of Sitka spruce to meet war needs for aircraft materials, there will exist great danger that pressure to widen this breach will be injected by local interests to maintain local industries after the war is over. That issue was considered by the Congress and definitely decided on a basis of national good when Olympic National Park was established.

There has been considerable agitation to cut the mature trees within national parks on a selective logging basis. The proponents of such action miss entirely the main point of national park philosophy, for they fail to realize that the removal of any portion of the forest under any system of logging, however restrictive, disrupts the balance of nature, and is contrary to the very principles upon which the national parks and monuments were established. Once logging is introduced into an area, it no longer exists as a superlative virgin forest.

With the greatly increased demand for lumber to meet war needs, the cutting of forests on private and national forest lands was intensified, so that responsibility for the preservation intact of representative areas of the magnificent virgin forests of this Nation rests more than ever upon the National Park Service. Of the once extensive forests that covered the continental United States, there still exist approximately 630,000,000 acres of forested land. Of that amount, approximately 1 percent is contained within the national parks and monuments. That is a small fraction to hold inviolate according to the national park pattern. Surely there is ample justification for the consensus among conservation leaders that the forests in the national parks should not be invaded, unless the trees are absolutely essential to the prosecution of the war with no reasonable alternative.

As proposals to mine certain critical minerals in the national parks and monuments have been received, the Service has taken the position that such invasion can be justified only when it would furnish materials indispensable to the war and not obtainable in sufficient quantities elsewhere. This policy has been taken into consideration by war production agencies in connection with studies made in the national park areas.

As was the case during World War I, growers of livestock urgently demanded grazing privileges in many of the areas of the National Park System. In order to answer these demands, a study was made of all areas throughout the system and increases in grazing allotments in certain types of areas were authorized as an emergency contribution to the food-production program. However, the study substantiated the basic policy that grazing is detrimental to the preservation of natural forest, meadow, and wildlife conditions, and that it should not be allowed in national parks and monuments of the "wilderness" type.

This study revealed that the total lands which are administered by the National Park Service and which are suitable for grazing constitute but one-seventh of 1 percent of the grazing lands in the United States—an infinitesimal amount when compared with the Nation's food supply. Other evidence clearly demonstrates that grazing is severely detrimental to the flora and fauna that are such important parts of the

balance of nature present in the national parks and monuments. Park properties subjected to grazing during the last war were damaged out of all proportion to the small increase in the food supply attained.

### MILITARY USES

The Army and Navy have continued to use national park and monument lands for varied military purposes. On the part of military authorities there has been shown a spirit of cooperation and understanding of Service objectives and a recognition of the need for the preservation of natural and historic values. This was borne out in two important instances. At Joshua Tree National Monument, California, desert warfare training units extended a road across the Monument, and at Hawaii National Park extensive training and defense installations were made. When the damage to natural features was reviewed with Army authorities, immediate steps were taken to locate suitable alternative areas and to repair the damage. Practically all of the national park and monument areas along the Pacific, Atlantic, and Gulf Coasts, because of their strategic location, are being used for defense installations, such as the large number of aircraft warning service posts installed by the Army, or for training purposes. Yet no important park values are being destroyed, and in many cases military needs are being served in conjunction with park-protection activities.

The Navy Department, in June 1943, took over the Ahwahnee Hotel in Yosemite National Park, California, as a convalescent center. This unique hostelry is serving its highest purpose in wartime by furnishing an ideal environment in which members of our naval forces may regain their health.

The Eastman Hotel and Bathhouse at Hot Springs National Park, Arkansas, was purchased by the War Department for use as a hospital in connection with the Army and Navy Hospital.

All types of equipment for Arctic warfare were tested in advance of quantity production by the Army's Quartermaster Corps at Mount McKinley National Park, Alaska, because this was the only reasonably accessible place in North America which would afford Arctic conditions in summer. Various kinds of tests of equipment and clothing were also conducted at Shenandoah, Mount Rainier, and Yosemite National Parks.

The national historical parks, military parks, and historic sites of the East made their principal contributions to members of the armed forces as laboratories for the study of military activities. In the early stages of the development of the national military parks and battlefields following the War Between the States, the greatest care was



taken by Confederate and Union participants to mark carefully the movement of troops and to report accurately, without praise or censure, the events that took place on these battlegrounds.

A familiar sight during the past year has been the activity of officers from the Quantico Marine Base, Virginia, carrying on field studies of the First and Second Battles of Bull Run in Manassas National Battlefield Park; or troops from the A. P. Hill Reservation tracing the route of march of Stonewall Jackson on the battlefield of Chancellorsville.

A considerable portion of Petersburg National Military Park, Virginia, formerly a part of Camp Lee, was again returned to Army jurisdiction. Lands adjoining Fort Oglethorpe in the Chickamauga-Chatanooga National Military Park are serving as camps and training grounds for some members of the Women's Army Corps.

The engineering laboratory which had been engaged principally on testing materials for the Bureau of Yards and Docks, United States Navy, was lent in August 1942 to the U. S. Engineers. To facilitate their operations, all laboratory equipment was transferred to a temporary wooden building at one of the Army field stations. On December 25, 1942, this structure burned to the ground, completely destroying all of the laboratory equipment. The U. S. Engineers will replace the destroyed equipment after the war when specialized laboratory apparatus and equipment of this type are again manufactured.

Thousands of dollars worth of equipment were turned over to the armed forces by the National Park Service. A typical example is the snow-removal equipment, conservatively valued at \$150,000, which was made available to clear Army airfields of snow during the winter months.

With the spread of Army and Navy training centers throughout the Nation, the commanding officers and members of the armed forces have come in increasing numbers to the national parks and monuments. There were almost three times as many military visitors in the fiscal year 1943 as there were during 1942. Travel reports from 122 areas indicated approximately 1,650,000 members of the armed forces visited those areas in the fiscal year ending June 30, 1943.

Many Army bases in the West and Southwest combined recreation with training in convoy operation and preventive maintenance. Not only the driving of convoys over mountain roads, but also establishing of overnight bivouacs and field practice were beneficial, and far-reaching effects upon the mental attitude of these members of the armed forces resulted from their seeing some of the greatest aspects of the America that they are fighting to preserve.

The desert warfare training camps in Arizona and southern California organized maneuver-recreation trips to Grand Canyon National Park. There on the South Rim one of the former CCC camps was renovated and equipped to accommodate them. Mount Rainier and Olympic National Parks in the State of Washington were the "objectives" of many soldiers from Fort Lewis and other camps in that area, who had completed their training and were awaiting orders to be transferred to war zones, while Yosemite and Sequoia National Parks in California served thousands of nearby military personnel. Opportunities for such visits were made honor awards in many of the camps.

Mount McKinley National Park in Alaska is being enjoyed by the soldiers stationed in the northern battle zone. The McKinley Park Hotel, operated by The Alaska Railroad, was turned into a recreation center where soldiers are given vacations that afford some respite from the experiences of the battles they fought along the Aleutians.

There is significant justification of the national-park concept in the fact that increasing thousands of members of the armed forces are being given opportunities they never had before, and may never have again, to see the inspiring beauty and historical significance of this land of ours.

#### CONTRIBUTION TO WAR PRODUCTION

As the tempo of the United States' participation in the war increased, there came increasing demands upon the National Park Service for wartime use of the areas that the Service administers and of the resources that these acres contain.

During the fiscal year 448 such requests were received, and of these 403 were approved. The 45 which proposed operations that would have done material damage to natural or historic features were returned and alternatives were suggested that would meet military needs without destroying important park and monument objects.

Most of the war uses authorized were for facilities and areas formerly open to the public, and simply involved change in the type of use. For example, the main through roads in Yellowstone National Park, the Blue Ridge, Natchez Trace, and George Washington Memorial Parkways were opened to military trucking on a temporary emergency basis. Such direct damage to roads as may occur will be repaired when normal travel is resumed and trucking has been discontinued.

In order to cooperate to the fullest extent in relieving the shortage of tannin extract materials, dead chestnut extract wood on a portion

of the Blue Ridge Parkway was advertised for sale. The forests involved are not of virgin character and the future plans for parkway development provided for the removal of a part of this dead chestnut.

Upon the recommendation of the War Production Board, it was necessary, as a contribution to the war program, to permit the sale of some urgently needed Sitka spruce and Douglas fir within the Queets Corridor, between Olympic National Park and the Pacific Ocean, which had been acquired for parkway purposes. The timber to be removed, amounting to approximately 4,000,000 board feet, was marked with great care on a selective basis so as to leave a forest canopy. Immediately along the prospective parkway the forest was left practically untouched. The lands within the Queets Corridor are not a part of Olympic National Park and, therefore, are not protected by the prohibition against commercial logging which applies to national park lands. It is recognized, however, that even this selective logging along the Queets Corridor entails a sacrifice of primeval forest conditions and future parkway values in the interest of the war.

To meet the need for war purposes of minerals that are becoming critically scarce, it has been necessary to make certain departures from national park policy. As a contribution to war production, the Defense Plant Corporation, a Government agency, was authorized to extract salt from Death Valley National Monument, California, to meet immediate requirements for scheduled operations at the Basic Magnesium Plant near Las Vegas, Nev. Between June 2 and July 31, 1942, more than 15,000 tons of salt were removed from the monument. Meanwhile, investigations of other sources proved to be successful and brought to a close the operations within the monument. It will be many decades before nature can gradually soften the scars and restore the picturesque salt pinnacles that were destroyed by these operations.

A valuable deposit of tungsten within Yosemite National Park was mined by the Metals Reserve Co., a Government agency, upon recommendations of the Geological Survey, Bureau of Mines, and War Production Board that it was essential.

Army and Navy contractors removed approximately 130,000 tons of sand and gravel from Rialto Beach, Olympic Acquisition Area, Washington, and approximately 45,000 tons from Sitka National Monument, Alaska.

Permission to build a short-cut road through a portion of Mount McKinley National Park, Alaska, was given to the owner of an antimony mine which will permit shipment of approximately 700 tons of crude ore and concentrates during the summer of 1943.



Operators of manganese mines adjacent to the boundary of Olympic National Park were permitted the use of park lands for building low-standard truck trails to reach nearby existing highways. In order to facilitate production of important minerals at Death Valley National Monument, four access roads across monument lands were constructed to sources of manganese, lead, tungsten, and talc.

To help in some degree to meet the critical need for food and fiber during the war period, increases from approximately 20,000 head of cattle to 25,000 head, and from 74,000 sheep to 82,600 sheep were authorized on certain national monuments, recreational demonstration areas, and historical areas. There was no increase in the major national parks. A small amount of grazing still exists in 10 national parks and a considerable amount in 33 national monuments and other areas. In approving this wartime step, the Secretary of the Interior reaffirmed the long-established policy of gradual decrease and ultimate elimination of grazing in national parks and monuments.

An incidental contribution to the Nation's meat supply was made through the necessary reduction of the northern elk herd of Yellowstone National Park. Disposal of Government-killed elk (691 animals) was made to 11 Indian agencies and to the Montana Fish and Game Commission in accordance with arrangements which were made to have the meat used for domestic consumption. Hunters outside of the park killed 7,230 elk. It is estimated that the elk-reduction program resulted in 1,789,000 pounds of meat being made available for human use.

The Yorktown Historical Museum in Colonial National Historical Park was remodeled into a post office to help meet the needs of the greatly increased population in that wartime center. The administration and museum building of Boulder Dam National Recreational Area was turned over to the Bureau of Reclamation and municipal authorities to remodel into a hospital for the workers in war plants in and surrounding Boulder City, Nev.

About 8½ million pounds of scrap metal, mostly iron and steel, were collected in the areas administered by the Service and contributed to the scrap metal drive. At the same time, following request of the War Production Board, a survey was made of the nonferrous metal contained in the statues, historical cannon, and other mementoes. It was learned that there was a total of about 985 tons of nonferrous objects of all sorts in the national parks. While this was done to assist the War Production Board in calculating the potential war resources of the Nation, the National Park Service took care to point out that these historic objects and memorials are part of our national heritage which should be preserved inviolate until all other sources of scrap

metal have been exhausted. The Salvage Division of the War Production Board acceded to this view, as did the Office of the Chief of Ordnance, and it was agreed that cannon antedating 1865 and other historic objects should not be scrapped. Indeed, the Office of the Chief of Ordnance displayed willingness to save from the scrap pile such historic cannon as might come into their possession. As a result, the National Park Service was able to secure from the War Department a number of Burgoyne cannon for Saratoga National Historical Park, New York, and a fine old cannon for Castillo de San Marcos National Monument, Florida.

Lands which form a part of the National Capital Parks in the District of Columbia provided sites for defense installations and for the buildings required to provide working space for the thousands of men and women engaged in war duties in the Nation's Capital. The lands involved have an appraised value of \$24,300,000. The cost to the Federal Government of purchasing alternative sites would undoubtedly have exceeded that amount. While the withdrawal of these lands curtailed the amount of open space in downtown Washington and the recreational opportunities so important in an overcrowded city, such uses were held to be inescapable. Associate Director Arthur E. Demaray, as the liaison officer in Washington, D. C., has performed important public service in connection with this problem. It is the hope of those who have worked to make Washington the most beautiful capital in the world that all temporary structures will be removed at the end of the war much more rapidly than was the case with their predecessors of World War I.

The use of National Park Service areas and facilities, the expert services frequently provided by its administrative, technical, and construction staff, and the occasional use of minerals and other natural resources, are estimated to amount in value to date to more than \$30,000,000.

## TRAVEL

The critical condition of the Nation's transportation systems, the drastic shortage of rubber, and the lack of gasoline and oil for other than essential civilian consumption, have called for discouragement, rather than encouragement, of civilian travel. All motor transportation engaged in sightseeing services in the national parks was stopped. Motor bus trips not absolutely essential were eliminated and many of the busses were transferred to war work. Only direct bus service between rail and bus terminals and accommodations within the parks was allowed by the Office of Defense Transportation. This authorized

service was used by many thousands of visitors in July, August, and September 1942.

By June 1943, the travel situation had become so critical that even the reduced hotel and transportation services were discontinued in many places. Railroads were unable to put on special supplemental trains, and all reduced summer rates as an incentive to vacation travel were eliminated. Only through trains were operated and, with connecting bus service curtailed or discontinued, there were drastic reductions in the number of civilian visitors to the national parks. There were practically no winter visitors to Mount Rainier, Crater Lake, and Lassen Volcanic National Parks, because snow removal equipment had been loaned to the Army Air Forces and the roads were not kept free of snow.

Travel to the national parks as a whole has not stopped, however, nor were they closed to visitors. Services and accommodations were adapted to the varying needs as they developed under rapidly changing conditions. Concessioners under contract with the Department continued to furnish limited services to the public. It was necessary for the Department of the Interior to discourage civilian use of transportation resources involved in long-distance travel. Civilians not close by found it difficult or impossible to visit the parks.

National parks remote from centers of population, such as Acadia, Bryce Canyon, Crater Lake, Glacier, Grand Canyon, Grand Teton, Mesa Verde, Shenandoah, and Yellowstone, received less than 25 percent of their normal travel. The largest losses compared with the 5-year average were to Acadia, 98 percent, and to Shenandoah, 93 percent. The cumulative totals of travel to all of the national parks and monuments reflect a reduction of 50 percent in comparison with the 5-year average for the years 1938 to 1942.

In Hawaii National Park, the lifting of the restrictions on civilian travel resulted in a 20 percent increase above the normal number of visitors, with 386,185 people visiting the park during the past fiscal year. This is an indication of the advance planning that must be done now to take care of the large number of persons who will want to visit the national parts as soon as travel conditions permit.

The Statue of Liberty National Monument, New York, nearly attained its normal travel with a total of 320,750 visitors making the pilgrimage to this outstanding symbol of liberty. It was also the scene for patriotic rallies and services broadcast throughout the world.

Among the national parks there was a notable increase in the number of persons who came and stayed for their full vacation period. To Yosemite National Park, California, in June 1943, for example, came 17,195 persons who stayed for a total of 77,900 visitor-days. The average stay per visitor at this park has more than doubled since the



outbreak of war. Increased use of the public campgrounds was also reported from Lassen Volcanic National Park, California, and numerous other areas.

Notwithstanding the handicaps of traveling under wartime conditions, many thousands of persons were willing to take coach trains, use what gasoline they had for their automobiles, ride horseback, travel by wagon, propel a bicycle, or walk, in order to seek a few hours or days of relief from war tension in the environs of the national parks and monuments.

Park officials report that from July 1, 1942, to June 30, 1943, approximately 6,572,500 civilians in addition to 1,655,720 members of the armed forces visited the areas administered by the National Park Service. Thousands of workers transferring to war plants took advantage of opportunities to visit parks and monuments en route. Several areas did not report visitors because of lack of personnel to keep the necessary records or for reasons of military censorship, which in some degree is responsible for decrease in the total travel figures.

### PROTECTION OF PARK FORESTS

Although the forests in the National Park System are not commercially available for production of the raw materials of war, nevertheless they are among the possessions that this Nation is perpetuating in order that future generations may know and appreciate in some measure the native, virgin forests which once covered a large portion of the United States. Their proper protection in wartime is a responsibility of first magnitude.

Forests cannot be set aside like inanimate objects. They are living entities, the elements of which are born, grow, mature, reproduce, and eventually die like all other living things. During this cycle they are subjected to all the hazards of nature. Against many of these elements man's efforts would be futile, but against fire, tree diseases, forest insects, the excessive inroads of man himself, the battle must go on if the national park forests are to be preserved "for the benefit and enjoyment of the people."

To the normal problem of fire protection, an acute threat of sabotage and enemy incendiaryism was added. This, and the withdrawal of many trained fire fighters from the forest, necessitated intensification of training, keener analysis of fire problems, and a thorough revitalization of the fire protection organization.

In recognition of extreme fire hazard, areas within 300 miles of the coast were included within the allocations of national defense funds for fire protection of forests, forest industries, and strategic facilities.

Five Civilian Public Service camps, consisting of approximately 100 men each, were assigned to work primarily on white pine blister rust control, but were available for fire suppression. They were located at Shenandoah, Great Smoky Mountains, Glacier and Sequoia National Parks, and the Blue Ridge Parkway.

During the year, there were 402 forest fires affecting national park areas, a decrease from the previous year of 25 percent. The total area inside the National Park System burned during 1942 was 4,415 acres, a decrease of 85 percent from the previous year. This included 3,224 acres of forest, 512 acres of brush, and 679 acres of grass. Over 25 percent of the total acreage burned resulted from a series of lightning fires in Yellowstone National Park.

Credit for the 23 percent decrease in the number of man-caused fires, and the relatively small acreage burned, is attributable to the intensive fire prevention campaign which has been waged and to the fire training programs.

Recent studies of past fire causes revealed that the tourist was responsible for 47 percent of the total number of park man-caused fires, while 53 percent were caused by people who live or work in or near the parks. Fire-prevention efforts, therefore, were directed to a greater degree toward this class of person than heretofore.

The forest insect situation in the National Park System was generally favorable as a result of previous intensive control programs. A small amount of maintenance control operations held most insect infestations in check. Continuing vigilance and prompt control of minor outbreaks are required to forestall epidemics such as those which have swept over vast forest areas in the past.

White pine blister rust, a serious exotic disease, which attacks the eastern and western white pines, including the magnificent sugar pine of the West, has continued to spread. Approximately 382,740 acres of pine forest in the national parks warrant intensive control work. The intensified control program, initiated last year by the appropriation of special funds, was carried forward in 1942 with an additional 9,660 acres added to the previous 262,740 acres which have received initial control. The Bureau of Entomology and Plant Quarantine of the United States Department of Agriculture furnished excellent cooperation and technical assistance in carrying out this program in the parks.

## PROTECTION OF WILDLIFE

Basic wildlife studies have been continued on a limited scale by service personnel. The loss of Civilian Conservation Corps wildlife technicians, curtailment of regular personnel, and reductions in funds

greatly restricted the research and advisory work done by the Fish and Wildlife Service in the National Park System, but cooperative relationships with that bureau were continued by the small staff of experts in its section on National Park Wildlife.

Thirty-three projects were undertaken during the year, including investigations of range limitations, boundary surveys based on ecological considerations, wildlife-cattle relationships, management plans for reduction of bison, elk, and deer in certain areas, field surveys in connection with plans for reintroduction of antelope, beaver, and other members of the native fauna of some parks and monuments, bear-visitor studies, and predator-prey investigations.

The long-planned reduction of the northern herd of Yellowstone elk was initiated in the fall of 1942. Experience indicated that live-trapping and removal would not solve the problem, primarily because available ranges outside of the park appeared to be fully stocked with elk. Satisfactory results were achieved through a combination of slaughter within the park, and adjustment by the State authorities of the hunting season outside the park. By January 14, 1943, when the Montana hunting season was closed, 7,230 elk had been eliminated from the northern herd, 691 of which were killed by park rangers within the park. This was the first systematic program carried out in a national park to effect a large-scale reduction of surplus animals. Its purpose was to bring the northern herd in Yellowstone National Park within the limits of the winter food supply and to save the herd from starvation. A census taken at the close of the reduction program showed that more than 8,000 elk remain in the northern herd. Range studies indicate that not more than 7,000 elk in addition to other grazing and browsing animals can be supported by the forage available.

Bears were live-trapped and taken to remote sections of Yellowstone, Yosemite, Glacier, Mount Rainier, Crater Lake, and Sequoia National Parks to remove them from areas of intensive human use. Artificial feeding of bears was stopped in order to remove the inducement to bears to concentrate in specific areas and to induce them to return to normal methods of foraging. Efforts were made to impress the public with the necessity of treating bears as wild animals. One person died after being injured by a bear at Yellowstone National Park. Although there have been many serious injuries to visitors at the park, this is the first and only instance in which a fatality has ensued.

In order to control the increasing population of bears, and to eliminate those which are dangerous to human beings, 87 of these animals were disposed of by park rangers in Yellowstone, Yosemite, and Crater Lake National Parks. The number of bears in the national parks and monuments is estimated at 2,544 black bears and 510 grizzly bears.



## ADDITIONS TO NATIONAL PARK SYSTEM

*Jackson Hole National Monument, Wyoming.*—This monument was established by Presidential proclamation on March 15, 1943, thus bringing to a head a program that was initiated in Wyoming almost 20 years ago. Grand Teton National Park, established by the Congress in 1929, and Jackson Hole, which adjoins it to the east, have long been famous for their majestic scenery. The two areas bear as close a relationship to each other as do the cliffs and valley floor of Yosemite National Park. The preservation of this great landscape as a national treasure, a place which better than any other symbolizes the fur trading and pioneering eras in America's history, an area wherein earth-building processes are displayed in spectacular form, and as an outstanding nature sanctuary, had been urged as a project of importance to the Nation for half a century.

The so-called "Jackson Hole Plan" was originally sponsored by local, State, and Federal interests as a means of realizing the benefits to the Nation of perpetuating the significant characteristics of this area for the enjoyment of this and future generations. Nearly 15 years ago, Mr. John D. Rockefeller, Jr., became interested in the "Plan" and volunteered to purchase portions of the area for national park purposes. This year, after having invested over \$1,500,000 in the project, and having waited 15 years for his gift to be accepted, Mr. Rockefeller requested that conclusive action be taken. As 76.9 percent of the land was in public ownership and 15.2 percent was owned by Mr. Rockefeller, a combined total of 92.1 percent, the President's Proclamation establishing the national monument assured protection and unified administration of the major part of the area. The proclamation protects all valid existing rights on the 7.9 percent of lands in private ownership. By an administrative order, the Secretary of the Interior continued certain privileges previously enjoyed by the local people on Federal lands and has given assurance that all private rights will be protected.

Nevertheless, there developed misconceptions that people would be deprived of their homes and livestock enterprises, that Teton County would be ruined because of loss of taxes, and that other economic changes to the detriment of the community would result. As a consequence, House Resolution No. 2241 was introduced by Congressman Frank A. Barrett of Wyoming calling for the abolishment of Jackson Hole National Monument. Hearings were held on the bill by the House Public Lands Committee in Washington and, during the summer recess, members of the committee plan to make joint investigations

in Wyoming with members of the Senate Committee on Public Lands and Surveys.

*Thomas Jefferson National Memorial, Washington, D. C.*—The Thomas Jefferson National Memorial, at the Tidal Basin in Washington, was dedicated by President Roosevelt on April 13, 1943, the two hundredth anniversary of Jefferson's birth; thus rededicating the Nation to the ideals of this great exponent of our democratic faith in political and religious freedom, educational advancement, and opposition to every form of tyranny over the human mind.

The memorial building derives its inspiration from the Pantheon at Rome, which so fired the enthusiasm of Jefferson that he used it as the model for the Rotunda of the University of Virginia. In the center is the model for the statue of Jefferson by Rudolph Evans which will be completed after the war.

*Independence Hall National Historic Site, Philadelphia, Pa.*—By cooperative agreement with the city of Philadelphia, Independence Hall was designated as a national historic site by the Secretary of the Interior on May 14, 1943. The Declaration of Independence was adopted by the Continental Congress in Independence Hall. It was also the meeting place of that Congress and of the Constitutional Convention of 1787, and the seat of Government of the United States during the American Revolution and during the period of 1790–1800.

*Olympic National Park, Washington.*—At the request of the people of Port Angeles, Wash., and local officials, 20,600 acres, known as the "Morse Creek Watershed," were added to the park by Presidential Proclamation of May 29, 1943. The area includes Mount Angeles, a beautiful lake of the same name, fine old growth of Douglas fir, and the Webster gardens.

*Hawaii National Park addition.*—The Territorial Legislature of Hawaii adopted a resolution on February 27, 1943, directing the Commissioner of Public Lands to acquire 10,511 acres by purchase or condemnation for addition to Hawaii National Park, as authorized by act of June 30, 1938, and provided \$15,000 for the acquisition.

*Lands acquired.*—Although no new land acquisition projects were authorized during the year, 3,188 acres were acquired as a result of projects under way, 868 acres were donated, and 190,903 acres were transferred from other Federal agencies, as shown in the following table:

Lands acquired for the National Park System, July 1, 1942, to June 30, 1943

	Acquired by	Funds expended		Acres	Total Federal lands in area (acres)
		Federal funds	Donated funds		
Antietam National Battlefield Site, Maryland.	Donation	-----	-----	1.00	51.73
Blue Ridge Parkway, Virginia-North Carolina.	do	-----	-----	473.96	36,048.17
Capitol Reef National Monument, Utah.	Purchase	\$1,800.00	-----	66.00	33,068.74
Great Smoky Mountains National Park, Tennessee-North Carolina.	do	100,943.11	-----	2,744.50	-----
Jackson Hole National Monument, Wyoming.	Transfer	-----	\$100.00	0.56	462,355.10
Kennesaw Mountain National Battlefield Park, Georgia.	Purchase	17,263.10	-----	280.79	3,094.21
Mammoth Cave National Park, Kentucky.	do	-----	15,675.00	377.45	-----
Olympic National Park, Washington	Donation	-----	-----	3.63	50,303.83
Saratoga National Historical Park, New York.	Transfer	-----	-----	20,600.00	845,991.92
Additional disbursements in 1943 for lands acquired previously.	Donation	-----	-----	11.70	-----
	Purchase	5,400.00	-----	96.35	1,535.90
		9,201.80	-----	-----	-----
Total		134,608.01	15,775.00	194,963.94	1,602,790.60
Lands in Federal ownership in other areas.		-----	-----	-----	19,763,564.84
Less acreage in Petersburg National Military Park transferred to War Department pursuant to the act of June 5, 1942 (56 Stat. 332)					21,366,355.44
					738.75
Non-Federal lands within authorized boundaries					21,365,616.69
					770,677.31
Acreage within maximum boundaries					22,136,294.00

*Other Accessions.*—Important gifts of historical materials included a valuable collection of letters and the personal effects of Gen. George A. Custer and a collection of drawings, paintings, and photographs by the late William H. Jackson. His death at 99 brought to a close a life which had been devoted to an interpretation of the West. The sketches bequeathed to the National Park Service included some that were made in 1863 while he was soldier in the Union Army in Virginia, and others extending over a period of 79 years during which he recorded events and scenes along the Oregon Trail, early expeditions into the Yellowstone, and many other activities of the pioneer West. Plans are being developed to exhibit these significant historical items in a W. H. Jackson room in the museum at Scotts Bluff National Monument.

The Carnegie Institution of Washington donated to the National Park Service its second extensive gift of publications. They covered reports by the institution in the fields of ethnology, archeology, biology, geology, and history with a monetary value of \$1,500. The material was distributed to a score of field areas, the four regional offices, and the Director's Office.



## NATIONAL PARK AND MONUMENT PROJECTS

*Big Bend National Park Project, Texas.*—Situated in the impressive Big Bend region of the Rio Grande River, from which the park takes its name, this area contains some of the most notable of all southwestern mountain, plains, and canyon scenes. From the Chisos peaks the landscape stretches south into Mexico (where the Mexican Government has an adjoining project). The park combines unusually significant exhibits of historic, prehistoric, physiographic, and biologic types, highly important in the interpretation of cultural America.

Unsurpassed in the park field was the achievement of the State of Texas in acquiring 476,972.10 acres of land for this project in one year's time, following the appropriation in 1941 of \$1,500,000 by the Texas legislature for that purpose. The land bought by the State with this fund, plus other State land in the project, brought the total of State holdings to 697,683.5 acres, only 15,236 acres short of the total of 712,919.5 within the approved park boundary. Plans for the acceptance of this area as a national park will be completed as soon as the deeds have been perfected. The Congress included funds for the administration and protection of the park in the 1944 Interior Appropriation Act.

*Cape Hatteras National Seashore Recreational Area Project, North Carolina.*—A more interesting example of the beach type of ocean shore than this area cannot be found on the eastern coast. The raw, windblown sands driving upon the land from the sea, the rugged patches of trees and shrubs struggling to maintain existence, the miles of quiet marshland, the rich bird life and aquatic biology, the grand scale of the scene, its human history extending back to pre-Revolutionary times, its recreational attractiveness, and the rapid changes of expression brought on by alternations of calm and storm over this vast Atlantic wilderness, afford an opportunity to conserve a worthwhile and distinctive aspect of America.

Titles and options covering considerable land within this 62,000-acre project, which was authorized by the act of August 17, 1937, were acquired by the Cape Hatteras Seashore Commission. A plan of procedure was formulated between the State and Federal authorities to establish the area when a portion sufficient for practical administration has been acquired in one unit and deeded to the Federal Government. During the year the State enacted legislation which authorizes State funds for the purchase of land within the project.

*Cumberland Gap National Historical Park Project, Kentucky, Tennessee, and Virginia.*—The Cumberland Gap region is significant

principally in the story of early immigration, transportation and settlement in the midwest heart of America. Though much of its once wild and picturesque forests and streams have been modified by man's inroads, this historic spot still retains much of the atmosphere of adventure which prevailed when hunter, trapper, soldier, colonist, thief, and vagabond alike passed through the gap in the great pageant of our westward expansion.

Negotiations during the year with representatives of the three States concerned resulted in a general agreement in regard to a minimum project area of 6,000 acres to include the most significant historical features. The three States obtained the authority of Congress, by act of May 26, 1943 (amending the act of June 11, 1940), to enter into a compact to acquire the necessary properties and to transfer them to the Federal Government. With \$225,000 available among the three States for the project and with the authority of the Congress for an interstate compact, rapid progress is anticipated.

*George Washington Carver National Monument Project, Missouri.*—In accordance with an act passed by the Congress, the Moses Carver plantation, near Diamond, Mo., where the famous Negro scientist was born, was investigated by the National Park Service, to determine its significance as a national monument to commemorate the life's accomplishments of George Washington Carver in the advancement of human welfare.

*Other projects*—Efforts were continued during the year by the Governor of Florida to acquire sufficient land for the Everglades National Park Project.

An area on the American side of the International Boundary in the State of Arizona was selected for the Coronado International Memorial. Further progress awaits the acquisition by the Republic of Mexico of an adjoining area in the State of Sonora.

The Fort Frederica Association acquired most of the land needed for the establishment of Fort Frederica National Monument near Brunswick, Ga.

*Richmond National Battlefield Park Project, Richmond, Va.*—During the past year progress has been made by the State of Virginia toward the acquisition of approximately 700 acres of land on which are located the earthworks erected to defend the Confederate capital in the Peninsular Campaign of 1862 and in the battle of Cold Harbor in 1864.

## PLANNING

*Alaska Highway.*—On January 8, 1943, the President authorized a survey of the lands adjoining the 310 miles of the Alaska Highway in

Alaska, and approved an allocation of \$50,000 from the highway fund for that purpose. The National Park Service was asked to undertake this study as a basis for protection of landscape and other values on the Government lands bordering the highway.

Public Land Order of July 20, 1942, withdrew from entry a strip of land 40 miles wide, 20 miles on each side of the line of the general route of the highway in Alaska, to provide military protection during the war and to allow time for the conduct of land use studies prior to settlement and development. The Canadian Government reserved a strip of land 2 miles wide along the 1,360 miles of the highway in Canada.

A staff of four National Park Service employees established headquarters in Juneau, Alaska, in June 1943. The study is expected to be completed by October 1944. Consideration will also be given to the lands adjoining the Richardson Highway and the cut-off from Tanana Crossing to Anchorage in Alaska. Other Federal agencies cooperating in the studies include the Fish and Wildlife Service, United States Army, Forest Service, Bureau of Mines, General Land Office, Geological Survey, and the Office of Indian Affairs. As far as the National Park Service is concerned, the aim of this study is to prevent this highway, which runs largely through public domain, from going the way of haphazard and unplanned development.

*Drainage basins.*—With funds allotted by the Bureau of Reclamation, a plan was completed for effective utilization of recreational opportunities created by the Columbia River Reclamation project at Grand Coulee Dam in the State of Washington. It was developed in cooperation with a committee of Federal, State, and local people.

On the Central Valley project in California, the National Park Service provided the leadership for a recreational study which is being planned with the assistance of a committee representing all State and local interests. A technical survey of the recreational resources of the Colorado River Basin was also begun.

*Denison Dam and Reservoir Recreational Planning Project, Texas and Oklahoma.*—Field investigations covering the recreational possibilities of the Denison Dam and Reservoir have been virtually completed. These include locations and plans for recreational developments, historic and archeological resources, and fish and wildlife resources, in which latter study the Fish and Wildlife Service cooperated.

*Advance planning.*—In anticipation of the economic changes from wartime to peace, the National Park Service has been asked to complete its project construction programs, which form a dependable list



of necessary and appropriate physical improvements, and roads and trails projects.

Judging from the experience after World War I, with the removal of transportation restrictions the pent-up urge to travel on the part of millions of people will result in tremendous increase in the number of park visitors. Adequate plans must be made to take care of them. Such considerations as the design and rotation of the use of campgrounds, the location and construction of new facilities, the routing of traffic so that all may benefit from visits to the areas with minimum damage to natural features and landscape beauty, and the reorganization and training of personnel, are essential phases of advance plans that should be considered now. While some work along these lines can be done with the present reduced technical staff, prior to the initiation of any general public works program, the Service must be provided with planning funds to make studies, surveys, and plans of the proposed projects.

### RECREATIONAL DEMONSTRATION AREAS

The acceptance by the State of Oklahoma of the 2,228-acre Lake Murray Recreational Demonstration Area on February 20, 1943, marked the beginning of the process of transferring these areas from Federal to other jurisdictions as authorized by the act of June 6, 1942. Since that date, the task of effecting additional transfers has progressed as rapidly as the deeds could be prepared and submitted for approval. Sixteen recreational demonstration areas have been transferred, or approved for transfer to the States, one has been transferred to the Bureau of Reclamation, and nine have been added, in whole or in part, to the National Park System. Thus 26 out of a total of 46 recreational demonstration areas have been disposed of. Seven of the twenty areas remaining are being held for further study to determine whether they, or parts of them, should be given permanent status in the National Park System. They are Camden Hills, Maine; Hickory Run, Pa.; Catoctin, Md.; Fall Creek Falls and Shelby Forest, Tenn.; Custer, S. Dak.; and Roosevelt, N. Dak.

The 13 others in 7 States are still to be disposed of when the State or other public agencies, which are expected ultimately to take them over, are in a position to do so. The status of all 46 of these areas transferred to the States in recent years or added to the National Park System is shown in the tabulation on page 219.

### ADVISORY BOARD

Because of war conditions, meetings of the entire Advisory Board on National Parks, Historic Sites, Buildings and Monuments were

not held, but an interim committee of four members met twice during the fiscal year 1943. The counsel of that committee has been helpful in meeting the demands for war production and military uses that would not destroy irreplaceable values in National Park Service areas. The members of the interim committee are Edmund H. Abrahams, chairman; Dr. Waldo G. Leland; Charles G. Sauers; and Richard Lieber. The other members of the Board include Dr. Clark Wissler, vice chairman; Dr. Frank H. Setzler, secretary; Dr. Thomas Barbour; Dr. Herbert E. Bolton; Mrs. Reau Folk; and Dr. Fiske Kimball. George de Benneville Keim, a member of the Board, died on July 9, 1943.

### NATIONAL PARK CONCESSIONS, INC.

National Park Concessions, Inc., the nonprofit distributing corporation authorized by the Department of the Interior in 1941, was authorized to purchase and operate the concession facilities at Isle Royale National Park, Michigan, and at Vanderbilt Mansion National Historic Site, New York. The corporation also entered into a subagency agreement with the Lassen Park Co. to operate the concessions in Lassen Volcanic National Park for the duration of the war.

### ADMINISTRATIVE ORGANIZATION

Because of the many curtailments caused by the war, efforts were made to strengthen the administrative organization of the National Park Service. Prior to this year, special appropriations for the Civilian Conservation Corps, Works Progress Administration, Public Works Administration, and other emergency agencies were available to perform essential Service functions. As they were discontinued, certain basic functions in the Director's Office, the regional offices, and the field offices were adversely affected. In collaboration with the Bureau of the Budget and the Appropriations Committees of the Congress, funds were provided to continue nucleus staffs of engineers, landscape architects, and historians in the Director's Office and in the four regional offices of the Service, thus putting important basic functions upon a permanent rather than a temporary basis.

Consolidated management of functions and activities is also being accomplished. The headquarters of the Southwestern National Monuments was consolidated with the Region Three Office at Santa Fe, N. Mex., and duties were reassigned so as to make for a reduction in the combined force.

Reducing the Service to a minimum basis has been a detailed and aggressive program. Each function has been analyzed as to its need

in wartime. Activities such as the United States Travel Bureau, the Historic Sites Survey, the Historic American Buildings Survey, and land acquisition, with the exception of completing authorized projects, were discontinued. Construction of major roads, trails, parkways, buildings and utilities was stopped. Equipment not necessary to vital park and monument protection was transferred to war agencies.

The problem of maintenance assumed major proportions during the year. Drastic shortages in the number of workers was caused by the withdrawal and diversion of manpower to the armed forces and war industries. The abolishment of the Civilian Conservation Corps withdrew maintenance services conservatively valued at \$1,000,000 annually. Many areas depended upon the CCC for practically all of their maintenance work. The shortage of personnel, together with the lack of many necessary supplies and replacement items, increased the work of the small maintenance organization that was available.

Unfortunately, storms further increased the work of the maintenance staff. During January 1943, severe storms in the West caused considerable damage in Mount Rainier, Yosemite, Sequoia, and Zion National Parks, and in Oregon Caves and Death Valley National Monuments. Hundreds of trees fell across roads, trails, and telephone and power lines; sewer lines were washed out; bridges and culverts were damaged; and rock and earth slides blocked many roads and trails. Flash floods and ice storms in the East damaged thousands of ornamental and historic trees, roads and bridges in the battlefields, monuments, and cemeteries in Virginia. Without remedial action, requiring the immediate attention of experienced engineers, landscape architects, foresters, and historians, the usefulness of these areas to the Nation would have been greatly depreciated.

The transfer of the Director's Office from Washington, D. C., to Chicago, Ill., caused a disruption of work for 2 months during August and September 1942. As the year progressed, the difficulties of operating the central office at a base far removed from the Department, the Congress, the Bureau of the Budget, and the loss of cooperative advice and counsel from other Federal agencies and conservation organizations located at the seat of Government were increasingly evident. Experience of the past year has amply demonstrated that for efficient and economical operation, the Director's office (as distinguished from the regional and field offices), should be returned to Washington, D. C., as soon as possible after the close of the war.

## PERSONNEL

The reduction in permanent full-time positions from 4,510 on June 30, 1942, to 1,974 on June 30, 1943, including 121 "working fund"



positions, was made with few of the personal inconveniences that would ordinarily result from such a reduction. During the fiscal year, 334 employees of the Service joined the armed forces, bringing the total to over 600. Also, approximately 500 employees transferred to war agencies. No seasonal ranger-naturalists were employed during the 1943 travel season, and seasonal ranger positions not necessary to protection of the parks and monuments were not filled. Women park rangers and fire lookouts were employed for the summer season in several areas.

The Service is proud of its personnel. Those who entered the armed forces are serving at battlefronts throughout the world. Those who remained on duty did a creditable job of defending Service principles and protecting national park properties. The fact that with reduced funds all of the special war uses recounted in this report were handled efficiently and effectively, while at the same time those fortunate to be able to visit the parks, including increasing numbers of our military forces, were taken care of, is ample evidence of the loyalty of our workers to the institution that they serve.

Under conditions of total war the concept of conservation represented by the national parks has faced the most critical challenge in its history. Statement and restatement of purposes and responsibilities of the Service's trusteeship had to be made. Some sacrifices in the common cause were necessary, and more may be inevitable. But it is believed that we can emerge with the basic idea intact that the national parks and monuments must be protected as symbols of the greatness of this Nation.

*Recreational demonstration areas*

Area	State	Acreage	Disposition	Visitors <sup>1</sup>
Acadia.....	Maine.....	5,660	Added to Acadia National Park, June 6, 1942.	.....
Alexander H. Stephens Badlands.....	Georgia South Dakota.....	938	Added to Badlands National Monument, June 26, 1936.	11,700
Beach Pond.....	Rhode Island.....	3,472	Transferred to State, June 28, 1943.....	11,633
Bear Brook.....	New Hampshire.....	6,155	Transferred to State, May 12, 1943.....	12,130
Blue Knob.....	Pennsylvania.....	5,136	.....	8,890
Blue Ridge (2 areas).....	Virginia-North Carolina.....	10,585	Added to Blue Ridge Parkway, June 30, 1936.	.....
Bull Run.....	Virginia.....	1,605	Designated as Manassas National Battlefield Park, June 10, 1939.	.....
Camden Hills.....	Maine.....	4,962	.....	7,219
Catoctin.....	Maryland.....	9,746	.....	3,200
Cheraw.....	South Carolina.....	6,832	Under lease to State <sup>2</sup> .....	.....
Chopawamsic.....	Virginia.....	14,080	Added to National Capital Park System, August 13 1940.	.....
Crabtree Creek.....	North Carolina.....	4,983	Transferred to State, April 6, 1943.....	27,950
Cuivre River.....	Missouri.....	5,802	.....	10,748
Custer.....	South Dakota.....	20,167	.....	.....
Fall Creek Falls.....	Tennessee.....	15,776	.....	2,313
French Creek.....	Pennsylvania.....	6,198	( <sup>3</sup> ).....	.....
Hard Labor Creek.....	Georgia.....	5,802	.....	22,450
Hickory Run.....	Pennsylvania.....	12,908	.....	8,600
Kings Mountain.....	South Carolina.....	10,147	( <sup>2</sup> ) ( <sup>4</sup> ).....	.....

See footnotes at end of table.

Recreational demonstration areas—Continued

Area	State	Acreage	Disposition	Visitors <sup>1</sup>
Lake Guernsey	Wyoming	1,753	Transferred to Bureau of Reclamation, June 8, 1943.	
Lake Murray	Oklahoma	2,228	Transferred to State, Feb. 20, 1943	3,939
Lake of the Ozarks	Missouri	16,037		18,560
Laurel Hill	Pennsylvania	4,025		17,025
Mendocino Woodlands	California	5,419		4,946
Montgomery Bell	Tennessee	3,744	Transferred to State, June 9, 1943	17,760
Montserrat	Missouri	3,439		16,666
Oak Mountain	Alabama	7,805	Transferred to State, Apr. 30, 1943	4,370
Otter Creek	Kentucky	2,435		11,821
Pere Marquette	Illinois	2,522	Transferred to State, May 7, 1943	3,895
Pine Mountain	Georgia	3,018		4,595
Raccoon Creek	Pennsylvania	5,034		9,620
Roosevelt	North Dakota	69,365		14,335
St. Croix	Minnesota	18,499	(?)	9,804
Shelby Forest	Tennessee	12,305		45,600
Shenandoah	Virginia	10,129	Added to Shenandoah National Park, June 6, 1942.	
Silver Creek	Oregon	4,088		18,453
Swift Creek	Virginia	7,610		43,668
Versailles	Indiana	5,371	Transferred to State, Apr. 20, 1943	9,107
Waysides (6 areas)	South Carolina	239	(?)	
Do	Virginia	206	Transferred to State, Mar. 26, 1943	
Waterloo	Michigan	12,018	Transferred to State, June 15, 1943	10,677
Winamac	Indiana	6,233	Transferred to State, Apr. 20, 1943	13,260
White Sands	New Mexico	1,719	Added to White Sands National Monument, June 6, 1942.	
Yankee Springs	Michigan	4,197	Transferred to State, June 15, 1943	43,832
Total		360,392		448,581

<sup>1</sup> Attendance figures shown for areas transferred to other agencies include visitors through the month in which the transfer was effected.

<sup>2</sup> Transfer to State approved by President and awaiting State acceptance.

<sup>3</sup> 214 acres established as Hopewell Village National Historic Site, Aug. 3, 1938. Remaining 5,984 acres added to site, June 6, 1942.

<sup>4</sup> 3,972 acres added to Kings Mountain National Military Park, July 11, 1940. Remaining 6,175 acres under lease to the State.

National Park System, acreage, and number of visitors

Areas (classification)	Location (State)	Approximate acreage maximum boundaries	Approximate visitors, fiscal year July 1, 1942-June 30, 1943	Approximate visitors, 5-year average, 1939-43.
<i>National Parks</i>				
Acadia	Maine	24,629	9,680	390,555
Bryce Canyon	Utah	35,980	19,600	106,015
Carlsbad Caverns	New Mexico	49,568	107,365	239,860
Crater Lake	Oregon	160,334	61,410	267,785
Glacier	Montana	984,310	53,925	176,015
Grand Canyon	Arizona	645,120	101,645	375,190
Grand Teton	Wyoming	96,000	30,100	112,500
Great Smoky Mountains	North Carolina-Tennessee	462,385	604,065	1,078,525
Hawaii	Hawaii	173,399	386,680	289,610
Hot Springs	Arkansas	1,011	179,455	202,090
Isle Royale	Michigan	133,839	6,150	17,535
Kings Canyon	California	454,600	87,135	177,090
Lassen Volcanic	do	104,527	40,230	105,795
Mammoth Cave	Kentucky	50,304	69,505	139,790
Mesa Verde	Colorado	51,334	10,365	37,580
Mount McKinley	Alaska	1,939,493	(?)	1,310
Mount Rainier	Washington	241,782	245,020	428,135
Olympic	do	856,011	58,990	126,440
Platt	Oklahoma	912	128,710	309,650
Rocky Mountain	Colorado	259,416	311,455	636,755
Sequoia	California	386,560	111,305	281,880
Shenandoah	Virginia	193,441	63,595	882,820
Wind Cave	South Dakota	12,640	8,415	19,790
Yellowstone	Wyoming, Montana, Idaho	2,212,773	146,155	535,770
Yosemite	California	761,111	228,725	522,185
Zion	Utah	86,343	58,680	167,980

See footnotes at end of table.

National Park System, acreage, and number of visitors—Continued

Areas (classification)	Location (State)	Approximate acreage maximum boundaries	Approximate visitors, fiscal year July 1, 1942-June 30, 1943	Approximate visitors, 5-year average, 1939-43.
<i>National Historical Parks</i>				
Abraham Lincoln.....	Kentucky.....	111	41, 100	110, 780
Chalmette.....	Louisiana.....	30	46, 630	31, 015
Colonial.....	Virginia.....	6, 793	220, 070	559, 800
Morristown.....	New Jersey.....	1, 051	98, 215	173, 395
<i>National Monuments</i>				
Ackia Battleground.....	Mississippi.....	49	( <sup>2</sup> )	( <sup>2</sup> )
Andrew Johnson.....	Tennessee.....	17	4, 390	<sup>1</sup> 3, 620
Appomattox Courthouse.....	Virginia.....	970	3, 925	<sup>1</sup> 13, 885
Arches.....	Utah.....	33, 680	960	2, 625
Aztec Ruins.....	New Mexico.....	26	6, 100	12, 665
Badlands.....	South Dakota.....	150, 103	60, 950	220, 035
Bandelier.....	New Mexico.....	26, 026	4, 280	11, 555
Big Hole Battlefield.....	Montana.....	200	730	3, 865
Black Canyon of the Gunnison.....	Colorado.....	13, 969	6, 030	18, 120
Cabrillo.....	California.....	50	( <sup>2</sup> )	<sup>1</sup> 109, 040
Canyon de Chelly.....	Arizona.....	83, 840	845	2, 170
Capitol Reef.....	Utah.....	37, 126	1, 000	1, 530
Capulin Mountain.....	New Mexico.....	680	16, 700	35, 750
Casa Grande.....	Arizona.....	473	10, 735	16, 515
Castillo de San Marcos.....	Florida.....	19	128, 970	241, 100
Castle Pinckney.....	South Carolina.....	4	( <sup>2</sup> )	( <sup>2</sup> )
Cedar Breaks.....	Utah.....	6, 187	6, 840	16, 045
Chaco Canyon.....	New Mexico.....	21, 509	585	2, 415
Channel Islands.....	California.....	1, 120	( <sup>2</sup> )	( <sup>2</sup> )
Chiricahua.....	Arizona.....	10, 695	5, 470	9, 630
Colorado.....	Colorado.....	18, 311	8, 235	30, 960
Craters of the Moon.....	Idaho.....	48, 184	4, 485	17, 935
Death Valley.....	California-Nevada.....	1, 907, 720	24, 155	70, 040
Devil Postpile.....	California.....	800	6, 085	7, 430
Devils Tower.....	Wyoming.....	1, 153	9, 955	32, 290
Dinosaur.....	Utah-Colorado.....	203, 965	1, 850	8, 665
El Morro.....	New Mexico.....	240	455	1, 585
Father Millet Cross.....	New York.....	.01	( <sup>2</sup> )	( <sup>2</sup> )
Fort Jefferson.....	Florida.....	87	2, 650	1, 385
Fort Laramie.....	Wyoming.....	214	2, 065	6, 380
Fort Mantanzas.....	Florida.....	18	1, 960	14, 755
Fort McHenry.....	Maryland.....	48	269, 120	515, 495
Fort Pulaski.....	Georgia.....	5, 427	( <sup>3</sup> )	<sup>1</sup> 88, 420
Fossil Cycad.....	South Dakota.....	320	( <sup>2</sup> )	( <sup>2</sup> )
George Washington Birthplace.....	Virginia.....	394	9, 925	43, 260
Gila Cliff Dwellings.....	New Mexico.....	160	140	190
Glacier Bay.....	Alaska.....	2, 299, 520	( <sup>2</sup> )	( <sup>2</sup> )
Gran Quivira.....	New Mexico.....	611	680	2, 555
Grand Canyon.....	Arizona.....	201, 291	115	1, 120
Great Sand Dunes.....	Colorado.....	46, 034	3, 740	11, 060
Holy Cross.....	do.....	1, 392	30	40
Homestead National Monument of America.....	Nebraska.....	161	455	1, 215
Hovenweep.....	Utah-Colorado.....	286	160	205
Jackson Hole.....	Wyoming.....	221, 610	( <sup>2</sup> )	( <sup>2</sup> )
Jewel Cave.....	South Dakota.....	1, 275	780	3, 805
Joshua Tree.....	California.....	837, 480	12, 375	14, 140
Katmai.....	Alaska.....	2, 697, 590	( <sup>2</sup> )	( <sup>2</sup> )
Lava Beds.....	California.....	45, 967	14, 080	32, 760
Lehman Caves.....	Nevada.....	640	1, 370	4, 295
Meriwether Lewis.....	Tennessee.....	300	6, 285	18, 170
Montezuma Castle.....	Arizona.....	521	3, 330	8, 240
Mound City Group.....	Ohio.....	57	( <sup>2</sup> )	( <sup>2</sup> )
Muir Woods.....	California.....	425	91, 445	144, 370
Natural Bridges.....	Utah.....	2, 740	265	740
Navajo.....	Arizona.....	360	75	460
Ocmulgee.....	Georgia.....	683	28, 110	46, 535
Old Kasaan.....	Alaska.....	38	( <sup>2</sup> )	( <sup>2</sup> )
Oregon Caves.....	Oregon.....	480	19, 575	43, 200
Organ Pipe Cactus.....	Arizona.....	330, 687	42, 100	22, 590
Perry's Victory and International Peace Memorial.....	Ohio.....	14	41, 145	36, 815
Petrified Forest.....	Arizona.....	93, 199	49, 395	197, 530
Pinnacles.....	California.....	14, 498	5, 960	20, 000

See footnotes at end of table.



National Park System, acreage, and number of visitors—Continued

Areas (classification)	Location (State)	Approximate acreage maximum boundaries	Approximate visitors, fiscal year July 1, 1942-June 30, 1943	Approximate visitors, 5-year average, 1939-43.
<i>National Monuments—Continued</i>				
Pipe Spring	Arizona	40	5,090	2,535
Pipestone	Minnesota	116	1,035	<sup>1</sup> 1,425
Rainbow Bridge	Utah	160	70	200
Saguaro	Arizona	63,284	5,305	13,745
Santa Rosa Island	Florida	9,500	332,505	<sup>1</sup> 82,735
Scotts Bluff	Nebraska	3,476	41,650	83,375
Shoshone Cavern	Wyoming	212	(3)	(3)
Sitka	Alaska	57	5,540	7,180
Statue of Liberty	New York	10	320,755	442,500
Sunset Crater	Arizona	3,040	5,355	11,365
Timpanogos Cave	Utah	250	9,775	11,300
Tonto	Arizona	1,120	3,005	6,085
Tuinaecocori	do	10	5,135	9,665
Tuzigoot	do	43	4,120	<sup>1</sup> 7,800
Verendrye	North Dakota	253	2,000	4,950
Walnut Canyon	Arizona	1,879	6,990	12,490
Wheeler	Colorado	300	180	385
White Sands	New Mexico	144,946	42,815	68,315
Whitman	Washington	46	7,115	<sup>1</sup> 6,500
Wupatki	Arizona	35,813	900	3,365
Yucca House	Colorado	10	100	90
Zion	Utah	49,150	250	<sup>1</sup> 339
<i>National Military Parks</i>				
Chickamauga and Chattanooga	Georgia-Tennessee	8,551	136,825	361,000
Fort Donelson	Tennessee	103	8,635	33,540
Fredericksburg and Spotsylvania County Battlefields Memorial.	Virginia	2,424	39,685	110,000
Gettysburg	Pennsylvania	2,425	75,745	557,765
Gulford Courthouse	North Carolina	149	4,850	34,130
Kings Mountain	South Carolina	4,012	8,985	22,080
Moore's Creek	North Carolina	30	3,285	4,175
Petersburg	Virginia	1,308	135,030	209,685
Shiloh	Tennessee	3,717	75,195	233,460
Stones River	Tennessee	324	3,185	4,595
Vicksburg	Mississippi	1,338	9,655	187,675
<i>National Battlefield Sites</i>				
Antietam	Maryland	55	7,690	24,960
Briecs Cross Roads	Mississippi	1	1,200	<sup>1</sup> 1,880
Cowpens	South Carolina	1	1,970	2,140
Fort Necessity	Pennsylvania	2	31,215	69,435
Kennesaw Mountain	Georgia	60	11,950	13,025
Tupelo	Mississippi	1	6,000	6,300
White Plains	New York		(2)	(2)
<i>National Historic Sites</i>				
Atlanta Campaign Markers	Georgia	21	(2)	(2)
Federal Hall Memorial <sup>5</sup>	New York	49	110,195	<sup>1</sup> 76,615
Fort Raleigh <sup>6</sup>	North Carolina	16	6,645	77,560
Gloria Dei (Old Swedes' Church) <sup>7</sup>	Pennsylvania			
Hopewell Village <sup>6</sup>	do	6,198	22,050	<sup>1</sup> 55,925
Independence Hall <sup>7</sup>	do			
Jamestown Island <sup>8</sup>	Virginia		(9)	(9)
Jefferson National Expansion Memorial <sup>6</sup>	Missouri	77	28,055	(1)
Manassas National Battlefield Park <sup>7</sup>	Virginia	1,605	12,330	<sup>1</sup> 8,380
McLoughlin Home <sup>8</sup>	Oregon		11,120	(1)
Old Philadelphia Custom House <sup>5</sup>	Pennsylvania	79	6,735	6,090
Salem Maritime <sup>6</sup>	Massachusetts	9		
San Jose Mission <sup>7</sup>	Texas		10,825	<sup>1</sup> 17,470
Vanderbilt Mansion <sup>6</sup>	New York	212		
<i>National Recreational Area</i>				
Boulder Dam	Arizona-Nevada	1,939,808	268,310	668,435

See footnotes at end of table.

National Park System, acreage, and number of visitors—Continued

Areas (classification)	Location (State)	Approximate acreage maximum boundaries	Approximate visitors, fiscal year July 1, 1942-June 30, 1943	Approximate visitors, 5-year average, 1929-42.
<i>National Memorials</i>				
Camp Blount Tablets.....	Tennessee.....		100	20
House Where Lincoln Died.....	District of Columbia.....	.05	35,965	36,585
Kill Devil Hill.....	North Carolina.....	314	8,965	70,470
Lee Mansion.....	Virginia.....	.50	130,540	334,070
Lincoln Memorial.....	District of Columbia.....		572,645	1,331,225
Lincoln Museum.....	do.....	.18	60,235	60,940
Mount Rushmore.....	South Dakota.....	1,800	98,475	105,995
New Echota Marker.....	Georgia.....	1		4,235
Thomas Jefferson Memorial.....	District of Columbia.....		362,930	172,585
Washington Monument.....	do.....		448,560	893,565
<i>National Cemeteries</i>				
Antietam.....	Maryland.....	11	900	180
Battleground.....	District of Columbia.....	1	2,700	3,440
Chattanooga.....	Tennessee.....	136		
Custer Battlefield.....	Montana.....	765	17,550	28,295
Fort Donelson.....	Tennessee.....	15	( <sup>9</sup> )	( <sup>9</sup> )
Fredericksburg.....	Virginia.....	12	( <sup>9</sup> )	( <sup>9</sup> )
Gettysburg.....	Pennsylvania.....	16	( <sup>9</sup> )	( <sup>9</sup> )
Poplar Grove.....	Virginia.....	9	( <sup>9</sup> )	( <sup>9</sup> )
Shiloh.....	Tennessee.....	10	( <sup>9</sup> )	( <sup>9</sup> )
Stones River.....	do.....	20	( <sup>9</sup> )	( <sup>9</sup> )
Vicksburg.....	Mississippi.....	120	( <sup>9</sup> )	( <sup>9</sup> )
Yorktown.....	Virginia.....	3	( <sup>9</sup> )	( <sup>9</sup> )
<i>National Capital Parks</i> .....	District of Columbia.....	11 25,570	( <sup>10</sup> )	( <sup>10</sup> )
<i>Parkways</i>				
Blue Ridge.....	Virginia-North Carolina.....	34,770	187,890	521,525
George Washington Memorial.....	District of Columbia-Virginia.....	2,366	( <sup>2</sup> )	( <sup>2</sup> )
Natchez Trace.....	Mississippi, Alabama, and Tennessee.....	12,834	( <sup>2</sup> )	( <sup>2</sup> )
<i>Projects</i>				
Saratoga National Historical Park <sup>12</sup> .....	New York.....	2,594	8,215	<sup>1</sup> 24,245
Kennesaw Mountain National Military Park <sup>12</sup> .....	Georgia.....	3,094	( <sup>9</sup> )	( <sup>9</sup> )
Grand total.....		22,136,294	<sup>13</sup> 8,228,220	17,767,920

<sup>1</sup> Travel figures available for less than 5 years.

<sup>2</sup> Travel figures not available or maintained.

<sup>3</sup> Closed to visitors.

<sup>4</sup> Established by Presidential Proclamation, Mar. 15, 1943.

<sup>5</sup> Federally owned; operated by cooperating private agency.

<sup>6</sup> Federally owned and operated.

<sup>7</sup> Nonfederally owned and operated.

<sup>8</sup> Federally and privately owned and operated.

<sup>9</sup> Included in travel figures for adjacent battlefield site, military park, or historical park.

<sup>10</sup> Travel included under memorials.

<sup>11</sup> Includes Chopawamsic Area, Virginia, and C. & O. Canal, Md.

<sup>12</sup> Administered by Service pending final establishment.

<sup>13</sup> Includes 1,655,720 military visitors.





# Fish and Wildlife Service<sup>1</sup>

IRA N. GABRIELSON, Director

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**T**HE Fish and Wildlife Service is the custodian of a rich natural resource which contributes to the specialized wartime demands of the Nation as well as to the continuing needs of national existence in many and often surprising ways. This resource consists of two major segments: The fish supplies of a vast coastal area and of the lakes and rivers of the interior of the country; and the wildlife resources comprising a wide variety of birds and fur-bearing animals. The direct contribution of this living resource to the Nation's requirements of food and strategic materials is imposing. The fisheries yield four billion pounds of aquatic products, from which high-protein foods, vitamin oils, animal feeds, and oils that are essential in certain industries are produced. The food which is derived from wildlife includes approximately 9 million pounds from domestic rabbits, another million and a half from small wild game, and 250 million pounds from larger game. Our herds of deer and elk have already yielded a large quantity of hides to be processed into leather for the Army, and other animals and birds have provided a quantity of furs and feathers which have been used in the manufacture of garments and specialized equipment which is indispensable to the armed forces in cold climates.

The Service's resources of men, material, and land have also been enlisted in the war program. Utilizing their technical skills and specialized knowledge, representatives of the Service have already given assistance to the Nation at war. We have instructed the military services in methods of controlling destructive and disease-carrying rodents in Army encampments, provided information of strategic importance about certain remote outposts which are little known except

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<sup>1</sup>In August 1942 the headquarters of the Fish and Wildlife Service was transferred to Chicago. A liaison office with a small staff remained in Washington to facilitate the maintenance of relationships between the Service and other governmental agencies in Washington.

for the explorations of our naturalists, and controlled species which are injurious to crops. We have made available the facilities of wildlife refuges for military training, assisted Army and Navy Intelligence units and military patrols in remote areas in which our field personnel is stationed, and contributed to the material needs of the Nation by carefully harvesting the grain and fiber crops, hay, and timber from the national wildlife refuges.

In addition to these contributions to the war program on the military fronts and at home, the Service has also fulfilled its obligations to continue the basic studies and the protective vigilance and care necessary to insure the preservation of our fisheries and our wildlife resources for future use.

### AIDING THE WAR PROGRAM WITH LAND, VESSELS, MEN

The Aleutian Islands, a national wildlife refuge comprising nearly 3,000,000 acres, is in the immediate zone of hostilities. Intimate knowledge on the part of Service personnel of the topography and meteorology of this chain of islands, sought by the armed forces, was freely placed at their disposal. To the northward lie the Pribilof Islands, summer home of the highly valuable fur seal herd. In view of the possibility of an attack on these islands, which are administered by this Service, their populations of native workers (476) and our personnel (23) of teachers, doctors, and administrators were evacuated to the mainland where essential care of the natives is being continued. Through the branch of National Parks Wildlife, information and photographs of strategic value in relation to Alaskan and Siberian territories were given to Army and Navy authorities.

In its capacity as a land administering agency, the Service was able to cooperate with the military authorities in providing training areas. Sites aggregating 1,845,000 acres were allotted on 35 national wildlife refuges within the United States for many types of Army and Navy training. Despite the vast extent of these activities, disturbance and harm to wildlife have been held to a minimum through careful selection of the areas and through the excellent cooperation of the armed services.

Direct aid was provided also by the transfer of 11 of the larger vessels in the Service's fleet to the Navy, Coast Guard, and Marine Corps.

Our staff of game management agents contributed materially to the internal security of the Nation by furnishing evidence of subversive activities to the Army and Navy Intelligence units, and to the Federal Bureau of Investigation. In Alaska, wildlife agents cooperated with

the military forces in patrolling the Territory. More than half of the qualified personnel has been employed in cooperation with war agencies and the Department of Justice in the appraisal and acquisition of lands for war purposes.

At the request of Army and Navy officials, field men of the Service gave direct assistance in controlling rodents on numerous military reservations throughout the country. Aid was rendered in curtailing serious damage by rats to subsistence and clothing supplies. Another important phase of the work was the control of plague-carrying field rodents that constituted a menace to the health of troops. It was also necessary to control pocket gophers and kangaroo rats that were undermining airplane runways and building dirt mounds on military airfields, thus presenting a serious hazard to aircraft in taking-off and landing. A Service employee is serving on the faculty of the Army Medical School, delivering lectures on rodent control before classes of the School of Tropical and Military Medicine in order to prepare the candidates to supervise campaigns for the suppression of rodent-borne diseases in tropical countries. Assistance was given to the Navy Department in the development of natural camouflage materials for aquatic situations. Help was also extended that Department in its search for materials that might make fresh water available from sea water. In this connection a great many plant materials were subjected to chemical, biological, and physical tests and a few of them showed promise for practical use. In addition, cooperation was given in the testing of materials for "survival kits." Suggestions were given on subject matter for a Navy manual on "Survival" to be used in training aviators to take care of themselves should they be forced to land in areas remote from civilization.

#### AIDING THE WAR PROGRAM WITH WILDLIFE AND OTHER CROPS

Through notable increase in the economic use of the Federal wildlife refuges, a variety of contributions were made to national needs. Thus grazing to the extent of 227,585 animal months was authorized and 13,945 tons of hay were harvested during the year. The timber cut included: 10,900 cords of fuel and pulp wood, 488,600 board feet of lumber, and 23,975 posts, poles, and ties. In addition, 18,680 acres of refuge land, cultivated by private individuals and refuge personnel, produced 65,600 pounds of seed crops, 70,000 pounds of fiber crops, and 430,000 bushels of grain and other crops, most of which were used in augmenting the Nation's food supply. Increased fur production made it possible to provide additional material which



was vitally important in the manufacture of special clothing for the use of the armed forces in frigid climates.

The results of the biological developments of refuge lands undertaken during the height of CCC and WPA activities are reflected in increases in wildlife. Between 1937 and 1942, big game on national wildlife refuges increased 80 percent. Waterfowl populations increased from 27 millions in 1934 to between 115 and 120 millions in the spring of 1943, and 25 million waterfowl used the refuges for resting and feeding along the major flyways during the 1942 fall migration. Increases approximating those of the waterfowl are also evident in the upland game, which in the case of pheasants have resulted in the extraordinary density of 4 birds per acre on the Sand Lake Refuge in South Dakota.

The total revenue from the economic uses on national wildlife refuges, including the disposition of big game animals, fur animals, and surplus products, was \$213,800.

Sealing on the Pribilof Islands in the 1942 season was interrupted suddenly, after only 127 skins had been taken, when evacuation of the islands was ordered by military authorities. Before the opening of the 1943 season, however, sufficient personnel was returned to resume sealing and a large take of skins is anticipated. Supplied by the take of the previous season, two public auction sales of fur-seal skins were held at St. Louis, Mo., one in October and one in March. In all, 42,447 sealskins were sold for the account of the Government for a total of \$1,537,530.87.

The handling of blue foxes on the Pribilof Islands is incidental to sealing activities. In the 1942-43 season, 785 fox skins were taken, of which 182 were from St. Paul, and 603 were from St. George Islands.

During the year there were sold at public auction 780 blue, and 5 white, fox skins taken on the islands. The blue pelts sold for \$10,068 and the white for \$85, a total of \$10,153.

Wartime utilization of fish, game, and fur, consistent with preservation of breeding stock, is being emphasized on Indian lands through investigation of these resources, extension work among the Indians, and action by the Tribal Councils. Fisheries, long the most important wildlife activity among Indians, are being expanded. Investigations of Pacific Northwest salmon fisheries, of which the Indians' share approximates 1 million dollars annually, have resulted in closer cooperation between the Indians and the State of Washington, particularly at Celilo Falls; increased numbers of spawning fish in the Yakima River spring run of chinooks; planting of fry to establish new runs of silver salmon in three coastal streams; an increased efficiency in

marketing the Quinault sockeye catch. At Red Lake, Minn., the commercial catch, chiefly walleyed pike, was increased from 650,000 pounds to 1,000,000 pounds, on the basis of studies by Service biologists. The supply of fish for local consumption among the Indians was increased by plantings, by improved management recommended after scientific study, and by expansion of fish production in stock-watering reservoirs.

Few reservations have had a surplus of game to draw upon as a wartime source of meat, because of the prevalence of unrestricted hunting by Indians. At Crow and Pine Ridge, surplus buffalos have been used, and unusually large numbers of rabbits have been killed on several areas. In Alaska, where scientific studies of lichen range showed the desirability of reducing the Nunivak Island reindeer herd, authority was given for reduction from 19,000 to 10,000 head. Both meat and hides are to be used by military and civilian populations entirely within the Territory.

Improved management and marketing of furs is now being carried out in several northern reservations as the result of recommendations following scientific investigations. Beaver management plans have been started at Grand Portage, Rosebud, Pine Ridge, and Flathead. At the last reservation a system of marketing through public auction has increased returns to the trappers by about 30 percent and has facilitated law enforcement. A somewhat similar muskrat management project, based upon intensive investigations by Service biologists, has been authorized at Bad River, Wis., on 10,105 acres.

## STIMULATION OF FOOD PRODUCTION

Valuable as were the direct contributions of the Service to the national food and fur supplies, they were far exceeded by the results of stimulating and aiding production through regular channels and of encouraging the use of partially or wholly neglected resources.

### FISHERY PRODUCTS

Because of war-created needs, the products of the Nation's fisheries are finding a greater variety of uses and are more urgently needed than ever before. As excellent muscle-builders, rich in vitamins and minerals, fish are especially valuable foods for fighting men and civilians. Canned fish are a concentrated food easily transported to soldiers in remote bases or on battlefields. Vitamin oils obtained from fish livers are helping to sharpen the eyesight of night bombing crews or of troops on night maneuvers, and are aiding troops and civilians to build up resistance to respiratory infections. Animal-feeding meals and oils,

derived chiefly from Pacific pilchards, herring, and menhaden, are providing the proteins and vitamins needed to produce hogs and poultry in larger numbers and of better quality. In the industrial field, fish oils have a variety of important uses. They are used, for example, in the preparation of glycerine for explosives and as core oils for aluminum castings and lubricants for delicate machinery.

During the first year of the war the yield of the United States fisheries fell more than a billion pounds below the 5-billion pound catch of 1941. This decline, which unfortunately occurred in a year when demands for the products of the fisheries were at an unprecedented high, was caused by the requisitioning of fishing boats by the military services, manpower difficulties, and other war-created hindrances to normal operation. Early in 1943 it was announced that if all governmental and civilian requirements for fish were to be met, a catch of 6 billion pounds would be needed in 1943.

To assist the fisheries to operate effectively in the midst of war, the President established the Office of the Coordinator of Fisheries by Executive order in July 1943. The Office was staffed by members of the Fish and Wildlife Service, its officials and field representatives being drawn largely from the Divisions of Fishery Industries and Fishery Biology. While direct services to the fishing industry are now performed largely by the Coordinator's Office, and are summarized in a separate section of this annual report, the basic research activities have remained in the Fish and Wildlife Service.

*Improvement of fishery technology.*—Technological studies have been concerned chiefly with the production, preservation, and utilization of fishery products and byproducts. Laboratories were maintained at College Park, Md.; Seattle, Wash.; Ketchikan, Alaska; and at Mayaguez, Puerto Rico.

Because the amount of tin available for manufacturers of fishery products has been greatly curtailed, extensive research has been conducted on nonmetallic containers for fresh shucked oysters, clams, and mussels; for fresh cooked crab meat and shrimps and for fresh fillets. The aim of this research is to aid industry and government to determine to what extent it is possible to use substitute materials, and to develop practicable substitutes for tin.

Packs of all types of canned fishery products have been made in containers fabricated from substitute plates containing no tin, or smaller amounts of tin than the plate formerly used. These are being subjected to storage, shipping, and other tests to determine their suitability. To effect further possible savings in tin for preserved fishery products, experiments are being continued to develop satisfactory dehydrated and salted fish products.



Field and laboratory tests have been made to determine the utility of fibers other than manila in the fabrication of cordage and certain types of trawl nets. The results show, for example, where sisal, jute, hemp, istle, and other hard and soft fibers can be used in the fishing industry.

Studies in Service laboratories and in cooperation with industrial and other agencies have led to the development of new canned fishery products for government and civilian use. Principal among these are canned Maine sea herring, menhaden, mussels, and a fish loaf, all of which are now being packed commercially. Cooperative work with the Army has developed several promising special canned rations incorporating fish.

To further the use of species of fishes which formerly were discarded, or utilized in small quantities, studies are being made to determine suitable methods of handling and preservation. Other investigations deal with their nutritive value and with the development of recipes for cooking these new species. Some of the groups investigated have been soupfin shark, Alaska sharks, carp, burbot, monkfish, skates, and mussels. "Wartime Fish Cookery" and "Home Canning of Fishery Products," two publications designed to guide the consumer to fuller and more satisfactory use of fish, were released.

Work on vitamin oils provided a basis for more judicious utilization of raw material sources and has supplied information on the stability of these oils and on handling and processing factors that influence it.

The war made it essential to find new sources of supply of agar, a seaweed product which is extensively used as a medium in bacteriological research and in numerous food industries and in manufacturing processes. Formerly 90 percent of the agar used in the United States was imported from Japan. Our technologists are now investigating the properties of numerous seaweed gums in an attempt to find a satisfactory substitute for agar.

Experiments in adapting a purse seine to South Atlantic shrimp trawlers promise a materially increased catch of other food species by these vessels during the season when no shrimp are caught.

*Improvement of fishery economics.*—Investigations have been directly concerned with holding production at a high level and with solving problems of distribution. The use of menhaden from the southern fisheries as bait in a northern cod fishery where other bait was not available demonstrated the translation of research into fish production. Processing Great Lakes herring into fillets for Army use, and establishing industrial production for such neglected species as gars, sharks, and king whiting are representative of research activities leading to immediate action. The king whiting, a potentially

valuable variety produced incidentally to the capture of another species, heretofore had been discarded but now has found a satisfactory market. Other species, such as mullet, are readily marketed in certain parts of their range but are neglected in other areas of abundance.

*Dissemination of fishery statistics.*—The statistical section continued the collection and dissemination of data relating to the commercial catch of fishery products, employment of personnel, craft, and gear in the industry, and the production of manufactured fishery commodities. It was necessary, however, to curtail certain of the regular statistical surveys and to expand others in order to undertake the collection of specific data required by the various war planning and regulatory agencies.

The collection and publication of monthly data on the important vitamin-A industry was begun during the year, and the quarterly survey to obtain information on the domestic production and stocks of all marine animal oils was changed to a monthly basis. Special surveys were conducted to obtain information for the War Shipping Administration on the earnings of certain Atlantic and Pacific coast fishing craft, and data were collected for the Office of Price Administration on the price ceilings of individual wholesale dealers for manufactured fishery products.

When shortages of critical materials developed as a result of the war, it became necessary to prepare estimates on the annual requirements of the industry for supplies and equipment. Fortunately, a Nation-wide survey to obtain data on the material needs of the industry had been begun during the previous fiscal year and was completed in the fall of 1942. The data obtained in this survey and the information collected in a special canvass relative to the industry's requirements of controlled materials (steel, copper, and aluminum) served as a basis for estimates that were used in obtaining allocations of supplies which were required by the fishing industry.

In order to assist the Federal agencies concerned with the Nation's food program in planning for the purchase and allocation of fishery products, historical information relative to the industry, current production data, field reports on the trends of the fisheries, and estimates of future production were prepared throughout the year for their use.

*Fishery market news service.*—To meet the requests of war agencies and a war-gearred fishing industry, the daily reports, monthly and annual summaries, and the monthly review have all been expanded to cover more areas and supply additional current information on all phases of production, distribution, and marketing.

All daily reports have generally increased the volume of their price quotations. The New York report now includes Norfolk production data, while the Boston report has better coverage of Maine, and the Seattle report has better coverage of Oregon and California. Federal Regulations, and limitation of allocation orders, are now either reprinted or briefed in the daily reports to inform the fishing industry of the meaning of these rules and regulations as soon as possible. The industry has indicated that it appreciates this added service.

The weekly summaries have been expanded, particularly in the Boston report, in order to make weighted average prices immediately available. Wholesale fish prices of this type are supplied the Bureau of Labor Statistics weekly for inclusion in its index which covers 900 price series.

Monthly and annual summaries have increased their coverage in both text and tabular material. Each annual now includes a monthly index of production and tables defining market classifications for fish and shellfish. The Chicago and New Orleans monthly summaries have added a series of weekly price ranges.

"Fishery Market News," the monthly review issued in Washington, has added a number of pages for timely articles on matters affecting the fisheries, particularly Federal regulations. Complete or abbreviated versions of the latter are included as issued to provide a convenient form of reference. A better picture of the fisheries from month to month also has been developed by including additional sectional production and price data both in text and graphic form.

*Consumer relations.*—Consumers, deprived of the usual abundance and variety of customary foods, needed guidance in maintaining an adequate diet from the foods that were available. In response to this need, the task of informing the public how to derive the maximum food values from the Nation's aquatic resources was undertaken by the Service. Information based on technological investigations in Service laboratories was distributed to consumers through every available educational medium.

*Fishery exploratory investigations.*—The war has greatly stimulated the establishment of fishery industries in the American Republics and other areas of the Western Hemisphere. While the Caribbean area normally consumes 315,000,000 pounds of fish yearly, it produces only about 160,000,000 pounds. Imports, chiefly salt fish, make up the difference but have been drastically curtailed by reduced transportation facilities.

To determine whether this shortage could be made up by expansion of local fisheries, the Office of the Coordinator of Inter-American Affairs provided funds to the Service for a factual survey. Nearly all



Republics, Colonies, and Possessions in the Caribbean Area were visited by this mission between April and November 1942. Reports and recommendations for each political unit and for the area as a whole have been completed, and have formed the basis of action toward developing or expanding fisheries in this area.

Venezuela, Panama Bay, and Cuba offer the greatest opportunities for expansion of production, but nearly all other parts of the area also can produce more fish. As one result of the work of the Mission, the British colonial governments have procured fishing equipment to maintain normal production and will undertake an intensive cooperative survey of fishing and processing methods. Fish salting projects have been initiated in Cuba and Haiti; and Venezuela has requested assistance in the development of its salt fish industry.

The Service cooperated with the Board of Economic Warfare in surveying fishing possibilities in the Southwest Pacific as part of a general investigation to promote local production of foodstuffs for consumption by our armed forces in that area as well as by civilian populations. It was found that small-scale fisheries could be established at many points. The board has furnished fishing gear and trained personnel to exploit these fisheries.

The Service also cooperated with the Anglo-American Caribbean Commission in the expansion of fisheries in the Bahama Islands. As a result of Service recommendations, tuna were commercially caught and canned in this area. Service representatives advised the local industry regarding methods of preserving fishery products and means for obtaining greater utilization of the fishery resources.

#### RABBIT AND FURRED-GAME MEAT

World War II has brought about a shortage of many customary foods, and radical changes in eating habits have resulted. Foods that many of us never before considered eating are now being favored. The domestic rabbit is one of the new sources that is helping to solve the meat problem in many homes.

The Federal Government has been recommending domestic rabbit raising for 20 years and during the last 2 years has been cooperating in the food-for-freedom program to put rabbit meat on the dining table. In 1923 about 2,000,000 pounds of domestic rabbit meat were produced annually for food alone; in 1942, the amount was 9,000,000 pounds. Future production is expected to be as much as 12,000,000 pounds. As a result of the Service's campaign to stimulate the production of rabbit meat, new backyard rabbitries are appearing in every community. City and suburban dwellers are learning that for the time, labor, and expense involved, rabbits pay a handsome dividend

in good food. Key men have been selected in each State to cooperate with State colleges and universities, State and county food production units, and with the American Rabbit and Cavy Breeders Association and its affiliated clubs to increase the production and use of domestic rabbit meat.

Since September 1942, the Service has published and distributed 95,000 copies of Conservation Bulletin 25, "Rabbit Raising," to inquirers in every State in the Union and 20 foreign countries. The Extension Service personnel of about 10 percent of all the counties in the United States has requested quantities of these bulletins. The demand for information about rabbits has been so great that 15 States have reproduced for local distribution discussions of the subject which this Service has published.

Encouragement is being given also to a greater utilization of muskrat, raccoon, and opossum meat for human consumption. The estimated production of muskrat meat in 1942 was 1,000,000 pounds, raccoon 400,000 pounds, and opossum 200,000 pounds. It is possible to encourage greater use of these meats by promotional and educational work through the field force of this Service.

#### PROPAGATION OF FOOD AND GAME FISHES

A shift of emphasis in the propagation of food and game fishes has taken place and is continuing. Loss of manpower, shortages and increased costs of fish food, higher wages, and not least of all the need for increased food production, have influenced this trend.

Altogether 14 fish-cultural stations have been closed and 2 more will curtail operations or close July 1, 1943. These include stations whose production was relatively low and those producing trout for stocking recreational areas. Further reduction has been made by the suspension of cooperative nurseries which propagated trout for stocking Federal forest areas until the fishing load warrants additional plantings. The general policy is to reduce the stocking of game fish in less accessible bodies of water and to concentrate personnel and funds on the production of food fishes.

During 1942 the farm-pond program, advocated and assisted by the Service, has gained impetus. Ponds are fertilized, stocked with balanced populations of fish, and then managed according to recognized practices. They may come into production on a sustained basis within one year and require no restocking. Thus effort in succeeding years may be applied to bringing new areas into production.

There was an increase of 356 percent in fingerlings allotted to ponds constructed under the supervision of the Soil Conservation Service, and of 351 percent to other farm ponds. These will yield

an estimated increase during 1943 of 205 and 235 percent, respectively, in the weight of fish produced. The total production this year of farm ponds stocked in the last 2-year period is estimated at 1,415,805 pounds of fish.

Cooperative distribution programs have been set up between various State and Federal hatcheries for stocking farm ponds and other waters. This has been accomplished by the new regional superintendents of fish distribution. Both Federal and State commitments are filled from the hatchery nearest to the applicant. By preventing a duplication of stocking and distribution, there is better utilization of fingerling fish, a saving of tires and gasoline, and more efficient use of State and Federal fish-cultural facilities, including the time of the personnel.

Salmon salvage operations were increased on the Columbia and begun on the Sacramento Rivers. With the closure of the barrier created by the Shasta Dam, salmon runs were completely cut off in the Sacramento during the fall of 1942. This jeopardizes a commercial catch of between 750,000 and 1,500,000 pounds of salmon. The first spawning and salvage operations will begin during the 1943 spawning run.

In total production there was an increase from 5.86 billion fishes and eggs in 1941 to 7.82 billions in 1942. Among the game fishes these was a reduction in the take of trout eggs and a decrease in trout production. The largest increase in the egg take resulted from the salvage of cod, haddock, and pollock. Commercial species showing an increase included buffalo, whitefish, lake herring, cod, flounder, pollock, and lobster. Black bass, which are used to stock farm fish ponds, were produced in greater number.

Hatchery activities have been intensified for the production of warm-water fishes for farm ponds and the salvage and propagation of salmon to replace spawning runs on the Pacific coast. This will result in larger production of these species. Stocking of trout is concentrated in the areas still most heavily fished and has been temporarily abandoned in less accessible areas.

#### FEDERAL AID IN WILDLIFE RESTORATION

During the year Federal aid in wildlife restoration was reduced in scope due to conditions imposed by the war. Notwithstanding lessening of activities, however, the program functioned very effectively.

Investigations to determine wildlife populations and their trends as well as the carrying capacities of the ranges were emphasized by the cooperating states. The information sought is essential to sound management of this natural resource. Maintenance of full popula-



tions of wildlife is important as the basis for hunting which provides outdoor recreation for millions of citizens. Without management guided by adequate research, hunting pressure cannot be varied to control depredations, to check range deterioration where overpopulations exist, and to protect wildlife where it should be increased. The bagging of game, which yielded a quarter of a billion pounds of wild meat by the hunters of the Nation during the past hunting season, proves the value of wildlife in providing a supplementary source of food.

Immediately following World War I, there was an upsurge in the sale of hunting licenses, the number sold greatly exceeding the totals for pre-war years. In anticipation of a like situation developing after the present struggle, it is very important that the States maintain wildlife populations on a high plane of productiveness. By the investigative measures conducted through the medium of the Federal-aid program, and the translation of findings into appropriate regulation of hunting seasons and bag limits, wildlife populations can be maintained in a State that will permit use and enjoyment by millions of hunters.

While stress was placed on wildlife management investigations during the year, the States also continued land acquisition and development. Due to material and equipment shortages caused by the war, major construction work could not be undertaken. The States, however, have been able to continue with developmental measures such as cooperating with farmers in soil conservation districts in the planting of perennial legumes in field borders and waste places as an aid to soil conservation and to provide wildlife food and cover. They have also been able to continue the trapping and transplanting of game birds and mammals and furbearers from places where surpluses exist to suitable but vacant areas. Land acquisition efforts have been directed toward the purchase of areas of no particular value for agricultural uses which may advantageously be developed for wildlife during the post-war readjustment period.

The sum of \$1,250,000 was appropriated to carry out the purposes of the Federal Aid in Wildlife Restoration Act this year, as compared with \$2,750,000 for the fiscal year 1942. As of December 31, 1942, the special Federal aid to wildlife restoration fund in the Treasury contained \$9,329,849. Preliminary information on collections of the Federal excise tax on sporting arms and ammunition indicates that the yield for this fiscal year will be approximately \$1,100,000. This will be a great reduction below the \$5,072,588 collected and covered into the special fund during the fiscal year 1942, but it should be remembered that production of the articles upon which the tax is paid was sus-

pended until quite recently, when authorization was granted and scarce materials were made available to meet ammunition requirements for the 1943 hunting season.

Through appropriate legislation, Georgia became eligible for benefits under the cooperative wildlife restoration program during the year, leaving Nevada as the only State not participating. Outside of the United States, restoration projects are in progress in Alaska, Puerto Rico, and the Virgin Islands, extension to them of the benefits of the Federal Aid in Wildlife Restoration Act having been authorized within the fiscal year 1942 by an amendment to the basic law.

## WARTIME UTILIZATION OF FURS AND HIDES

### FURS AND FUR FIBERS

Because of their warmth-retaining qualities, animal fibers are indispensable to the armed forces and civilians in cold climates. In the present crisis it is necessary to make full use of animal fibers and to allocate each type to the purpose for which it is best adapted. Our objective has been to determine the value of fur as a substitute for other fibers and to develop effective uses for fur byproducts that have hitherto been wasted. Cooperative research with the Bureaus of Animal Industry and Human Nutrition and Home Economics has contributed valuable information to the Office of Quartermaster General. Four confidential reports of the results of this work were prepared and forwarded to that office. Commercial furs were compared with piled fabrics and other materials to determine resistance to abrasion, tearing strength, air permeability, compressibility, compressional resilience, and other qualities. Microscopic analysis of the fibers is necessary to determine the characteristics which contribute to these physical qualities.

Research in the utilization of industrial waste hairs has demonstrated their suitability for making soft brushes and for felts of various kinds. Long-haired furs were studied for their ability to shed ice crystal accumulations, caribou hair for its buoyancy, and Angora rabbit fibers for warmth-retaining qualities. "The report on air permeability of furs and fabrics," says the Quartermaster General, "is proving particularly valuable at this time, inasmuch as it gives us a base on which to isolate the comparative factors of thermal insulation and air permeability in determining the over-all warmth of furs, various types of fabrics, pile fabrics, and windproofs. It is expected that the reports which you have rendered will make a substantial contribution to the development of sound equipment for cold weather."

## BIG-GAME HIDES

Because of increased leather requirements and the drastic curtailment of importations, it is of immediate importance that full use be made of the domestic supply of deer and elk hides. A general preference order, reserving deer skin leather for military uses, was issued by the War Production Board.

During the 1942-43 big game season, 615,000 deer and 34,000 elks were taken by licensed hunters in the United States, and approximately 162,000 hides from this source were channeled into industry. Although this number represents only about a fourth of the animals taken during the 1942-43 season, the cooperators feel that assembling that many was very creditable, considering that the demand for this raw material was not known until the first of November. This was a cooperative undertaking to obtain additional leather for the Army. The Quartermaster Corps, the War Production Board, the Federal Departments of Agriculture and Interior, State game and conservation departments, sportsmen's organizations, individual hunters, hide dealers, and leather manufacturers are working together to salvage all the available deer and elk hides—a program that will be continued during the 1943-44 hunting season.

## CONSERVATION OF FOOD AND WILDLIFE RESOURCES

The variety of ways in which the Fish and Wildlife Service aids directly or indirectly in production of the Nation's food and wildlife is evident. But production is not enough; what we grow we must protect so that it will be available for use or to assure future supplies. To that end the Service devotes its basic scientific investigations of fisheries and wildlife, and its activities in predator and rodent control, law enforcement, and maintenance and development of wildlife refuges.

### CONTROL OF PREDATORY ANIMALS AND INJURIOUS RODENTS

Cooperative predator and rodent control contributed substantially to the war food program of the Nation. The taking of 115,287 predatory animals resulted in the saving of thousands of sheep, calves, and poultry; the treatment of 14,537,033 acres of rodent-infested lands prevented the loss of tons of agricultural crops and range forage; and the control of the common house rat saved large quantities of stored food and feed.

Of the 115,287 predatory animals taken in cooperative projects, 103,981 were coyotes, 1,014 wolves, 9,527 bobcats and lynx, 147 mountain lions, and 618 stock-killing bears. In cooperative field rodent



control work, 2,514,500 acres of infested lands were treated under direct supervision of the Service's field personnel and cooperators and 12,022,533 acres were treated under general instructions.

Total expenditures for both predator and rodent control consisted of \$770,209 from departmental funds, \$540,275 from cooperating states, \$1,344,394 from cooperating counties, livestock and agricultural associations and others, and \$21,400 from emergency funds.

Eight hundred and thirteen thousand, three hundred and sixty-one pounds of rodent bait materials were distributed to cooperators from the Service's Supply Depot at Pocatello, Idaho, in addition to manufactured supplies and equipment used by the Service and cooperators in predatory animal control.

Control operations played an important role in protecting livestock, thus increasing the production of food, wool, and mohair. The control of burrowing field rodents saved vital irrigation structures from damage. The destruction of warehoused fabrics and other strategic materials and the loss and contamination of a variety of stored foods was greatly reduced as a result of a Nation-wide effort to control rats. The Service intensified its rat control activities in the South-eastern and Gulf States in cooperation with local health departments to assist in curtailing a rising incidence of murine typhus, and the work was attended by noteworthy success.

Control of rodents and predators to air maximum production of farm crops and livestock was authorized on only seven Indian reservations this year, and even there the work was hampered by limited funds. The need for control was in each case substantiated by scientific investigation. Need for coyote control also has been found at San Carlos and Fort Apache, but a more complete study has been requested. This is now under way.

Several factors have operated to increase the seriousness of the predator and rodent control problem. There has been a marked decrease in the activity of private trappers, who normally hunt and trap predatory animals for their pelt values. These men have either been inducted into the military service, or have found more remunerative employment. The lack of this supplement to organized predator control has increased the burden on the predatory animal hunters of the Service and its cooperators. Our men, unassisted, could not conduct proper control work on all affected areas. Insufficient manpower is also making it impossible adequately to control crop-destroying field rodents. The influx of workers into industrial centers and the shortage of disposal facilities for trash and garbage in these areas has added greatly to the rat control problem, as has the storage of food and feed-stuffs in improvised nonrodent-proof buildings.

Reports of severe depredations by predators and rodents continue to be received in volume, and considered in the aggregate, they present a serious picture of destruction of resources that are urgently needed in prosecuting the war. Of great interest and importance, therefore, are the operations of the Fish and Wildlife Service in reducing losses. The following instances illustrate the benefits derived from timely and scientifically applied control measures.

A Service hunter captured the coyotes that had taken an average of 18 chickens a day for some time on one farm and had destroyed 50 percent of the turkeys on a neighboring place in Martin County, Tex. Poultry and egg sales in Stonewall County, Tex., now amount to \$20,000 monthly but this was made possible in large part through the taking of 1,419 coyotes and 262 bobcats from the county since 1937. Predator depredations previously had been so severe that poultry could not be profitably raised. Previous to 1942, because of severe coyote depredations, it was impossible to produce turkeys at a profit in the vicinity of Groveland, Tuolumne County, Calif., but intensive control work permitted the raising of 5,000 in 1942; and it is anticipated that 35,000 turkeys will be produced in this area for the 1943 market. Numerous instances of the benefits of control work have been reported.

#### CONTROL OF INJURIOUS BIRDS

Available laboratory and field facilities were concentrated on solving or alleviating pressing problems in the control of bird depredations on agricultural crops. Severe waterfowl damage was investigated in Colorado and Idaho, and in Colorado the appraisal was made of the extent of loss. Where economically justified, measures for control of the offending birds were quickly put into effect with good results. Bird depredations upon the rice crop in California and Louisiana received special consideration. Procedures for minimizing damage were outlined and new devices for deterring the birds were developed and prepared for testing. The bird control problems of the growing army of victory gardeners also were given attention.

#### BIOLOGICAL INVESTIGATION OF THE FISHERIES

The nature of the fishery biological investigations conducted by the Service during the past year has been controlled by two diverse and equally urgent demands born of war conditions. Our biological investigators, because of their long association with fishermen and the fishing industry, have been peculiarly fitted to give advice and direct assistance in the all-important problem of maintaining and increasing the yield of food and essential byproducts of aquatic origin. Their

time and abilities have been extensively utilized in this wartime service. In addition, there remains the necessity of continuing the month-by-month observations of the condition of the fishery stocks and of the factors—economic and natural—which determine the future yield of the fisheries.

This twofold demand has been met as follows. To assist in staffing the Office of the Coordinator of Fisheries with competent workers, eight key biologists were detailed as area coordinators to serve in the regions in which they have been conducting fishery investigations for a period of years. Their assistants have also been called upon to aid in this work to varying extents in addition to carrying on research. Purely theoretical work on the fisheries has been abandoned, and basic research has been confined to providing information essential to maintaining production of the major fisheries. Because the war has brought violent and far-reaching changes in the fishing industry, it is more necessary than ever before to record the increase or decrease of fishing intensity and the changes in the abundance of fish stocks so that our use of the resource may be prudent and may not endanger future supplies.

*North Atlantic Area.*—The New England section, center of the fresh-fish industry of the country, has felt the effect of war-created hindrances to production perhaps more directly than any other area. Although figures cannot be given for security reasons, a large number of the most productive fishing vessels were requisitioned by the military services for direct war use. Since the annual production of a single large trawler is approximately 5 million pounds, this reduction of the fishing fleet has produced an inevitable effect on the quantity of fish landed. During the calendar year 1942 landings at the principal New England ports—Boston, Gloucester, and Portland—declined by 100,000,000 pounds, from 473,000,000 pounds in 1941 to 373,000,000 in 1942.

This decline has been partially offset by an increase in the production of the small boat fleets at New Bedford, Mass., and Rockland, Maine. At New Bedford, a large and important fishery for yellowtail flounders has grown up within the past 2 or 3 years, the catch increasing from about 3,500,000 pounds in 1938 to some 37,000,000 in 1942. Because the fishing grounds for yellowtails lie relatively close inshore, small boats of various types can be used in this fishery, with the result that the New Bedford fleet, in contrast to almost all others in New England, has actually increased in size since the beginning of the war. The growing importance of Rockland, Maine, as a fishery port is due largely to the booming rosefish industry, in which many small and medium sized boats, which can land at the smaller ports, are engaged.



Observations on these two rapidly growing fisheries have given rise to some concern. There are indications that the rosefish grows very slowly, which would make it particularly susceptible to overfishing. The full effects of the recent tremendous expansion of the fishery cannot yet be measured. The yellowtail stock is showing some signs of reduced abundance, with a high percentage of the available fish being removed each year.

The haddock population, on the other hand, is more abundant than at any time in the past ten years because of the reduction in the number of large trawlers. The larger spawning population which will result should insure good catches in the next several years.

To compensate for the decline in production caused by reductions in gear and manpower, the North Atlantic staff has encouraged the use of various edible species formerly discarded for lack of a market. These have resulted in increased landings of the angler-fish, raja-fish, and red hake. A wholly new industry for the canning of sea mussels was developed largely as a result of the Service's encouragement and information on available supplies. During the 1942-43 season a pack of 40,000 cases, representing more than a million pounds of food, was made. Alewives, which this year supported an important canning industry, were stocked in many suitable streams from which they had been eliminated by dams or overfishing. The program of creating runs of Atlantic salmon in streams now devoid of them also is meeting with success, judging by the large seaward migration of salmon smolts in the Pemaquid River.

*Middle Atlantic Area.*—Crab production, always an important industry in the Middle Atlantic and Chesapeake Bay States, assumed new significance when the war cut off the annual imports of 10 million pounds of canned crab meat from Japan. Besides furnishing general guidance to the States in maintaining a high level of crab production, the Service has conducted specific studies in an area set aside by the State of Virginia as a seasonal sanctuary for spawning crabs. The early results have been encouraging, indicating an increase in the number of spawning crabs and providing evidence that the sanctuary principle in crab conservation is both biologically and administratively sound. The crab population in the Chesapeake, as well as commercial production, has increased appreciably since the refuge was established.

A marked increase in the yield of striped bass on the Atlantic coast, especially from Chesapeake Bay to New England, occurred during the 1942 season. This was mainly the result of unusually successful spawning in Chesapeake Bay during 1940 and was similar to the period of abundance which began in 1936 as a result of a good spawn-

ing season in the same region in 1934. In accordance with a recommendation of the Service, in which the Atlantic States Marine Fisheries Commission concurred, several additional Atlantic Coast States have adopted legal size limit of 16 inches for striped bass. Compared with smaller limits, the 16-inch size insures a larger return from the resource by providing for a greater aggregate production over a longer period from each brood of fish.

Recommendations for the management of the Atlantic coast shad fishery were submitted to the State conservation departments and the Atlantic States Marine Fisheries Commission. In the Hudson River, where restoration of the shad runs has been singularly successful, the catch was increased within biological sound limits to meet the wartime need for additional food. The Hudson yielded more than 4,000,000 pounds of shad during the 1943 fishing season, compared with yields of about 3,500,000 pounds immediately before the war. In the Chesapeake Bay, where depletion of the shad fisheries has been relatively severe, the fishing rate was somewhat reduced as a result of the manpower shortage and kindred difficulties. This reduced intensity of fishing will allow more shad to spawn and should assist in restoring the population.

*South Atlantic and Gulf Areas.*—Major efforts were directed toward maintaining or increasing production by encouraging the marketing of previously little used species, by having certain areas opened to commercial fishing, and by assisting the industry with priority, food rationing, manpower and other wartime problems. Such duties, connected with the Office of Fishery Coordination, became practically a full-time responsibility early in March, hence biological research was of necessity curtailed and only those programs that could not be dropped without serious consequences received attention.

*Pacific Area.*—Biological investigations of salmon and herring in Alaska were directed toward meeting wartime demands for additional millions of pounds of fishery products from this region.

Study of the Alaska herring populations was continued and from the information obtained it was possible to predict the size and abundance of herring that will be available in the coming year and to allot quotas to permit the maximum catch without causing depletion.

Biological studies of pink salmon were continued at the Little Port Walter field station in southeastern Alaska where a two-way salmon counting weir is operated. The first completed runs from this point showed that only 2.7 percent of the pink salmon survived the period spent at sea. This knowledge was used in predicting the size of the commercial catch for 1943 and the prediction was made available to

the industry so that operations could be planned to make as large a catch as possible without endangering the stock.

In the Bristol Bay area adequate numbers of spawning red salmon were observed in many of the streams. A migration of 360,000 adult red salmon was counted through the weir at Brook's Lake, the largest run since the installation of the weir. The marking experiments on young salmon in the Naknek River system indicated the possibility of a good run of red salmon in 1945.

While handicapped by a greatly reduced fishing fleet, fewer fishermen, and fewer workers in shore plants, the pilchard industry is faced with larger demands for canned sardines, oil, and meal than ever before. In spite of production difficulties the total Pacific coast catch during the 1942-43 season was 550,000 tons—within 6 percent of the average for the preceding 5 years. The bulk of the fish were larger than in several past seasons, owing to unusual availability of pilchards 3½ and 4½ years old.

Because of the need of maintaining the yield of pilchards at as high a level as possible without endangering the future supply, the emphasis in pilchard research is directed toward devising means of measuring the resource and determining the effect of the fishery upon it.

As a consequence of wartime demands for vitamin A, intensive fisheries for certain species of sharks were carried on along the Pacific coast of the United States and Mexico. The Fish and Wildlife Service has acted as a clearing house between the several State conservation agencies on the Pacific coast in encouraging and effecting interstate collaboration in shark research.

*Great Lakes area.*—Production of food fishes in the Great Lakes area received a severe setback through failure of the 1943 spring fishery for smelt. Despite elaborate preparations of the Service and cooperating State and Federal agencies for the fullest exploitation of the run, this fishery, which had been expected to yield 10 million pounds, produced no more than a quarter of a million. The scarcity of smelt has been attributed to severe mortality, the cause of which is unknown.

Improved market conditions have resulted in increased yields and better utilization of carp, suckers, and other low-priced fishes.

In the Great Lakes area the manpower shortage handicapped production much more severely than did scarcity of equipment. The shortage was particularly severe in the heavily industrialized areas where the transfer of numbers of professional fishermen to war factories aggravated the condition created by the induction of large numbers into the armed forces.



The International Board of Inquiry, established in 1940 by the Governments of the United States and Canada to study methods of preserving and developing the Great Lakes fishing industry, submitted a report on its findings to the Department of State. Most significant of the Board's recommendations were those calling for unified control and continuous scientific observation of the fisheries.

*Shellfish investigations.*—Oyster production in the United States has declined by 50 percent from the level maintained in the 1890's. Although the Pacific coast oyster industry has made substantial growth during this period, the decline on the Atlantic coast has been so marked that the general downward trend has not been checked. Its principal cause is the system of free fishing which prevails in most of the Atlantic Coast States and which prevents full utilization of our oyster grounds.

Although the quantity and quality of oysters produced in any area can be greatly increased by cultivation, only about 13 percent of the oyster bottoms in our coastal waters are developed by scientific methods of oyster farming. Because of the objection on the part of many southern states to leasing public oyster bottoms to individuals for cultivation, the Service has developed and is advocating a system of state management of public grounds, under which oyster fishermen would cultivate and harvest the oysters under the supervision of the state. It is estimated that such a plan, put into operation on even half the public grounds, would double the yield from these beds.

In areas in which private cultivation of oysters is practiced, the Service continued its assistance by issuing frequent bulletins on the progress of oyster spawning and setting, so that growers might obtain a maximum crop of seed. Assistance was also given in protecting oyster beds against starfish, drills, and other enemies, and instances of oyster mortality due to industrial pollution were investigated.

The State of Maryland has undertaken a system of management of the oyster resources of the Potomac River, based on the Service's recommendations following a survey of this river.

At the request of the State of Texas, a survey was made of present conditions on the principal oyster grounds and numerous administrative and legislative changes were suggested to permit more efficient utilization of this resource through cultivation or oyster farming.

Comprehensive studies conducted jointly by the Service and the Washington Department of Fisheries helped to increase production of the oyster introduced from Japan in 1902. The industry has depended upon annual importations of seed from Japan, hence its existence was threatened by the outbreak of war. Methods of propagation

have now been developed by local oyster growers, giving promise of the continuance of the industry.

As part of the program to stimulate the production of oysters through cultivation, a cooperative experimental and demonstration oyster farm was established in North Carolina on North River, in the vicinity of the Fish and Wildlife Service station at Beaufort. The materials and equipment for the farm were supplied by the State of North Carolina, and supervision was furnished by the Service. Utilization of acreage in the vicinity of the demonstration farm, in addition to that which is being acquired by private concerns in other sections of the State, should yield in the next 2 years from 2 to 5 million pounds of oyster meat, create a profitable market for the large supply of seed oysters on the natural beds, and expedite establishment of an important commercial industry for future employment by fishermen.

*Management of angling resources.*—Sport fisheries in inland waters are known to attract more than 12,000,000 persons annually. In addition to providing recreation for large numbers of people they are a source of food especially important in wartime when, because of the scarcity of meats, it is difficult to provide a balanced diet. For various reasons there has been a progressive decline in the abundance of game and pan fishes and it is the purpose of Service investigations to develop methods of management which will assist in maintaining and improving the angling resources of our lakes and streams.

A 5-year study of experimental fish management in the Pisgah National Forest in North Carolina and other carefully controlled experiments in the Sierra Nevada Mountains in California show that it is possible to plant too many fish. Overstocking, it was found, increased the demand for food far beyond the available supply, with disastrous effects on both the planted and native trout populations. Large plantings of young fish in the fall were largely lost and did not materially affect the catch in later years. Legal-size fish planted in the spring in numbers adjusted to the available food supply and the size of the resident trout population, on the other hand, resulted in an increase of about 300 percent in the number of fishes caught.

The farm fish pond assumes especial importance in wartime when home production of food is more necessary than ever and the scarcity of other meats emphasizes the value of fish in the diet. Furthermore, land which is of little value for other purposes may frequently be utilized for ponds and brought into a high state of production. Appreciating these facts, the Service has devoted much time and effort to the development of better methods of pond management. The amount of edible fish produced in any body of water depends very

largely on the methods employed in operating the pond and experiments are now in progress to show the way to better management. The largemouth black bass and the bluegill sunfish appear to be the species best suited to farm ponds but they must be present in the proper proportion for good results. Experiments at Leetown, W. Va., and Welaka, Fla., indicate that the best ratio of sunfish to bass is 8 or 10 to 1, instead of 15 to 1 as usually recommended.

One of the most important problems in pond culture is the control of objectionable vegetation which may make the pond unfishable and decrease its productivity. In the past, control of pond weeds usually involved the laborious and expensive method of removal by hand. Later it was found that vegetation could be controlled by applications of copper sulphate and sodium arsenite. This method has proved very effective in farm ponds. A further advance is the discovery that the coarser aquatic plants can be controlled indirectly by the use of certain inorganic fertilizers. These fertilizers promote the growth of filamentous and "water bloom" algae which smother the pond weeds and prevent their growth.

*Fish protection and engineering developments.*—For the past 20 years the supply of salmon in the Columbia River has steadily declined, presumably as a result of the combined influence of overexploitation and the interference of dams and diversions of water. Statistical studies of the commercial catch records have been made to determine the present status and trend of the resource. A survey of the spawning and rearing areas of the Columbia River watershed neared completion during the year. It included: spawning potentialities, the needs for fish protection at dams and diversions, and the present status of the salmon population. Upon the basis of the findings, programs of fish protection and rehabilitation are prepared. Much attention has been given to salvaging the runs of salmon that formerly spawned above Grand Coulee Dam by transplanting them to tributaries below that point. The success of this program depends upon the return of the fish at maturity to the tributaries into which they or their parents were transplanted. Accordingly, marking experiments have been conducted to determine the accuracy of homing. Other marking studies have been designed to ascertain the relative merits of various hatchery procedures, particularly the length of the rearing period. The large-scale operation of hatcheries in the salvage program has introduced unprecedented problems of nutrition and disease control which have been the subject of extensive investigation. Many of the findings have already been applied.



Preservation of the salmon resources of the Sacramento River, threatened by the construction of Shasta Dam, continued to receive the Service's attention in cooperation with the Bureau of Reclamation. A comprehensive report has been prepared on the work of the last 3 years. The situation on the Sacramento reached a critical stage in November 1942, when the Shasta Dam became an impassable barrier to salmon migrating upstream. Because of the height of the dam, it is not feasible to provide fish ladders as was done at Bonneville and a salvage plan has been developed. This involves the transfer of most of the early run fish to Deer Creek, a tributary of the Sacramento River, where they will be allowed to spawn naturally. The remainder of the spring-run fish and the early part of the fall run will be held in the ponds in Battle Creek and spawned artificially. The greater part of the salmon ascending the Sacramento in the fall will be held between racks constructed in the river over gravel beds suitable for spawning. Observations during the spawning season of 1942 showed that many salmon spawned successfully on these beds.

*Pollution studies.*—Among establishments vital to the war, munitions factories, plants manufacturing cellulose derivatives, distilleries producing industrial alcohol from grains, petroleum refineries, and even shipyards are discharging voluminous effluents that create new pollution problems in many localities.

With the continued cooperation of the War Department, investigations of conditions produced by these effluents and laboratory studies of the toxicity of the wastes and means of denaturing them have been the major tasks of the Water Quality Laboratories of this Service during the past year. Where feasible, recommendations for control have been made to the proper authorities. Investigations of various new effluents are now in progress and reports on acetylene wastes, metal scourings, and several munitions effluents have been completed.

In addition to studying wartime pollution, units of this Service have cooperated extensively with the State of Mississippi in a pollution-abatement program, and with the Republic of Colombia on special problems. A new and very accurate method of bio-assay of effluent toxins has been devised and measurements made of the peculiar and detrimental oxygen demand of oil films.

#### WILDLIFE CONSERVATION LAWS AND REGULATIONS

Wildlife-conservation statutes administered by the Service include the: (1) Lacey Act, (2) Migratory Bird Treaty Act, (3) Migratory Bird Conservation Act, (4) Migratory Bird Hunting Stamp Act, (5) Black Bass Law, (6) law protecting wildlife and property on Federal

refuges (sec. 84, Criminal Code), (7) Bald Eagle Act, and (8) through the Alaska Game Commission, the Alaska Game Law of 1925, as amended.

Major amendments to the Migratory Bird Treaty Act regulations in 1942 lengthened the season on waterfowl from 60 days in 1941 to 70 days, permitted hunting each day from sunrise to sunset, and provided for possession of legally killed birds for 30 days after the close of the season.

The 69 salaried Federal game law enforcement officers, working alone or in cooperation with state conservation agents and United States deputy game wardens, obtained convictions of 2,567 violators of wildlife protection statutes, resulting in fines totaling \$75,215.26 and jail sentences of 2,826 days (table 2).

TABLE 1.—Cases of violation of the Migratory Bird Treaty Act disposed of during the year and cases still pending on June 30, 1943

Disposition	Number	Pending	Number
Conviction.....	383	From preceding year.....	169
Dismissal.....	65	New cases.....	419
Nol-pros.....	15		
Found not guilty, jury trial.....	41	Total.....	588
Closed without prosecution.....	15		
No bill rendered.....	3	Disposed of.....	524
Closed by death.....	2	Pending at end of year.....	64
Total.....	524		

TABLE 2.—Summary of penalties imposed during the year for violations of wildlife conservation laws

Act	Convictions	Fines and costs	Jail sentences
	Number	Dollars	Days
Migratory Bird Treaty Act.....	383	12,200.85	<sup>1</sup> 615
Migratory Bird Conservation Act.....	32	1,070.00	<sup>2</sup> 180
Migratory Bird Hunting Stamp Act.....	44	930.00	
Wildlife Refuge Trespass Act.....	9	436.70	<sup>3</sup> 1,095
Upper Mississippi River Wildlife and Fish Refuge Act.....	2	10.00	<sup>4</sup> 60
Lacey Act.....	2	25.00	<sup>5</sup> 365
State prosecutions resulting from Lacey Act investigations.....	73	3,321.05	<sup>4</sup> 175
State laws, cooperative prosecutions.....	2,021	57,206.66	336
Black Bass Act.....	1	15.00	
Total.....	2,567	75,215.26	2,826

<sup>1</sup> Also, 300 days suspended in 4 cases and probation for 3½ years in 21 cases.

<sup>2</sup> Also, 2,730 days suspended in 8 cases.

<sup>3</sup> Probation.

<sup>4</sup> Suspended.

<sup>5</sup> Also, 1,126 days suspended in 25 cases.

Reduced travel by civilians has resulted in a corresponding reduction in the number of permits issued for the importation of live wild birds and animals. However, service men returning from overseas

are bringing home many birds and animals as pets. Importation permits issued during the fiscal year were 751 as compared with 1,371 for the preceding year. Birds imported last year numbered 56,211. This year only 27,731 were entered of which 15,000 were quail from Mexico for restocking purposes. A request for a permit to import chaffinches (a prohibited species) was denied. The total number of animals imported was 5,880, of which 3,675 were Rhesus monkeys to be used in scientific experimentation, and 32 were black bears.

Scientific collecting permits were reduced in numbers from 1,779 to 1,510. Only 97 new permits of this kind were issued. There was a corresponding reduction in the number of outstanding scientific possession permits from 604 to 563. New scientific possession permits were issued during the year to 22 persons. Permits issued to take birds and mammals in Alaska for scientific purposes numbered 20. There was practically no change in the number of bird-banding permits, which on June 30 numbered 2,390.

Permittees reported raising in captivity 2,668 wild geese, and 49,943 wild ducks, of which 46,827 were mallards. Other species raised included black ducks, wood ducks, pintails, green-winged teals, and red-heads. The Nation's meat supply was increased by the sale of 19,391 of these ducks and 379 geese for food. Migratory waterfowl sold for propagating purposes included 4,741 ducks and 867 geese. In addition, 6,481 ducks and 178 geese from game farms were liberated.

Permits issued to protect crops from depredations by birds numbered 688, but only a few of these authorized the actual killing of the birds, and then, only after frightening devices were found to be ineffective. To abate crop damage in Colorado, an order was issued to permit the taking of mallards only from December 24, 1942, to January 31, 1943 on agricultural fields in a few areas within the State.

One whaling shore station and three catcher or killer boats were licensed to take and process whales on the California coast, for which \$1,250 in fees were collected and deposited in the United States Treasury.

#### ENFORCEMENT OF THE ALASKAN GAME LAW

The Alaska Game Commission employs 23 persons, who, with the executive officers, operate 5 planes, 3 sea-going vessels, 17 motor vehicles, and numerous inboard and outboard motor crafts in the enforcement of the game law throughout the Territory.

Cooperative patrols were made with the Royal Mounted Police of Canada to prevent smuggling of high-grade furs. Valuable service



was given to the Army, Navy, and law enforcement agencies in the furnishing of expert knowledge regarding the Territory, its people, climate, and terrain.

Wildlife protection problems in the Territory increased in proportion to the great influx of men in the armed forces and workers on the Alaska Highway. However, these problems were soon largely solved by intensive patrols, arrests, speedy convictions, and cooperation of the military authorities and superintendents of road camps.

During the year 133 persons were convicted for violation of the game laws. Their fines and sentences totaled \$3,765 and 810 days in jail. In addition, they forfeited furs, boats, guns, and traps having a value in excess of \$12,000. Fifty percent of the receipts of the Alaska Game Commission are covered into the Territorial school fund, and the remainder is deposited in the Treasury of the United States.

The Game Commission began its annual meeting in Juneau on January 22. Policies were formulated, regulations were discussed, and the official stations of some of the wildlife agents were changed in response to shifts in populations. Following the meeting, the executive officer conferred with Service officials in Chicago and Washington, D. C., regarding the conservation and development of the Territorial wildlife resources.

#### ADMINISTRATION OF ALASKA FISHERY LAWS AND REGULATIONS

The Fish and Wildlife Service, which is charged with the responsibility for regulating the time, place, and method of commercial fishing in Alaska under the authority vested in the Department by the act of June 6, 1924, continued its established program for the management and conservation of the fisheries to assure a stabilized maximum yield. Vigilant control over these valuable resources is necessary to prevent unwise exploitation at any time; in a period of emergency which might well extend beyond the anticipated duration of the war into a post-war period, when food requirements will be great, the need for such control is doubly important. Careful observation of fishery runs and escapements in an effort to assure maximum utilization of the resources without endangering the future supply is of the greatest importance. As a result of this management program, seasonal opening and closing dates, weekly closed periods, and gear restrictions, were adjusted from time to time to permit additional catches of salmon and other fishes in such quantities as observations indicated were wise.

Because of travel conditions, no public hearings were held on the Pacific coast on proposed changes in fishery regulations, though such hearings are customary. In the circumstances the industry was invited to submit recommendations for changes in the regulations to the Director of the Fish and Wildlife Service for consideration in the preparation of the 1943 regulations.

In protecting the fishing grounds, eight patrol vessels and five small high-speed boats were used in 1942, effectively supplemented in several districts by Government-owned airplanes. Four of the patrol boats previously used in this work were taken over by the armed forces. The personnel identified with fishery protective work numbered 105, as compared with 190 in 1941. They included fishery management agents, stream guards, weir operators, vessel crews, and biologists. In addition, nine wildlife agents of the Alaska Game Commission, deputized to enforce the Alaska fishery laws and regulations, were active during the fishing season in patrol work.

Weirs for counting escapement of spawning salmon were operated in seven representative streams, and biological investigations concerning the salmon and herring were continued on a limited scale.

Although every effort was made by the Fish and Wildlife Service to insure the maximum possible utilization of fishery products consistent with conservation requirements, in order to meet heavy demands especially for canned salmon for military rations and for lend-lease requirements, the yield of these products did not reach the high level of 1941. The principal causes for the decreased production in 1942 were manpower shortages, transportation difficulties, loss of floating equipment by operators to military agencies, and to a great extent, actual military operations in parts of central and western Alaska which prevented full-scale fishing.

Plans have been tentatively formulated for post-war activities in connection with the management of Alaska fishery and fur-seal resources. Briefly, they will include more efficient patrol facilities; bases in Alaska for repair, maintenance, and storage of patrol vessels; investigations of fishery resources now not utilized; an extensive program for the improvement of existing spawning areas and their tributary waters; and expansion of the Government-owned byproducts industry on the Pribilof Islands to include a plant on St. George and an enlarged factory on St. Paul Island where fur seal carcasses and blubber may be reduced to valuable meal and oil.

The total output of Alaska fishery products in the calendar year 1942 was 306,013,424 pounds, valued at \$56,507,699, compared with 431,125,520 pounds, valued at \$63,477,295 in 1941. The estimated

value of the catch to the fishermen was about \$17,429,700, or more than 2 million dollars more than in the preceding year. The number of persons employed in the various branches of the fisheries was 23,216.

Salmon products represented about 83 percent of the weight, and about 90 percent of the value, of Alaska fishery products in 1942. Almost 93 percent of the salmon products consisted of canned salmon, the pack amounting to 5,075,866 cases, or 236,524,688 pounds, valued at \$48,298,913. Compared with the pack in the preceding year, the output of canned salmon in 1942 showed a decrease of about 27 percent in quantity and about 14 percent in value. One hundred canneries were operated, nine less than in 1941, and the number of persons employed decreased from 21,994 to 19,946.

In the herring industry, the number of operating plants was reduced from 13 in 1941 to 4 in 1942. This decrease was due to curtailed operations in southeastern and western Alaska and to consolidation of those in central Alaska. Production of salt herring and oil and meal was substantially reduced.

Halibut landed by the Alaska fleet, which comprises American vessels landing more than half of their catches at Alaska or British Columbia ports rather than in the United States, totaled 25,387,000 pounds, valued at \$3,555,000. In 1941, comparable figures were 15,984,120 pounds of halibut valued at \$1,552,658.

Several of the minor fisheries showed a considerable gain over the previous year due to increased demands, especially for trout, sablefish, sharks, and clams, but the catch of cod, flounders, rockfishes, "lingcod", and shrimps declined to a marked degree.

#### NATIONAL WILDLIFE REFUGES

Despite the war and its checking effect on the national wildlife refuge program through the loss of trained personnel and of funds such as formerly had been expended in furtherance of the program, the wildlife refuges have played an important part in the Nation's wartime economy. The complete shut-down of CCC camps, WPA projects and other work relief programs, and the restrictions on construction to save critical materials for war necessitated drastic changes in the job of developing lands for wildlife.

Personnel turn-over has been high, and approximately 20 percent of the trained men of the Division of Wildlife Refuges have gone into the armed forces or into defense industries. While the services of these keymen have been lost to us for the duration, the training program of the Division has enabled us to replace them with subordinates.



Fire protection of valuable timber and grazing resources, forest industries, and strategic facilities on refuge areas was placed high on the list of major objectives and a special allotment of funds under the Sixth Supplemental Defense Act of 1942 enabled us to keep fire losses in forest and grazing areas to a minimum in the zone in which its expenditure was authorized. However, the loss of CCC and WPA personnel in forest fire suppression activities was keenly felt.

Flood damage of serious proportions resulting from heavy precipitation occurred on refuge developments in the West and Middle West, and in some instances extensive, costly repairs are necessary in order to replace damaged structures, dikes, and other water-control facilities.

As a result of management studies, it has been found possible to permit increased utilization of range lands within waterfowl breeding areas without reducing production on the nesting grounds. As a matter of fact, the more abundant rainfall in the Northern Great Plains region has so increased the density of nesting cover that light fall and winter grazing of nesting habitat has been found desirable in maintaining the coverts in a condition most favorable to the waterfowl. These modifications are of particular significance during the present national emergency when there is an increased demand for meat production.

Protective maintenance measures have resulted in extending the life of such equipment as trucks, cars, tractors, and draglines; and the restricted use of automobiles and the release of thousands of tires by the Service have undoubtedly been a material aid in the rubber conservation program.

The following areas were established as national wildlife refuges during the year: Chassahowitzka, an area of 3,156 acres in Hernando County, Fla., designated for the protection of migratory waterfowl (Public Land Order, June 15, 1943); Slade, an area of 3,000 acres in Kidder County, N. Dak., acquired through the bequest of the late George T. Slade, noted wildlife conservationist; Chincoteague, 8,809 acres of some of the finest resting and wintering waterfowl lands in Accomac County, Va.; and Skagit, an area of 2,518 acres in Skagit County, Wash., for resting and feeding waterfowl.

The Hailstone National Wildlife Refuge, an easement area of 2,655 acres in Stillwater County, Mont., for breeding waterfowl, has been administered as a refuge for some time but was only recently covered by Executive order (E. O. December 31, 1942).

One public land order, June 18, 1943, revoked the Matanzas National Wildlife Refuge due to a decision by the General Land Office that no Federal lands were included.

TABLE 3.—*Classification and acreage of national wildlife refuges administered by the Fish and Wildlife Service, June 30, 1943*

Classification	Number	Acres
For migratory waterfowl.....	188	2,971,381
For other migratory birds and general wildlife.....	25	3,982,589
For colonial nongame birds.....	<sup>1</sup> 44	<sup>1</sup> 85,677
For big game.....	16	<sup>2</sup> 10,578,050
Patuxent Research Refuge, Md.....	1	2,623
Total.....	274	17,620,320

<sup>1</sup> Decrease under last year's tabulation due to dropping Siskiwit Refuge, Mich. (added to the Isle Royale National Park), Matanzas Refuge, Fla. (General Land Office decision), and to the more accurate calculation of project acreages.

<sup>2</sup> Decrease under last year's tabulation due to more accurate calculation of project acreages.

*Land Acquisition.*—Because of the war's effect on land acquisition, most noticeable through the demands for extensive areas by the War and Navy Departments with the consequent need for land valuation engineers, there has been a slowing in the purchase of refuge lands. Marked increases in land prices have also been a retarding factor in refuge-land acquisition. Consequently, such purchases as have been made were almost exclusively limited to those adjacent to lands already in possession to insure their better control.

Although operating with a substantially smaller staff, much attention has been given to the legal and technical prerequisites to the vesting of titles in the United States of previously optioned lands and to the preparation of material for Executive orders establishing the refuges.

The Migratory Bird Conservation Commission approved the acquisition of 13 tracts on 6 refuges, totaling 5,819.26 acres and the lease of 3 tracts on 3 refuges, totaling 3,528.53 acres in 7 States. Most of these lands were urgently needed for the effective completion and administration of existing refuges.

During the year, titles have been vested in the United States to 73 tracts containing 36,378.39 acres in 18 States, and cadastral surveys have been made of 60 miles of refuge boundary and necessary subsidiary lines.

More than 497,500 acres of lands and the crops and physical improvements thereon have been examined, appraised, and type mapped for the Navy Department, the values determined amounting to \$12,116,347.46. For the same Department, 54 miles of boundary and subsidiary lines were resurveyed, and topographic surveys were made of 2,552 acres of land.

Personnel have also been called by the Department of Justice to appear as expert witnesses in the prosecution of condemnation proceedings directed toward the acquisition of certain of these lands.

## ECONOMIC INVESTIGATIONS OF WILDLIFE RESOURCES

To assist in the conservation of food and other resources, investigations to improve the methods and materials used in the control of destructive animals were carried on, as were also studies for the improvement of the management of waterfowl, upland game, and other wildlife.

*Control methods.*—Intensive search was made for substitute rodent and predator poisons to replace strychnine, red squill, and thallium. The war has resulted in a shortage of these materials which formerly were imported in large quantities from French Indo-China, North Africa, and Germany, respectively. A large number of organic and inorganic toxic chemicals was obtained or synthesized for bio-assaying and field testing. Extracts were procured or prepared from numerous native and South American poisonous plants. A few of these have proved to be very toxic and, therefore, worthy of further investigation. In locating new materials, cooperation was obtained from several industrial chemical concerns and drug manufacturers and from various research organizations engaged in the hunt for new toxic agents for other types of pest control.

Good progress was made in adapting one of the newer poisons, zinc phosphide, for control of rats and field rodents. This compound is now in use in various western areas as a substitute for thallium. Other promising new or substitute materials are being extensively tested under field conditions.

Constant effort is being directed toward making highly selective the methods used in control of injurious mammals, and gratifying progress has been made. It was found that birds can be deterred from feeding on poisoned rodent baits by treating the cereal ingredient with a brilliant dye. This treatment does not alter the acceptability of the bait to rodents; but makes it unattractive to ground-feeding birds. A number of new deterrents were tested to determine their value in protecting packaged foods, ship calking, telephone cables, and insulating material from rats and other rodents.

The practicability of combining an emetic with poisoned baits for rats was successfully demonstrated. This finding is expected to have far-reaching effect in operational rat control as the exposing of rat poisons so treated will be much less dangerous to dogs, cats, and other pets.

*Red squill supplies.*—The application of the red squill fortification process developed in 1941 continues to widen. The city of New Orleans' fortification plant, built according to Service specifications, is operating successfully, making possible the conversion of large quan-



tities of low-grade squill into a usable control product. Without fortification, much of the squill imported has a low raticide value. The British and Chinese governments, at their requests, have been supplied with specifications for construction and operation of fortifying plants.

The propagation of red squill in this hemisphere received further impetus through consummation of an agreement with the Bureau of Plant Industry, Soils, and Agricultural Engineering, and through initiation of a propagation program in Mexico by the Board of Economic Warfare. In connection with these developments the Service is giving technical assistance pertaining to the toxicity of squill stocks, and to the use of squill in rat-controlled programs.

*Marsh management.*—Coastal dim-out regulations forced the abandonment of continuous 24-hour burning as a marsh-management technic in the Gulf Coast region. After demonstrating the need for controlled marsh burning to increase the growth of desirable vegetation as food for cattle, fur animals, and other wildlife, limited approval for such operations was obtained from defense authorities. Continued progress was made in demonstrating the utility of regulated grazing on Gulf Coast marsh areas dedicated to wildlife preservation. Assistance was given to interested groups in the development of new wartime markets for marsh products and byproducts.

*Control of pest plants.*—Giant cut-grass (*Zizaniopsis*), a troublesome pest in southern marshes, was found to be 90 percent controlled by one under-water cutting during the period of maximum runner growth, which, in the latitude of Reelfoot Lake, Tenn., is usually in late August. Spatterdock (*Nymphaea*) was 85 percent controlled by under-water cuttings in June, late July, and August. More than 80 percent control of lotus (*Nelumbo*) was accomplished by one under-water cutting in water 5 feet deep during the period of maximum flowering. The planting of desirable competitor species following control was the subject of experiment to determine its practicability as a measure for preventing or retarding return of pest species. Granular 48 percent muriate of potash gives promise of being valuable for control of a common rush (*Juncus acuminatus*), which is sometimes a weed pest in shallow ponds.

*Propagation of waterfowl foods.*—The effects of various commercial fertilizers on the growth of important duck foods were investigated under controlled conditions in experimental ponds. Light fall burning was found to stimulate germination of seeds of a variety of important moist-soil grasses and sedges.

*Upland game-bird management.*—Technical assistance was rendered to the game departments of 18 States in connection with their upland game development and research programs. Diets for the bobwhite

quail consisting of materials available under wartime conditions were formulated and tested.

*Wildlife of forest and range.*—Investigations of forest-game management practices in the Southeast with emphasis on the preservation of the wild turkey were concluded. In cooperation with the State of Texas, investigations were begun of land-management and grazing practices affecting economically important game resources in the Edwards Plateau, the center of the Nation's mohair industry.

A study of overpopulated deer range in Nevada yielded information on which management recommendations were made to the Nevada Game Commission and to the Federal Forest Service. Sample areas showed an average of 4 and 16 deer per 100 acres on summer and winter ranges, respectively. On wide areas, livestock and deer ranges were seriously overutilized.

Pocket gopher investigations on the Grand Mesa, Colo., in cooperation with the Forest Service, determined average populations of  $2\frac{1}{3}$  per acre on meadows,  $8\frac{1}{2}$  on sagebrush types, and  $30\frac{1}{2}$  per acre on open parks. These rodents, on the basis of test plots, were taking as much forage as the allotted range cattle. The costs of control may prove uneconomic unless slow population recovery justifies spreading the operations over several years. Long-time projects in Mississippi, Oregon, Montana, California, and Arizona were placed on a maintenance basis for the duration of the war.

#### FUR ANIMAL PRODUCTION

Because of the war, basic research in reproduction, nutrition, and fur fibers has been greatly reduced. A special effort is being made, however, to keep the work alive so that continuity can be maintained.

During the 1943 breeding season, experiments were conducted to determine whether delayed implantation is a controlling factor in the length of gestation in mink. Investigations were continued to determine the optimum time in the ovulation period to breed foxes. The unit at Swarthmore College cooperated with the U. S. Fur Animal Experiment Station at Saratoga Springs, N. Y., on this work.

*Nutrition studies.*—Work was continued at Cornell University, Ithaca, N. Y., to learn more about possible substitutes for raw meat in the rations of fur animals. Raw carcasses of foxes proved entirely satisfactory when comprising 25 percent of the ration.

Preliminary results obtained with the nitrogen balance method indicate that the amount of protein in the ration necessary to maintain equilibrium in foxes lies between 7 and 10 percent. The minimum requirement of thiamin chloride ( $B_1$ ) necessary to prevent  $B_1$  deficiency symptoms in the fox lies between 0.7 and 0.8 gm. per gram of

dry food. The U. S. Fur Animal Experiment Station, Saratoga Springs, N. Y., cooperated with the Cornell unit to make these determinations. The minimum requirements of calcium for growing pups were tentatively determined to be between 0.4 and 0.5 percent of the ration. The vitamin-A requirements of growing pups were studied with 70 animals after a depletion period of 29 to 41 days.

*Fur fiber studies.*—In cooperation with the Bureau of Animal Industry, studies were continued on the fur fiber characteristics associated with woolliness in domestic rabbits.

Karakul fur investigations in cooperation with the Bureau of Animal Industry have been continued on a very reduced scale. The final step of one phase of the breeding program was taken this year in the production of broadtail lambs by crossing the Karakul and Navajo sheep. The pelts produced were of good quality.

*New York fur animal experiment station.*—The scarcity of animal proteins seriously affects the production of fur animals as the food is largely composed of meat and meat products. Experiments were conducted at the station near Saratoga Springs during the past year to adapt rations of fur animals to the present emergency conditions. It was found that beef meal can be used to replace half the raw meat in the summer mink ration. Preliminary studies indicate that soybean meal, cotton seed meal, corn gluten meal, and peanut meal can be similarly recommended.

*Maryland fur animal field station.*—A 5-page leaflet on "Recipes for Cooking Muskrat Meat" proved useful in the Service's campaign for increasing the use of the meat of furred game. The 6,000 muskrat carcasses graded and sold from the 5,233-acre marsh area near Cambridge, Md. brought as much as 35 cents per carcass wholesale in the Baltimore market. Approximately 60 mature muskrats, 10 nutria, and 4 raccoons are maintained in pens at the station for controlled experiments. A total of 49 litters of muskrats was born in pens during the year, the number of litters per female running from one to four in a season. The period for gestation for muskrats is believed to be 28½ days.

*California rabbit experiment station.*—Results from experimental work and cooperative relationships already established furnished the basis on which was developed a program for increased rabbit production. Rations containing less protein and a smaller proportion of concentrates are being studied. Hutches and accessory equipment construction requiring less critical materials are being emphasized. Studies have been made of the food conversion ability of rabbits of various ages, the effect of the woolly carrier on pelt values, cause of sore hocks, and malocclusion of teeth.



The staff at the station has devoted considerable time to answering correspondence and supplying information to those interested in raising rabbits to supplement the dwindling family meat supply. Informative material was sent to every State in the Union and to 30 foreign countries.

#### WILDLIFE DISEASE INVESTIGATIONS

*Fur animal diseases.*—Tests of six species have been conducted to determine the susceptibility of wild animals to distemper virus and thus ascertain whether they may serve as carriers of the disease. Mucoïd enteritis kills many domestic rabbits, and every effort is being made to determine the cause of the disease and to prevent losses from it.

*Game bird diseases.*—Control of avian botulism, the most devastating of waterfowl diseases, is being attempted on an experimental basis at various Federal refuges through manipulation of water levels. The value of salvaging the affected waterfowl was demonstrated conclusively by comparison of mortality figures for sick birds that had been hospitalized, banded, and released and for those that had not been hospitalized before released. The former show a much higher rate of complete recovery.

Demonstration was made of botulism toxin in the blood stream of sick ducks picked up in the field. By the use of movable duck cages it was possible to demonstrate the presence of toxin in very shallow water which was rich in organic matter. Likewise maggots from birds that had died of botulism were found to be highly toxic and the soil under the carcasses was found to remain toxic for more than 40 days. Studies were also made on the relationship of other soil and aquatic organisms to the botulism bacteria.

Identification of the causative agent of quail rhinitis as a filterable virus verifies a theory of long standing as to the nature of this infection. Cultivation and serial transmission on chick embryos provides means for the development of prophylactic control measures.

#### COOPERATIVE WILDLIFE-MANAGEMENT RESEARCH

The 10 widely distributed Cooperative Wildlife Research Units were chiefly engaged during the year in surveying game populations, estimating surpluses that could be safely taken for meat and fur, studying game depredations upon farm and range crops, and investigating factors affecting game supplies. Of 87 projects, 23 were completed and 38 were suspended because the investigators entered the armed forces. Research, training, and extension programs were actively carried on in Alabama, Iowa, Maine, Missouri, Ohio, Oregon, Pennsylvania, Texas, Utah, and Virginia, at the land grant colleges,

cooperating with the State game commissions and the American Wildlife Institute. Unit leaders acted as advisors to State game departments on conservation matters. In cooperation with the Texas Agricultural Extension Service, a 5-year wildlife extension program was completed in 221 of the 254 Texas counties, with more than 36,000 owners participating on approximately 21 million acres of land.

#### MIGRATORY BIRD INVESTIGATIONS

*The waterfowl situation.*—Continued favorable climatic and environmental conditions, and adherence to a sound management policy, have resulted in further increases in the continental population of ducks and geese. In 1943 fall migration of these birds should be the largest in several decades. Shortage of ammunition and transportation, the departure of many hunters for the armed services or the war industries, together with other factors, are likely to reduce hunting pressure. In consequence, prospects are excellent for the building up of a stock of birds that will fully occupy the available habitat. Because of this there is a pressing need to provide adequate winter quarters where food supplies will be ample. This condition is particularly acute on the Atlantic and Mississippi Flyways.

*Investigations in Canada.*—Despite difficulties encountered in reaching (without the aid of automotive transportation) the out-of-the-way lakes, marshes, and river valleys that are frequented by waterfowl, the biologists of the Atlantic and Mississippi Flyways succeeded in covering important concentration areas in the Maritime and Prairie Provinces of Canada. Much of the success of the waterfowl operations in that country must be gratefully attributed to the wholehearted cooperation of Dominion and Provincial game officials, and to others interested in the welfare of the birds. In addition to the information obtained directly by the Service biologists, the Canadian National Parks Bureau has made available the reports of its officers stationed in the Prairie Provinces and in British Columbia.

In Manitoba, Saskatchewan, and Alberta there were some losses caused by nest flooding, late freezes, and predatory animals, but the total was far less than losses a few years ago from drought. The biologists conclude that the prairie region of Canada has a substantial increase in its population of ducks and geese. Similarly, high water in the Maritime Provinces did some damage to early nests of the important black duck, but renestings were sufficiently numerous to produce a normal crop. An increase of waterfowl also was recorded in British Columbia.

The leader of the Maine Cooperative Wildlife Research Unit, operating in Quebec and New Brunswick during the month of August

1942, submitted a report upon the comparative status of the waterfowl in these two Provinces. While Quebec is not known to have extensive breeding grounds, there are important nesting areas in New Brunswick. Unmistakable evidence was found of a continuing increase in the number of ducks, particularly of the blue-winged and green-winged teals.

*Investigations in Newfoundland.*—In collaboration with the Department of Natural Resources of Newfoundland, two biologists of the Service worked in this crown colony during the month of June 1942, obtaining series of specimens and useful information on the avifauna of the island. Important elements of the Canada goose population of the Atlantic Flyway appear to have their breeding grounds in this region.

*Investigations in Alaska.*—Through the cooperation of the Alaska Game Commission, the biologist formerly assigned to the Mississippi Flyway, but now attached to that agency, was transported by air to the delta of the Yukon River where headquarters were again established at the village of Chevak. Work on the great waterfowl breeding grounds was just under way when it became necessary to suspend operations and send the Service representative to Washington on an urgent mission. Subsequent information, gathered by agents of the Alaska Game Commission, indicated that the numerical status of the Alaskan population of breeding waterfowl was generally satisfactory although the supply of geese appeared to be somewhat below normal.

*Investigations in Mexico.*—For the purpose of filling a gap in our knowledge of waterfowl wintering grounds in Mexico, the biologist of the Pacific Flyway devoted 6 weeks to a survey in the State of Chihuahua. The number of ducks and geese wintering in that district does not appear to be large and its importance is much less than that of previously surveyed areas on both coasts and in the Valley of Mexico. It is, however, one of the chief wintering grounds of the sandhill crane, a migratory game bird that for many years has been accorded complete protection, and has distinctly increased in numbers.

The biologist of the Central Flyway, from his headquarters at Brownsville, Tex., made several short trips into the State of Tamaulipas to study the wintering waterfowl in the Mexican portion of the Laguna Madre. War conditions made it necessary to dispense with aerial surveys over coastal areas of this country.

*Investigations in the United States.*—Breeding grounds in the northern United States continued in excellent condition. Abundant water filled sloughs and pot holes that had been dry for years. These additional nesting areas resulted in a greater dispersal of the birds so that on some of the refuges there appeared to be a reduction in



numbers. This necessitated extending investigations to adjoining areas.

Seasonal comparisons of the constantly increasing numbers of ducks and geese have become increasingly difficult, probably because the average observer, while fully competent to estimate the size of flocks that may contain only a few hundred individuals, finds such estimates extremely difficult for flocks composed of many thousands. The fall migration of 1942 was reported on by 305 observers, and the spring flight of 1943 by 252. Analysis of these data aided materially in appraising the status of the different species.

During the winter months and the migration seasons the flyway biologists maintained continuous surveillance on the great flocks of ducks and geese that annually gather in the South Atlantic and Gulf coasts and in the interior valleys of California.

Despite war conditions, both the Navy and the Coast Guard were able to render splendid cooperation in the taking of the annual inventory in January, furnishing sufficient aviation to assure coverage of most coastal areas. As a result of this operation it was estimated that the continental population of ducks and geese has increased to between 115 and 120 millions. A few species, such as the redhead and the ruddy duck, while showing gratifying increases, are still below the desired levels.

*Status of other migratory game birds.*—Investigations of the woodcock were continued in Maine and Pennsylvania, and in the Canadian Provinces of New Brunswick, Nova Scotia, and Prince Edward Island. While numerical recovery of this bird from the low point of a few years ago, now seems assured, nevertheless it is also apparent that wise management demands very cautious utilization.

Such data as were obtained indicated a further decrease in the number of the Wilson's snipe. From only two States, Florida and Louisiana, was there any evidence of a possible increase.

The mourning dove, on the other hand, is making a most gratifying recovery, particularly in the East where its numbers have been at low ebb. They are, however, still much below the optimum desired.

Due to the necessity for detailing the biologist of the Central Flyway to part-time work with the Office of the Coordinator of Fisheries, the investigation of the white-winged dove in Texas has been extended throughout the breeding season of 1943. Work with the western race in Arizona has been rounded out by a special study made during the summer of 1942 in the Mexican State of Sonora. As a result of this research, better management of the species should be assured.

*Banding game and other birds.*—The banding work has been severely restricted as a wartime economy. Many volunteer cooperators have

entered the armed forces or by virtue of their occupation in war industries have been obliged to close their stations temporarily. New permits have been issued only in exceptional cases and practically all work with species that nest in colonies has been suspended in order to conserve bands urgently needed for work with game birds. Nevertheless, the 1,700 cooperators reported the banding of 177,898 birds, of which 30,783 were ducks and geese. The grand total of birds banded since the beginning of the work is 4,528,241. Returns and recoveries totaling 22,774 brought the total of these data to more than 315,000. This file is a veritable "treasure trove" of new information regarding North American birds and is being widely used for a variety of purposes.

*Distribution and migration records.*—Two hundred and eighty-six volunteer observers sent in 36,210 migration observations to be incorporated with the already vast and invaluable collection of this material. In addition, 630 locality, and 710 publication, references were added to the files.

#### BIOLOGICAL INVESTIGATIONS OF WILDLIFE

*National park wildlife.*—Study of beaver-elk relationships in Rocky Mountain National Park shows that the numbers and distribution of beavers are controlled, to some extent, by elk since the latter relish aspen on which beavers are dependent. Maintenance of natural areas in which beavers may work out their own destiny should prove valuable as a check on trapped areas and on domesticated fur animals. Since serious overpopulations of deer exist on certain areas in Kings Canyon and Sequoia National Parks, the need for trapping is indicated to prevent further damage to browse plants. Data were supplied to the National Park Service regarding wildlife of Jackson Hole National Monument, particularly in relation to the adjacent National Elk Refuge and the need for reduction of the southern elk herd.

Surveys were made of winter range for elk and other large mammals in Yellowstone National Park and elk reduction methods were studied at first hand in order to get information for use in future management plans for the northern elk herd. Range conditions in Rocky Mountain National Park are not as bad as in Yellowstone but show heavy use by deer and elk which are cut off from their former winter range outside the park. Reduction of the number of sedentary individuals by official means within the park appears necessary. A survey of pack and saddle stock grazing in a primitive section of Kings Canyon National Park showed that range conditions are, in general, good.

An inventory was made of rare fur-bearing and other mammals in border areas of Kings Canyon National Park, adjacent to the trap-

ping district. Possibilities for development and recreational use of wildlife at Denison Dam and Reservoir, Texas-Oklahoma, were studied. Information on wildlife resources of the Alaska Highway will be used in planning development of a protected strip along the road in Alaska. Investigation was made of moose and other wildlife of Isle Royale National Park.

Assistance was given in preparation of the National Park Service's report on present and potential contribution to the departmental food production program and in carrying on that for increased utilization of grazing and general agricultural resources. Study shows that sizable meat contributions have been and can be made through official slaughter of elk, deer, and buffalo to remove existing surpluses.

Investigation of aquatic resources in Lassen Volcanic National Park was made and studies of trout populations in Yellowstone and Kings Canyon National Parks were continued. It is the purpose of these studies to develop plans for management of park waters based on their physical, chemical, and biological characteristics. Special attention has been paid to lakes since they provide most of the fishing and offer the greatest opportunity for improvement of angling through proper management. However, with the decreased fishing intensity, there is less need for such studies at present and they will be discontinued until after the war. Fish for planting of park waters were supplied from Federal hatcheries. Hatcheries were operated in Glacier, Great Smoky Mountains, and Yellowstone National Parks. Eggs collected from Yellowstone waters and young fish were planted in national park and other public waters.

*Federal refuge faunas.*—An investigation of the Wichita Mountains Wildlife Refuge, Oklahoma, showed that the meager surplus forage which existed was not situated so that it could be used for grazing domestic livestock without seriously interfering with wildlife management. As a war economy, however, the better part of this surplus can be cut for hay without seriously disturbing conditions for wildlife. The herd of introduced pronghorn antelopes now numbers about 60. On the Sheldon National Antelope Refuge, Nevada, investigations were made of winter conditions in relation to game animals and of competition between wild game and domestic stock. A study was made of the 2,606 winter elk losses in the Jackson Hole region, Wyoming, of which 1,175 were on the National Elk Refuge. Many of these losses on the refuge were from necrotic stomatitis induced by the presence of squirrel-tail (*Hordeum jubatum*) in the hay, while those in the hills probably resulted from malnutrition on an overbrowsed range.



*Other field and laboratory studies.*—Because our scientists were engaged in war activities, little field progress was made on the biological survey of the State of Washington and none on those of other States. A report on a biological survey of the Aleutian Islands that has an important bearing on our war effort and reconstruction work neared completion. Continued studies of the marten were made in cooperation with the State of Montana, and a manuscript was in preparation on the habits, history, economics, classification, and distribution of American pumas. From surveys, an estimate of 6,748,414 big-game animals in the United States was made at the close of 1941, and a manuscript was completed for publication on "Our Big-game Resources, 1937-42," which discusses populations of big-game animals, their trends, and their relations on different classes of land. Consideration was given to the land-use aspect of the Alaska wildlife problem and to an inventory for major vegetative types of South-eastern Alaska and administrative reports thereon were made.

The Biological Survey's laboratories were used by more than 150 cooperative investigators, including many from the War and Navy Departments, the Office of Strategic Services, and the War Production Board. These investigators made use of our original maps and reports and were supplied with bibliographies and other material; and our scientists gave them information which was not procurable elsewhere.

### A LOOK AHEAD

True conservation demands that consumption shall not exceed production. Even wartime pressures should not result in exceptions to this rule and if the policies of the Fish and Wildlife Service prevail, there will be no deviations in its field from this basic principle of sound animal husbandry. Previous wasteful handling of natural resources has again been made apparent by the great needs developed in the present war. Continuation of such waste would be suicidal. Hence conservation, in all of its phases, undoubtedly will be a major national objective after the war.

Doing post-war planning now is of great importance and it has been given attention not only by the Fish and Wildlife Service but, at our request or instigation, by State conservation departments and by sportsmen's organizations and other interested groups. Within the Service, planning has embraced improvement of ordinary activities and also a program of development for lands now in administration or to be acquired, which will provide widespread employment and advance wildlife conservation to new and greater levels.

Unnecessarily as well as necessarily, we have expended mineral wealth that we shall be unable to replace. On the other hand, wildlife fortunately is a renewable resource which, with proper management, cannot only be maintained but increased. Preserving wildlife and at the same time profiting by conservative use of it is no mean economic achievement—in fact it is one that should gratify the most practical-minded. Beyond that, successful conservation of the bulk of our wildlife heritage for its own sake is an outstanding civic and esthetic accomplishment in which every citizen can take satisfaction.

# Office of The Coordinator of Fisheries

IRA N. GABRIELSON, Deputy Coordinator

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AMERICA'S fisheries have been called upon to produce their high-protein foods and their essential byproducts on an unprecedented scale during the war. So great is the need for canned and fresh fish, fish meal, and vitamin oil and industrial oils, that the industry has been asked to produce 6 billion pounds in 1943—more than a billion pounds in excess of its largest peacetime yield.

The fishing industry has felt the impact of war more than any other enterprise of comparable importance. Because its working tools and its manpower are peculiarly useful in actual military operations, its materials as well as its men were called into service early in the war. In some branches as many as half the vessels were requisitioned for coastal patrol, and for transporting munitions and food to defense outposts and theaters of combat. The hard fiber ropes and twines with which fishermen operate their boats and gear went to war on troop ships, warships, and cargo vessels. Fishermen's nets found a new and invaluable use in camouflage-operations. Putting to work their knowledge of the sea and their skill in handling boats, many fishermen entered the Navy, the Coast Guard, and the Merchant Marine.

The procuring of food and the essential byproducts of the fisheries, are also important wartime functions of fishermen and their boats and gear.

The Office of the Coordinator of Fisheries was established by Executive Order 9204, July 21, 1942, to give the fishing industry needed aid in solving its war-created problems. The Secretary of the Interior was designated Fishery Coordinator, and the Director and Assistant Director of the Fish and Wildlife Service later appointed by him as Deputy and Assistant Deputy Coordinator respectively. Authorized under the original order to assure the sustained production of aquatic food supplies and to coordinate fishery policies, plans,



and programs, the Coordinator of Fisheries received further authority over the production and processing of fishery products under Food Directive No. 2, issued by the Secretary of Agriculture on February 8, 1943.

To carry out these functions effectively the Coordinator's Office is organized on an area basis with a representative in each of 10 major commercial fishing areas in the United States and 1 in Alaska, and consultants have been appointed from the fishing industry. The central office personnel and field staff are members of the fishery divisions of the Fish and Wildlife Service, detached temporarily from their ordinary duties for this wartime service.

### GAINS MADE IN TWO FIELDS

During its first year the Coordinator's Office has accomplished substantial gains in two principal fields: (1) providing or retaining the men and materials to carry on the work of fishing, and (2) assisting the industry in using its facilities at maximum efficiency in order to bring in every possible pound of fish.

The return of fishing boats no longer urgently needed by the Army or Navy is essential if the fishery yield is to be increased. Early in 1943 the return of floating equipment to the Alaska salmon industry was arranged. This permitted the canning of a large pack of salmon which, on June 30, totaled 662,800 cases as compared with 288,786 cases to the same date last year. A number of seiners have been returned to the important sardine and menhaden fisheries, and a few trawlers to the New England banks—a distinct gain to fishery production, since most of these boats are capable of catching 5 to 6 million pounds a year. There is still a critical shortage of boats, and efforts are being put forth to secure the return of additional vessels to active fishing.

The program of fishing vessel construction is progressing satisfactorily. Besides those authorized earlier in a straight preference rating, the Coordinator's Office has secured controlled material allotments for the construction of some 250 vessels. At the present rate, construction will amount to about 20 million dollars per year and will probably increase.

By expediting applications for priority ratings for fishing gear, shore equipment, plant construction, and repair, the Coordinator's Office has helped to clear the bottleneck which has retarded normal repairs and replacements. It has formally recommended for approval priority cases involving material and equipment for repair, replacement, and expansion of fishing gear, fishing boats, and shore

processing plants amounting to approximately one and a quarter million dollars. Authorization has also been granted for the establishment of stockpiles of marine engines in the amount of approximately 800 engines by dealers located in 40 cities. These engines are released on recommendations of the Coordinator's field representatives.

### MANPOWER SHORTAGE AMELIORATED

By gaining recognition by the War Manpower Commission of fishermen and skilled labor in processing plants as workers performing a necessary war job, the Coordinator's Office has reduced the loss of manpower which was seriously hampering fishery production. Arrangements have also been made to restore certain classes of aliens to fishing.

Through arrangements with Coast Guard authorities, security regulations in coastal waters have been modified to minimize interference with fishing. Certain bombing ranges, located on highly productive fishing grounds, have been moved to less productive waters. In many instances, port restrictions on the movement of vessels, hours of fishing, and on the use of radio at sea have been modified or removed.

The decentralization of service functions of the Coordinator's Office among the 11 area coordinators has proved very successful. The services rendered by these field offices have been instrumental in adding many vessels to the fishing fleet through new construction and by return from the military services, by securing engines for fishing boats, obtaining priorities on repair materials, fishing gear, and equipment, and arranging for rationed allotments of food and fuel for fishing vessels. The area coordinators have also succeeded in having certain restrictions on fishing activities adjusted with benefit to production and have aided in bringing about the deferment, release from military service, or direct recruitment of a large number of fishermen or shore workers. In many areas they have been successful in promoting the production of new fishery products and in conducting promotional campaigns to increase production.

The Coordinator's Office has developed wartime programs of operation for the salmon and pilchard fisheries, which together account for more than a quarter of our total production of fish. The Alaska salmon industry is operating under a concentration plan, with the canning of salmon confined to 75 of the most modern and efficient plants, assuring effective use of labor and equipment and maximum production. On June 30 the coordinator announced a coordinated production plan for the Pacific pilchard industry, which annually

yields about 1 billion pounds of fish for canned sardines, fish meal, and oil. The pilchard production plan, worked out in consultation with representative fishermen, plant operators, and State conservation officials, is designed to provide an even flow of fish to the canneries and reduction plants. Under the ordinary distribution system, some plants stand virtually idle at intervals for lack of raw material, while others receive more fish than they can process. This year deliveries will be directed by dispatchers assigned by the coordinator to the principal ports.

At the mid-point of 1943, reports from most sections of the industry showed that production was running ahead of last year's figures by a satisfactory margin, justifying the assistance that has been given the fisheries and offering promise of more substantial future gains.



# Office of Indian Affairs

JOHN COLLIER, Commissioner

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**I**N REVIEWING the past 12 months, I think first of the Indian men and women in the uniforms of their country's armed forces. Eighteen thousand Indians are in the military services. Thousands fight overseas. Hundreds have already died in this war, and more will fall in the great offensive actions now beginning.

Deep in the jungles of New Guinea, Indian sharpshooters readily see through Japanese camouflage and fight with a ruggedness that has won them acclaim in the press. Indians served well with the armored divisions in the African desert campaign and contributed materially to the final Allied victory. Indian pilots, gunners, bombardiers, and radio operators man Flying Fortresses and other heavy bombers which raid important German industry. In the Mediterranean, in the Atlantic, in the Pacific, in Asiatic waters, Indians have convoyed precious cargo, on sea and in the air, and a few Indians are in the submarine service.

In the great offensive now beginning on European soil, Indians will continue to serve with distinction in almost every military job. These comrades in arms are the sons and grandsons of the toughest enemy we white Americans ever fought.

Their commanders speak highly of their prowess, and they are especially effective when several or more Indians are permitted to serve in the same company or unit. A Cherokee Indian, Lt. Joseph Woody Cochran, of Skedee, Okla., has received four medals: the Distinguished Flying Cross, the Air Medal, the Purple Heart and the Silver Star. Before entering military service, Lieutenant Cochran had obtained an Indian Service educational loan to attend Oklahoma A. & M. College. This year his wife repaid \$300 owing on the loan. Staff Sgt. Frankie Spindler, of Assiniboine Indian blood, who, I regret to report, was killed in action in Africa, received three medals: the Distinguished Flying Cross, the Air Medal, and the Purple Heart. Scores of Indians have received awards for distinguished service.

Some Indian jurisdictions report that 30 percent of the able-bodied men between the ages of 18 and 38 have gone to war; others report 40 percent and some 60 and 70 percent. By far the largest number of those inducted or enlisted are found in the Army. According to the War Department, 16,054 Indians entered the Army between June 1940 and May 1943. Several thousand more are found in the other military branches. More than 100 Indian women have joined the auxiliary military services.

These Army figures do not include Indians commissioned as officers. A few Indians have been wounded and have honorable discharges. A small percentage of Indians who were inducted have been returned to their homes because they did not speak and write English. These boys are more anxious than ever to learn English and they are now receiving special assistance from Indian Service teachers. In the largest non-English-speaking area, the Navajo country, the Wingate Vocational High School offers preinduction training to Navajos who desire to learn basic military English quickly. Army officers from a nearby ordnance depot have introduced military drill and calisthenics at the Wingate school.

#### INDIANS BACK THE ATTACK

Whenever the Indians hear that their country needs money, they give spontaneously. A Navajo, who had asked his superintendent whether it was true that the Government desired funds to fight the war, stated that he did not want the paper (a war bond certificate) if the Government would buy guns with his money. Eskimos of the little village of Kipnuk, distressed that some of their boys had been sent home because they did not speak and write English well enough for military service, held a meeting and decided they must help win the war. They collected and sent to the Juneau headquarters eight mink skins, one weasel skin, and \$16.50 in cash, left over from the season's trapping. The skins sold for \$118.30, and \$134.80 in war stamps was returned to the village of Kipnuk. Indian employees of the Service buy war bonds through the pay-roll allotment plan, and war stamps are the price of admittance to many tribal social gatherings.

I am unable to report how many millions of dollars the Indians have invested in war bonds and stamps. Only those Treasury bonds purchased with monies under the jurisdiction of the Federal Government are recorded in this office, and purchases in this category by individual Indians and by tribes total 5 million dollars.

Thousands of Indians have left their homes for war work. In the last 2 years, Indian Service vocational schools have trained and placed approximately 2,000 men and women in war industry. Certain war plants in the Oklahoma-Kansas area and on the West Coast have placed standing orders with Indian schools for all Indians who can be trained. Classes are also open to white persons, and age restrictions have been lifted. Many hundreds of Indians to whom Indian Service vocational schools are inaccessible have acquired skills for war employment through local NYA centers.

### FOOD PRODUCTION INCREASED

Despite labor shortages and upheavals occasioned by the war, the Indians actually increased their food production in the calendar year 1942. They produced and sold more food during the past year than ever before. Indians in the continental United States raised 21 million dollars worth of food, including beef, fish, poultry, cereals and vegetables. Two-thirds of this was sold on the 1942 market. The rest was consumed at home. Their sales of livestock and livestock products alone totaled \$12,808,244. This compares with top livestock sales of 4 million dollars in the last war when meat prices rose higher and the quality of livestock was generally poorer than obtains today.

On the basis of Army rations, the Indians in 1942 sold enough beef, mutton, poultry and fish to feed 220,250 soldiers for 1 year; enough cereals to feed 367,103; enough potatoes and vegetables to feed 52,057; enough eggs to feed 47,769; enough fruits and tomatoes to feed 38,346; enough beet sugar to feed 42,076 and enough butter and other fats to feed 51,269; finally on the basis of 199 pounds of wool per year, the Indians marketed enough wool in 1942 to supply all the clothing requirements, including replacements, for 19,000 soldiers.

These production figures represent a marked increase in Indian farming operations. In 3 years ending January 1, 1942, Indians planted 150,000 additional acres in grain and cereal crops and enlarged their gardens by 3,265 acres. They also planted new fruit trees, nuts, edible soybeans, and other produce. At the end of 1932, the Indians owned 170,794 beef cattle. Ten years later, cattle holdings had increased to 320,727. During the same period their dairy herds had increased more than fourfold—from 11,314 to 49,468.

Several factors are responsible for this increase in farming activity and the resultant increased production. Prominent among these is the careful planning by Indian Service employees and Indians working together. An example is the contract furnished by the United Pueblos Agency staff to an Indian who is going to war and desires



to assign his farming equipment, land, and livestock to another operator to use in his absence. Under the direction of the Governor and the village council, the new operator agrees to maintain the enterprise, to contribute his share to village relief, and to give to the original owner on his return the same amount of equipment and livestock he owned before leaving.

In 1936, Indian Service employees of the Pine Ridge Reservation sat down with the adult members of the 35 families of the Red Shirt Table community to plan with them a livestock and farming program for the community. At that time the Red Shirt Table community was one of the most impoverished and demoralized communities on the reservation. Long periods of drought and depression had completely liquidated their livestock holdings, and practically the entire community was dependent upon public assistance. Beginning from scratch, this community has developed a livestock industry the net worth of which, at the end of the fiscal year, was approximately \$60,000. This past season they planted and harvested 130 acres of irrigated land, conducted a poultry enterprise which brought them for the year a net income of approximately \$5,000, and have built a community root cellar and a community canning kitchen. The constant planning together of Indian Service employees and members of the community has resulted in the establishment of better community government, more adequate education and health facilities, and has made the entire community aware of its problems and its possibilities for the improvement of their welfare.

### TRIBES PLAN FOR FUTURE

On many other reservations similar planning has been going on between Indian tribal councils and Indian communities and representatives of the Indian Service. On the Fort Belknap Reservation these plans have resulted in considerable enlargement of the livestock industry of the reservation, and more effective use of the irrigated lands. On the Flathead Reservation, a program is being developed which will involve the use of tribal funds for land purchases and for the enlargement of credit facilities. On the Warm Springs Reservation, the tribal council has, for a period of 2 years, worked with representatives of the Indian Service in developing a reservation-wide program which includes land acquisition, restocking of certain of the ranges, and more effective control over their fishing industry. These are just a few typical examples of enterprises planned by Indians and Service employees working together.

Another factor responsible in no small degree for increased agricultural production by Indians has been the extension of credit facil-

ities. Up to July 1, 1942, the Federal Government, in cooperation with tribal corporations and credit unions, made 5,019 loans to Indians totaling \$3,186,727 from the IRA revolving credit fund. Repayments were less than 5 percent delinquent at the end of the year. Records of repayments for 1943 have not been compiled yet, but all indications are that fewer Indians will be delinquent in repaying their loans this year than ever before. A number of individuals have paid the interest on their tribal loans 2 years in advance, and some have paid 3 years in advance.

Another factor has of course been the increase in actual acreage of Indian lands through purchases and through the restoration to the tribes of lands once ceded to the Government to be opened to entry. Only a small amount of gratuity funds were appropriated for land purchases for the fiscal year 1943, but a number of tribes have continued to invest their tribal funds in sorely needed land.

While Indians are not ordinarily thought of as dirt farmers, the chief contribution the American Indian has made to American civilization is probably his agricultural plants, methods, and processes. Indians discovered methods of bringing wild plants under control and breeding them by seed selection long before the advent of the white man. Paramount among the food plants domesticated and developed by Indians and given directly or indirectly to the white man is corn, or maize. Others include the white potato, originally grown by the Indians in the Andes; tobacco; the many varieties of kidney and lima beans; cocoa; peanuts; pumpkins; squash; sweetpotatoes and tomatoes. It has been estimated that four-sevenths of the total agricultural production in the United States, measured in farm values, consist of economic plants domesticated by the Indians and taken over by the white man.

### MRS. DANIELS, 89, DOES HER BIT

This contribution of Indians to agriculture is not entirely a matter of past history. Within the past 5 years horticulturists have developed the only variety of lima bean yet known to grow satisfactorily in high, dry country. The original seed for this new lima bean was contributed by an 89-year-old Navajo woman, Mrs. Rose Daniels.

Five years ago a representative of the Horticultural Field Station, Cheyenne, Wyo., visited Mrs. Daniels at her home on the Uintah-Ouray Reservation, Utah. In her odd little seed house, Mrs. Daniels showed the scientist bottles and cans filled with seeds that she had saved during most of her life. As a child, Mrs. Daniels had been stolen from the Navajo by the Whiteriver Apaches and sold to the Uintah Indians and finally to a Mormon pioneer, a Mr. Daniels of

Fort Bridger, Wyo., who later settled with her on the Uintah Reservation. Mrs. Daniels has gardened successfully during her long life, growing a variety of vegetables in a homemade irrigated plot. She had only three lima beans remaining in her seed can, but the scientist wrapped them carefully and took them to the experiment station. From this small beginning was developed a new variety of lima bean placed on the market for the first time this year. The bean is especially adapted to the short growing season of the high dry country of such areas as eastern Utah, Wyoming, and South Dakota.

The first rabbit brush to leave the State of Nevada last year for rubber experimentation was collected by Indian agricultural students at the Carson Indian School. The boys used homemade balers and baled a sufficient quantity of rabbit brush to enable the United States Tire Co. to make extensive tests for rubber content.

During the past year irrigation supplied water to some 540,000 acres of farm land on Indian reservations west of the Mississippi River. These lands, used by Indians and non-Indian farmers, have been devoted to the production of critical food crops urged by the War Food Administrator for the western area. The combined value of food produced on Indian-irrigated land amounted to 20 million dollars in 1942. In addition, power systems operated by the Indian Service in connection with these irrigation projects furnished 35,000 kilowatts, either directly or by interconnection, to copper and molybdenum mines, numerous manufacturing plants, city utilities, and other commercial and industrial consumers in the rural West. The San Carlos and Colorado River projects furnish power to relocation centers settled by 30,000 Japanese-Americans who had been removed from the West Coast, and also to an army camp in Florence, Ariz., where prisoners of war are interned.

In a recent report of the Department of the Interior to the War Food Administrator, the Indian Service submitted plans for irrigating an additional 156,500 acres of Indian land over a 5-year period at a total cost of 16 million dollars. If adopted, the program would provide for increased food production valued at \$7,601,000 the first 2 years of operation and would also create post-war employment and farm areas for ready occupancy by Indians returning from the war and from industrial centers.

## LAND YIELDS WAR MINERALS

A number of essential war minerals are obtained from Indian lands. Lead, zinc, oil, and gas are produced in large volume. Copper, vanadium, asbestos, gypsum, and coal are produced in small quantities.



The Indian Service has responsibility for general oversight of mineral production on Indian lands. Some of the technical phases are handled by the Geological Survey. Certain aspects are subject to final approval by the Secretary. The scope of this work is indicated by the volume of business handled during the fiscal year, which included: Approval of 900 mining leases, the issuance of prospecting permits covering many thousands of acres, the development and approval of plans for the commingling of ores in order to increase production, the sale of certain tribally owned deposits of coal to the Defense Plant Corporation, and the assignment to the United States of an oil lease for Indian land on which a deep-test well revealed the presence of helium gas. Revenues to the Indian owners of these minerals thru royalties, rentals, and bonuses are estimated to exceed 5½ million dollars yearly.

The Indian Service, in cooperation with other Government agencies and with the Indian landowners, is encouraging the discovery of new deposits of strategic minerals, increased production from known reserves of low-grade ores, and the introduction of simplified procedures to make mineral deposits immediately available.

#### WOMEN IN LUMBER MILLS

From Indian-owned forests this year came timber for war construction totaling almost a half billion feet valued at 2 million dollars. Included are the Sitka spruce used in the construction of training planes, elm and oak, from which the ribs of ships are hewed, and Douglas fir and Western hemlock, which go into plywood for airplane construction.

A significant source of lumber in the Great Lakes area is the Menominee Indian Mills, Inc., at Neopit, Wis. As 200 Menominee men serve in the armed forces and others are away from the reservation in war jobs, production of lumber had to be curtailed until Menominee Indian women were called to replace the men.

May 3, 1943, marked the first time women ever worked directly in Menominee mill operations. Thirty Indian women made possible the return of the second shift which was discontinued for 3 months because of the manpower shortage. The women have learned to pick and sort stock, work on the chipper, and bundle lath. They also do general clean-up work in the mills and cooking in the lumber camps. About 50 additional women will be available for mill jobs this fall if plans for a nursery school can be carried out.

More than 50 Menominee women have been regularly employed to work in the forests, carrying out the blister rust eradication program

which was formerly manned by Indian CCC employees. They are driven to the work by Indian women truck drivers.

### BOMBING RANGES PROVIDED

Over many thousands of acres owned by Indians, few white men have trod. The War Department has found much of this land suitable for bombing ranges, airports, and other military uses because of the poor quality of the land and its remoteness from centers of population.

More than 400,000 acres on the Pine Ridge Reservation, South Dakota, were sold to the War Department for bombing ranges, necessitating the evacuation of 128 Sioux Indian families. These families were safely moved to new homes on recently purchased land and credit has been extended to them for the purchase of cattle and farming equipment. Smaller tracts of land have been sold or leased to the War Department on the Kiowa Reservation, Oklahoma; on land belonging to the Five Civilized Tribes, also in Oklahoma; on the Tulalip Reservation, Washington; on the Pima and Papago Reservations, Arizona; on Pueblo lands, New Mexico; on the Blackfeet Reservation, Montana, and on the Fort Hall Reservation, Idaho.

The road-building program of the Indian Service during the past year was restricted to the construction of roads leading to vital war materials. The completion of a road to a vanadium mine on the Navajo Reservation made possible the doubling of the mine's output of this essential mineral. Likewise it has been possible to obtain additional logs from Indian-owned forests and saw mills by completing several roads. The development of asbestos mining has necessitated plans for a road covering a section of an Apache Reservation which only Indians have heretofore traversed.

With 50 vacancies among Indian Service physicians and 150 vacancies among the nurses, the Indian Health Service is hard put to keep its organization together, and only by working overtime and with assistance from other employees can the excellent record of our physicians and nurses in caring for the Indians' health be maintained. Despite these handicaps the record of achievement of the Indian Health Service continued to be impressive.

The death rate among the Indians has dropped 53.3 percent in the past 12 years, and they are continuing to gain in numbers slightly faster than the general population. Of some 430,000 Indians in the United States and Alaska, 401,384 are under Federal jurisdiction.

Additional hospitals, trained medical personnel, modern schools, and an improved economic status for the Indians have all contributed

to lowering the death rate among them. The Indian birth rate has fallen about 25 percent in the past 12 years, but this is more than compensated by the sharp reduction in Indian deaths.

### “SULFA” TREATMENT FOR TRACHOMA

One of the most common and ancient diseases of mankind is trachoma, an eye affliction. The disease is contagious, intensely painful, blurs the vision, and often results in partial blindness and occasionally, total blindness. According to Indian Service physicians who have been treating Indians for this disease during the past half century, trachoma is caused by a virus. The Indian Service introduced sulfanilamide treatment in 1939, and the trachoma incidence among Indians dropped from 30 to 7 percent in the fiscal year 1942 and to 5 percent during the past year. The “sulfa” treatment is more economical from the point of view of time and effort and pain than any other treatment yet developed, and does not injure the eye tissues as have some of the harsh external treatments. Indian Service physicians have made a comprehensive survey of trachoma and of their experiences in administering the “sulfa” treatment. Their findings will be made available to the medical world in a paper to be published soon.

Several years ago an Indian Service physician was assigned to study the food habits of certain Southwest Indian communities. He had previously found serious nutrition deficiencies in the diet of western Shoshone children who, after being given the needed vitamins in their school lunches, immediately began to progress in school. This specialist has found the foods of Southwest Indian communities markedly deficient in certain nutritive values. The only products natural to the area containing the desired food values and easily accessible to the Indians are pine needles and, among the Papago, a certain cactus. To supply this need, employees are experimenting with bean sprouts, drawing on the Orientals' long experience in this field. In the Pueblos area, fish ponds were planted this past year to supply a source of food whose nutritive values are not represented in any other foods in the present diets of the Indians.

During the past year four Indian hospitals were closed, and the Tomah, Wis., Indian school and hospital were turned over to the War Department. Indians who would otherwise go to the hospitals at Leupp and Toadlena on the Navajo Reservation and to Towaco on the Consolidated Ute jurisdiction will be cared for in other Indian Service hospitals. Local contracts have been made with private



physicians to care for Indians of the Sac and Fox jurisdiction in Iowa and in the Tomah area in Wisconsin.

The State sanatorium of North Dakota has set aside 50 beds for the use of the Indian Service in treating Indians who have tuberculosis. Thirty-one of the thirty-two Turtle Mountain Indians known to have active tuberculosis are now under treatment at the State sanatorium, a record which any community in the United States might well envy.

Adequate health and school facilities are still lacking in some remote Alaska communities, but Alaska natives generally have had better service the past year because of the presence of our military forces in the Territory. Army, Navy, Coast Guard, and Marine officials have cooperated in epidemics and emergencies, either by supplying medical treatment or by furnishing rapid transportation for the natives to medical centers.

### LARGEST HOSPITAL COMPLETED

Because of war demands for building materials, few new buildings were constructed, but the Indian Service was fortunate in completing within the past year the largest hospital that it has ever built. The Tacoma hospital was started July 1941. Total cost of the principal building and the dozen buildings attached to it, including quarters for physicians and nurses, a laundry and commissary, was approximately \$1,300,000.

Commanding a view of Tacoma, Wash., and Mount Rainier on the east and the Olympic Mountains on the west, the hospital building is six stories from the basement to the auditorium, contains 350 beds and a fully-equipped out-patient department. It serves the Indians of the Northwest and Alaska. With the shortage of medical personnel, only 250 beds are now in use, but excellent doctors may be called in an emergency or for consultations from Tacoma.

The modern fireproof buildings finished in light buff brick with a limestone trim replace 56 obsolete frame buildings formerly used as an Indian school, and following the last World War as a veterans' facility.

In June 1942, the Japanese Army occupied certain islands in the Aleutians, bringing the war to the very doorsteps of the Alaska Indian Service. On Attu live 45 Aleuts and two Indian Service employees, Mr. and Mrs. Charles Foster Jones. According to a boat operator who visited the island of Attu several months prior to the Japanese invasion, Mr. Jones had planned with the natives the total destruction of their oil and gas stores, radio, and other equipment

which might be of value to the Japanese. Jones had also trained the natives as a small army and said they expected to resist if the Japanese landed.

The 63-year-old Jones couple were offered the Attu post in 1941 because of their long successful experience in Alaska and because they were versed in many skills and were extremely adaptable. Mrs. Jones was a qualified teacher, social worker, and trained nurse. Mr. Jones, who had spent his earlier years prospecting for gold in the Far North, was an experienced radio operator and could repair and maintain many types of machinery. The Weather Bureau needed a radio operator to report the weather on Attu, which has been described as the weather factory of the world. Until a few hours before the Japanese invasion, Jones reported weather schedules hourly to the Alaska Defense Command in addition to performing his duties as an Indian Service special assistant.

### THE JONESES VS. TOJO

Early in the spring of 1941, the Joneses carefully considered the possible dangers on Attu and then accepted the new post with enthusiasm. Transferring from Old Harbor, Alaska, they arrived on Attu in August 1941. Mrs. Jones' letters to the Juneau headquarters praised the native village as clean, progressive, and intelligent. Mr. Jones wrote discussing plans for introducing reindeer on the island to supplement the natives' income from fishing and trapping. After Pearl Harbor Mr. and Mrs. Jones were asked to discuss with the natives the possibility of evacuation to the mainland until after the war. Their answer in the face of daily threats radioed from Tokyo was that they preferred to take their chances and defend their island home. By the time the authorities had decided that evacuation was a military necessity and shipping arrangements were completed, it was too late to reach Attu. The fate of the Aleuts and of the Joneses is still unknown to the Service.

The Aleut people living on the islands of Atka, Akutan, Kashega, Makushin, the Pribilofs, and Unalaska were safely removed to villages in southeastern Alaska before any persons were injured or captured by the Japanese. The 477 Pribilof Islanders who were moved to Funter Bay, the site of an abandoned fish cannery, are under the jurisdiction of the Fish and Wildlife Service. The remainder of the Aleuts received Indian Service assistance.

The hundred other native families were furnished the lumber and tools with which to build cottages for themselves at their "duration" homes on the Alaskan mainland. For people who come from a land

where no trees grow, the Aleuts performed well with hammers and nails. According to an Indian Service official who supervised their resettlement at Ward Lake, the Aleuts built many houses from foundation to roof in a single day—complete with electrical wiring, hardware, windows, doors, and three or four rooms. The total cost of each house was less than \$150.

The Aleut evacuees have had no difficulty in obtaining employment or in earning a livelihood from fishing and trapping since settling in their new homes.

According to newspaper reports, Alaska's Indians and Eskimos make fine civilian soldiers in the Territorial Guard under the direction of the Governor. On familiar terrain, the natives can be of great assistance to the military authorities as guides and scouts. In many native villages, Indian Service teachers and nurses are responsible for organizing the natives in civilian defense units, and, under their guidance, native women have prepared many bandages and other materials for first-aid use.

Although the Indians were better off financially this past year than they have been in years, nevertheless a number of families continue to need assistance. The Welfare Division through its social workers and other Indian Service employees has assisted the Indians in filing applications for the family allotments, insurance, maternity and infant care which they are entitled to while members of their families are serving in the armed forces.

The food stamp plan administered by the Surplus Marketing Administration was abolished January 1, 1943. This method of administering relief to needy Indians proved greatly superior to methods employed by the Indian Service since its early history. A recent ruling of the Comptroller General permits the Government to make cash payments to needy Indians. This method, for many Indians, is preferable to the issuing of rations or purchase orders, the system which had been in effect for many years prior to the food stamp plan.

## TRIBAL COURTS AND POLICE

Maintaining law and order on Indian reservations is primarily the responsibility of the tribes themselves, who have their own tribal courts and tribal police. The Indian Service assists by encouraging tribes to adopt law and order codes and by providing a corps of 30 special officers who give guidance to Indian judges and Indian police and who in addition handle violations of certain criminal statutes, especially the Federal Indian liquor law.



Indian courts and Indian justice continue to operate satisfactorily, especially in close-knit Indian communities and in those areas where Indians and non-Indians are not living side by side. By far the large majority of the Indians are law abiding. Indian police and Indian judges need additional training and advice, but the Indian Service's Law Enforcement Staff, regrettably, is not large enough to contribute more in the field of training.

One thousand four hundred and forty-eight Federal and State criminal convictions were handled in 1942 by the special officers of the Indian Service. Nine hundred and sixty-two were non-Indians. Violations of the Federal law prohibiting the sale of liquor to Indians continues to be the most common offense and represents 75 percent of the crimes prosecuted by this Office. In 1942 the fines paid by non-Indians for violating this law totaled \$15,800.22, while fines paid by Indian offenders were less than one-tenth as much, or \$1,185.06.

The Menominee Advisory Council approved the appointment during the past year of their first woman judge, Mrs. Rhoda House. Judge House has an excellent approach to problems of family relationships, according to reports, and her desire to determine the causes and alleviate the conditions resulting in crime has contributed to a reduction in juvenile delinquency on the Menominee Reservation, Wisconsin.

The Indian Service, during the past year, has had to give increased attention to problems arising in centers where Indians have been employed in war industries. Many hundreds of Indians are away from their homes and engaged in war work. Unfortunately, the general misconception persists that an Indian, no matter where he may be, is the special problem of the Federal Government rather than a citizen entitled to recognition by the courts, by private charity and public welfare organizations. Consequently, many problems of law and order, housing and other aspects of social welfare are often referred to the Indian Service instead of being handled by local agencies.

Some Indians have their own solution. Families from Laguna Pueblo, New Mexico, now employed on the railroads, have reestablished in the towns of Gallup, Winslow, and Richmond, their traditional hierarchy of a lieutenant governor and council. These leaders are responsible for solving all the human problems which arise in the temporary work colonies. They administer justice and relief and direct community activities.

#### TRIBAL CODES ENFORCED

Likewise, the Florida Seminoles, several hundred of whom are employed in agricultural work away from the reservation, cling to their

family or clan relationships with a head man to enforce tribal moral codes. In their migrations from one seasonal job to another, the Seminoles create no housing problem, preferring their open thatched palmetto chikis to any kind of house that white men have yet devised. A large sugar beet corporation which has been nationally praised because of the clean, attractive town provided for its workers was forced to provide, in a recent contract signed with Seminole workers, for the use of a truck for gathering palmettos. The Seminoles chose to build their traditional shelter rather than live in the company houses.

Large numbers of Indians have been employed in jobs and in areas where they had never been employed prior to the war. Some 300 Sioux Indians were employed during the growing and harvesting season in the Platte Valley in Colorado. Four to six hundred Navajos were located along the Arkansas River between the town of Pueblo, Colo., and the Kansas border. Three to four hundred Navajos work in mines at Morenci, Ariz. More than 300 Pimas and Papagos work in mines at Ajo, Ariz. Some 800 Navajos load shells at the Fort Wingate Ordnance Depot in New Mexico. Several hundred Navajos are employed in the Sacramento Valley, Calif. Additional hundreds from dozens of different tribes are scattered through the West.

Representative Karl Mundt, of South Dakota, has placed before the House Committee on Indian Affairs a resolution to investigate the administration of Indian Affairs and to determine whether or not the Indians have received benefits under the Indian Reorganization Act. I record here some of the remarks I made at committee hearings on the Mundt resolution :

The Indian Reorganization Act fits the need of any Indian group whose members live and work in the same neighborhood or reservation. It fits those who have kept their ancient ways and those who have changed to modern ways. Its basic principle is that men need to organize, and that democratic organization protects and strengthens, and does not endanger or weaken, individual responsibility and rights.

However, the Indian Reorganization Act does not require Indians to organize. It is solely permissive. A tribe which has brought itself under the act is free to postpone organization indefinitely. Or it may organize politically (under a constitution) and never organize industrially (under a charter). The actual record to date is as follows :

192 tribes (130,704 Indians) accepted the act.

88 tribes (100,000 Indians) have adopted constitutions.

68 tribes (69,753 Indians) have received charters of incorporation.

In addition, the Indians of Oklahoma and the natives of Alaska were blanketed in by Congress.

## POLITICAL AND ECONOMIC ORGANIZATION

It goes without saying that Indian political and industrial management under the Indian Reorganization Act has not been perfect. Human affairs are not ever perfect. Majorities sometimes are unwise, sometimes are tyrannical. Legislative and executive representatives and officers sometimes are incompetent, or partisan, or corrupt. This is human life and it is Indian life. We believe that an examination of Indian organized life under the Indian Reorganization Act (and also, outside the Indian Reorganization Act) will show that it compares very well indeed with white organized life. Indian organization has produced a very impressive release of energy, and increase of purposeful effort and of economic production, among the tribes. It has, too, furnished a greatly needed outlet for exiled and suppressed emotion among the tribes; and if in some places it has brought into being debate, political excitement and even political uproar among some Indians, that, it would seem is to the good. Certainly it is our traditional and valued American way. To give body and form to this summary concerning the Indian Reorganization Act, I supply briefly a single example. It is taken from an article which I wrote for the *Atlantic Monthly*, September 1942.

"The several Apache bands were crushed in war and were then held for two generations in idleness. They were governed by authority immovable though not unkind. The Mescalero Apaches in southern New Mexico live amid 400,000 upland and high mountain acres. Nine years ago their land was used by white lessees. Six out of seven in the tribe inhabited a camp slum clustered about the Indian agency. The Government in preceding years from time to time had endeavored to lure or force the Mescaleros out from their noisome camp and back onto the land. In vain; authority failed, and inducement, and argument to the individual failed. Death doomed, robbed of their war-way, the Mescaleros had regressed, and they silently immured themselves in their dependency.

"To Santo Domingo Pueblo in 1934 the Mescaleros' delegates came. The draft of the Indian reorganization bill was being presented, and the Pueblos said 'Indeed and of course, for this is our own old-time day.' Incredulous, the Mescaleros went home.

"Congress passed the Reorganization Act. The Mescaleros were informed: It is the law. The law says that you must yourselves decide, for yourselves, whether you want to be free. You are required to make this choice, and it may be forever.

"They chose freedom, and then they realized that it was they themselves who must plan their future life. Tribes under the Reorganization Act may formulate political constitutions which thereafter only they or Congress can change, and they may adopt corporate charters empowering them for the whole range of business enterprise. The Mescaleros framed a constitution and charter, and earth and life began to emerge under a clear light, a light new and yet known from long ago. A miasma of collective regression started to fade away.

"Utilizing a government loan—there have been no delinquencies in repayment—the Mescaleros abandoned their slum camp and resettled themselves out where farming and cattle-running could supplement each other. Their net income from cattle jumped from \$18,000 to \$101,000 in 3 years. They closed out all leases to whites and they now use their entire range and built up its herbage and soil while using it. Their farm crops multiplied eightfold in value in 3 years. These figures are indices merely. Long-range economic planning has become a matter of course with the Mescaleros. Their energies surge. They have their war-way once more, their chance for combat, for leadership, the endless universal war-way wherein nature is antagonist and collaborator in one. Among the Mescaleros



as among all the other tribes that have organized under the new policy, women and men have equal duties and privileges."

## ADJUSTMENT TO WAR CONDITIONS SOUGHT

The in-service summer school was not held in 1942, but the replacement of many former employees with persons unfamiliar with Indian Service necessitated a session this year. Two hundred and eighty employees attended the summer school which was held during the month of June 1943 at Haskell Institute, Lawrence, Kans. The courses were designed to help teachers adjust to wartime conditions. One of the most popular classes attended by 75 women offered actual experience in repairing and maintaining mechanical equipment, refrigerators, locks, stoves, plumbing and laundry facilities, such as are attached to Indian Service schools in areas in which there is no mechanical assistance for many teachers.

The Indian Service supervisor in the management and marketing of Indian-owned livestock instructed employees in stock-raising, animal feeding, sanitation, and the construction of shelter for livestock and poultry. In order to increase local meat supplies, some employees received instruction in the care of rabbits and the building of rabbit hutches from second-hand materials which are easily available. Teachers and school principals from the Southwest were especially interested in classes in chemical gardening and in the sprouting of beans, and grew crops while they were at Haskell.

In a 25- by 50-foot greenhouse at the United Pueblos Agency, Albuquerque, N. Mex., one Indian Service employee is already growing vegetables with chemicals in his spare time for consumption in the schools and hospitals under that jurisdiction. Lettuce is ready for the table 29 days after planting the seed. A small section of the greenhouse yields 65 pounds of green vegetables each week.

Indians have dried meats, vegetables, and berries by simple methods for ages, but only within the last few years has the Indian Service begun experimentation in modern dehydration. A number of Indian Service schools have installed dehydration plants. The Indian Service boarding school at Phoenix, Ariz., has pioneered in this field with the cooperation of the Department of Agriculture. During the past year, Phoenix Indian School furnished a year's supply of dehydrated fruits and vegetables to the Eklutna, White Mountain, and Wrangell Boarding Schools and six Indian Service hospitals, all located in Alaska, and in addition preserved many types of food for its own use. The commandeering of transportation facilities to meet military needs greatly increases the desirability of dehydrated foods both for civilian

and military consumption because of the smaller shipping space required for foods that have been dried. Also, dried foods do not spoil. Oranges, grapefruit, onions, beets, potatoes, carrots, corn, beans, cabbage, and spinach are among the foods that are being dehydrated successfully. All but 4 percent of the moisture is usually extracted in the process.

### "EARTH BRICK CONSTRUCTION" PUBLISHED

Indian Service educators issued a revised book list of recommended reading for schools and also compiled an extensive bibliography of materials for schools in wartime. The long-awaited publication entitled "Earth Brick Construction" by Elbert Hubbell, specialist in building with native materials, appeared this year. The booklet contains instructions, plans, and illustrations for building with adobe and asphalt stabilized earth bricks, an economical type of construction which is growing in popularity in many parts of the West.

The fourth booklet in the Indian handicraft series, *Crafts of the Ojibwa*, by Carrie A. Lyford, appeared this year. Also published were additional school readers written by Ann Nolan Clark and illustrated by Indian artists, including four in the Sioux-English bilingual series, *The Pine Ridge Porcupine*, *The Slim Butte Raccoon*, *The Grass Mountain Mouse*, and *There Still Are Buffalo*, and Mrs. Clark's first reader in the Spanish-English series, *Young Hunter of Picuris*. These booklets are printed by Indian student printers in Indian school print shops, and as many of the youths have gone to war, Indian girls are assisting in the shops at Haskell and at Sherman Institute, Riverside, Calif. The pamphlets may be purchased at 50 cents each from Haskell Institute, Lawrence, Kans.

Publications emanating from the University of Chicago's study to determine the extent to which Indian native autonomy in the United States has been affected by the many years of Federal rule will begin to appear in the fall of 1943. Indian Service physicians and teachers worked many extra hours during the past year to assemble the necessary information, administer scientific tests and make physical examinations of 1,000 selected children between 6 and 18 years of age. These children live in 11 communities on the Hopi, Navajo, Pueblo, Papago, and Pine Ridge jurisdictions.

Few governmental agencies have undertaken so exhaustive an analysis and criticism of their work and its results. Already for those Federal employees engaged in the fact-finding, the research has provided valuable in-serving training. The study is under the direc-

tion of Dr. W. Lloyd Warner, professor of anthropology and sociology, and Dr. Laura Thompson, coordinator of research.

Designed to provide the basis for sounder education and adjustment of aboriginal peoples whose cultures now in transition are overshadowed by industrial civilization, the study of factors molding Indian personality may indirectly benefit the 30,000,000 Indians in the Americas. It has international sponsorship by the Inter-American Indian Institute, and a similar study is being undertaken in Mexico.

### LATIN-AMERICANS VISIT U. S. RESERVATIONS

The National Indian Institute, having sent representatives to Latin-American countries during the past 2 years to acquire some understanding of their vast Indian problems, was able this year to offer practical training to a group of 11 distinguished Latin-American technicians and rural educators who visited U. S. Indian Reservations. The Research Fellows came from the countries of Bolivia, Ecuador, Peru, Guatemala, Mexico, Panama, Haiti, and El Salvador. Sharing their time with other Federal agencies, the Latin-Americans spent from 3 weeks to 4 months studying U. S. Indian administration. Several representatives visited the Sioux country in the Dakotas, but they concentrated their studies on southwest reservations because climate, soil, and other factors there more closely approximate those which are found among their own rural Indians. Also our largest Spanish-American population lives in the Southwest.

The Research Fellows also learned something of the administrative mechanics of the Indian Service in its headquarters. They interviewed officials in Chicago and Washington and visited the summer school for Indian Service employees at Haskell Institute.

This preliminary Latin-American in-service training furnished such rich experiences to the Research Fellows and to the Indian Service that we hope an exchange of experiences between the United States and those countries having aboriginal peoples may continue. The Indian Service is in a position to offer more intensive training over a longer period, actually encouraging representatives of other countries to understudy those Indian Service positions here which correspond with theirs at home and to meet and solve problems as they arise.

### PERSONNEL CHANGES, LOSSES, NUMEROUS

Like many other agencies, the Indian Service has experienced the most rapid changes and losses among its own personnel in its history.



Eight hundred and thirty-eight regular employees have left for military service; others have transferred to agencies more directly responsible for the war program.

There are probably few employees throughout the Indian Service who are not performing more duties than their job-sheets describe in order to meet the war emergency. Teachers have been asked to guard the forests in lieu of fire look-outs. They have been asked to perform clerical work in the agency and hospital offices. In many instances, one employee is performing the work that two employees performed prior to the war, and in some instances, one employee has replaced three.

This has been made possible by the introduction of improved systems of statistical reporting and in-service training. A new machine tabulation system now being introduced in Indian Service hospitals is expected to reduce clerical work performed by the nurses and physicians 20 to 25 percent.

The recent law requiring payment of time and a half for official time worked beyond 40 hours a week has raised employee-morale considerably. I am aware that employees often work many hours beyond 48 hours a week because of seasonal and other exigencies. School and agency headquarters are often the only places from which an Indian can telephone, obtain a doctor's services, or whatever else may be needed in an emergency. Indian Service employees in the field cannot adhere to a daily or weekly time schedule, nor would a rigid schedule be desirable in administering to human needs in rural areas.

The wartime shortage of personnel and the fact that the bulk of the headquarters staff is now located 800 miles from Washington are bringing about a few long-needed changes in procedures. Additional authority has been delegated to Bureau heads, and the consequent simplifying of procedures is resulting in the saving of time and the elimination of needless correspondence. For example, certain legal problems of the Indians may now be referred directly to the field offices of United States attorneys. Thus, in April and May 1942 the legal staff received 589 communications from the Department of Justice as compared with only 195 such communications in the same months of this year, a decline considerably in excess of 50 percent.

Other changes are taking place throughout the headquarters and the field staffs. The small library and information staffs have been consolidated in order to effect economies in the answering of inquiries. The news magazine, *Indians at Work*, in which many inquiries of a general nature are answered, was formerly published monthly but now appears every other month. Among the magazine's readers are Indian

soldiers in New Guinea, Africa, England, and Alaska. They have written letters to thank the Bureau for the magazine.

The war has not curtailed the number of Indian estates to be probated, but the probate staff is reduced from four attorneys and two clerk-stenographers prior to August 1942 to the present chief probate attorney, one attorney, and one clerk-stenographer. There remain eight examiners of inheritance in the field offices. During the fiscal year, 1,403 cases were received by the probate staff, and despite the greatly reduced personnel, the work is as current as usual, only 50 cases awaiting attention. Probate matters involving the Five Civilized Tribes and the Osage Nation are handled separately. Through the efforts of the Indian Service, Indians of the Five Civilized Tribes were saved \$163,876.70 in the disposition of 995 cases in the county courts, and 143 cases in Federal, State supreme, and district courts. For the Osage Nation, 141 cases were disposed of in the Federal, State supreme, and district courts while 216 Osage cases are pending. Many Osage estates are very valuable and cases often remain in the courts for years.

### MISSION TO ARABIA

At the request of King Ibn Saud, who is attempting to acquire modern equipment and methods to improve the economic lot of his people, the chief engineer of the Indian Service, A. L. Wathen, J. G. Hamilton, of the Department of Agriculture, who formerly worked on soil conservation on the Navajo Reservation, and K. S. Twitchell, who has spent many years in Arabia, comprised the first U. S. Agricultural Mission to Saudi, Arabia. Mr. Twitchell had recommended to the State department, which sponsored the mission, that persons having technical experience in enhancing the economic opportunities of the Indians of this country be members of the mission. The mission traveled more than 11,000 miles in Arabia by automobile, donkey and camel, and visited places not previously seen by white persons. Every courtesy was extended to the Americans during their 10 months' stay by the King and the friendly Arabs. In the Hedjas mountains along the Red Sea, they found terraces that had been constructed probably thousands of years ago and are still maintained in good condition by the Arabs. They also found that, contrary to popular opinion, drainage is a principal requirement for the increase of crop production, particularly along the Persian Gulf, because of numerous springs that flow uncontrolled. Their findings and recommendations were published by the State department this year in English and in Arabic for the use of King Ibn Saud and his advisers.

## SERVICE ADMINISTERS RELOCATION PROJECT

We continued through the year to administer the War Relocation project on the Colorado River Indian Reservation in Arizona. As reported last year, this center was built by the War Department to house 20,000 Japanese and persons of Japanese descent who had been evacuated from the West Coast. The project is composed of three separate camps which are located south of Parker, Ariz., and below that portion of the reservation occupied by the Colorado River tribe. Altogether, 10 of these centers were developed for the War Relocation Authority and while only the center on the Colorado River reservation is operated by the Indian Service, two others, the Gila River center and the Leupp Detention Camp, occupy Indian lands.

Throughout the year our attention was mainly occupied with the construction phases of this project. The digging of irrigation canals and laterals and drains, the subjugation of land, the building of a trunk highway into the town of Parker, with secondary roads and streets within the three camps, and the building of schools and quarters for administrative personnel consumed the greater part of the funds and manpower which were available to the project. The housing provided by the Army engineers consists of simple barracks of the theater of operations type, covered with tar paper, which afford little protection from the extreme summer heat or from dust, which hangs in clouds over the camp much of the time. Little could be done to modify the basic housing, but in the construction of schools adobe brick has been used. This has the advantage of being economical and of providing insulation against extremes of temperature.

As the construction period draws to a close, and it is anticipated that most of the public works will have been put in operation by this fall, emphasis will shift to food raising. For the time being it is planned to cultivate about 5,000 acres, most of which will be planted to vegetables, with some feed for livestock. Already, hogs and poultry are being raised in sufficient quantity to meet the needs of the evacuees. The center is now almost self-sustaining in certain basic foods, requiring only the purchase on the outside of dairy products and beef. During the quarter ending June 30, 1943, a total of 540,000 pounds of vegetables was produced. No industrial activity is contemplated except for minor production of processed foods and clothing, with some woodcraft and carving, artificial flowers and minor art work.

### COUNCILS FUNCTION IN EACH CAMP

Particular effort has been devoted to organizing the evacuees as a community. A temporary governing council was first elected in each



of the three camps and while the camp population gained familiarity with its problems and opportunities, discussion went forward in the formulation of a municipal charter. Such a charter was recently adopted by popular vote and permanent councils now function in each camp. There is also a general council composed of representatives of the camps.

While the center provides food, shelter, health care, and education, all basic needs, it cannot provide for the many personal requirements of the evacuees. Laundry and dry-cleaning, shoe repairs, barbering and manicuring, and miscellaneous household goods and staples must be paid for out of cash wages (wage scales of \$12, \$16, and \$19 per month are in force) or out of savings which the evacuees brought with them. Canteens were established as soon as the center was opened and in time these canteens were handling a volume of business amounting to several thousand dollars daily. This enterprise is now organized on a cooperative basis. As in the case of the development of community government, this step was taken after months of educational work and after it had been submitted to popular vote.

The project has maintained from the beginning a social analysis section, the purpose of which was to keep a day-to-day objective record of community events, administrative decisions, and evacuee sentiments. The materials of such a record then furnish points of reference for the analysis of community opinion at any time or for prediction as to what this opinion may be at some future time, in given circumstances. It is an attempt to develop a technique by which an administrative agency dealing with people can gauge its effectiveness in directing the efforts or meeting the needs of such people.

### A POST-WAR PROBLEM

The great exodus of Indians from their homes confronts the Indian Service with a number of post-war problems.

Should economic conditions after the war continue to offer employment opportunities in industry, many Indians will undoubtedly choose to continue to work away from the reservations. Never before have they been so well prepared to take their places among the general citizenry and to become assimilated into the white population. Between 1934 and 1942, an extensive program of adult education was carried on throughout the reservations. Many, as CCC enrollees, learned to operate jackhammers, to weld, to drive bulldozers, and to maintain and repair all kinds of equipment. Under the Public Works program, large numbers of Indians were employed in the construction of schools and hospitals on reservations. In the road-building program of the

past ten years hundreds of Indians became proficient in the operation of heavy machinery, in surveying, and other skills involved in road construction and maintenance.

In addition, the vocational schools were much more proficient and each year several hundred young people were graduated directly from schools into skilled jobs. Since 1930 the Indian Service has devoted much effort to rehabilitation of the reservation resources, but this very program was the best possible training Indians could have received for off-reservation living. It will be no surprise, therefore, if a sizable proportion of those Indians now away from home continue in urban industrial employment during the post-war period.

### PLANNING POST-WAR PROJECTS

If, on the other hand, the war is followed by a period of depression and unemployment, the majority of those who are now away from their homes will return to the reservations. To enable these thousands of returning soldiers and workers to find work opportunities, I have asked Indian Service technicians to assist the Tribal Councils to intensify their plans for the fullest use of reservation resources, and to supplement these by plans of a public works character. According to a preliminary estimate several million dollars worth of improvements in the rehabilitation of the soil and forests, the adjustment of a complicated land ownership problem, the construction and improvement of many miles of roads, and the building or reconditioning of scores of schools and hospitals are urgently needed on Indian reservations. Indian Service architects and engineers are now preparing plans and making estimates of probable costs, and of the number of Indians who can be absorbed by such work.

The Federal Works Agency and the U. S. Army Engineers requested the Indian Service to make plans for a town site located at the terminus of the Alaska Highway. The plans were furnished to these agencies during the past year, but because of the shortage of shipping facilities, construction of the town will not get under way for some time.

Many Indians returning home will want to take up where they left off in livestock farming, lumbering, fishing, and other reservation enterprises.

Whether Indians of the post-war era remain at home or find their way into the outside world they are going to be much more critical of conditions both local and national. The old ties of home and tribe, the ancient ways of dealing with problems of sickness, of marriage, of relations of youth to elders, these and many others will undergo change

as the youth receive new ideas from the far corners of the world. Promises made over many years: rights as citizens, self-government, political equality, economic rehabilitation, will take on increased meaning. Young people coming back from service in the armed forces are going to demand that the American people make good on these promises. They will no longer tolerate the discrimination of special liquor laws which make it a Federal offense to sell liquor to an Indian. Many Indians in uniform have been turned away from bars where other soldiers, white, Negro, Japanese, Philippine, were being served.

On behalf of the Navajo boys at an Army camp, a Navajo soldier recently wrote his superintendent, "We do not understand the kind of citizenship that says we can fight but not vote." In 1924 the Congress declared all Indians to be citizens, but several States with large Indian populations still disfranchise the Indians.

### HOW THE SERVICE SERVES

In this report I have sought to describe the work of the Indian Service very largely by reporting the accomplishments, the needs, and the desires of the Indians themselves. It is the function of the Service to give guidance and assistance to the Indians where they need it. In many Indian communities, Indian Service employees serve on Selective Service boards. They implement OPA rationing machinery in Indian country. They advise the Indians on the filing of income tax returns, on the purchase of War Bonds and on their many other responsibilities to a nation at war which demands the united participation of all its people, including its non-English speaking Indian and Eskimo citizens living thousands of miles from our great population centers. Service employees have suggested to the Indians that they brush up on English before enlisting or that they find someone to carry on their farming enterprises before leaving home. Our task is to try to answer their questions, to interpret for them new forms and regulations which apply to many of them for the first time.

These new conditions facing the Indians have demanded a continual recasting of the functions of the Indian Service. With acute shortages of manpower, it has been necessary to simplify procedures, to assign new and different tasks to personnel, and to eliminate all activities except those directly connected with the war or essential to the welfare of the Indians. This recasting of functions will continue so long as the Nation demands increased production of minerals, timber, and food to achieve a victorious peace.



# Board on Geographical Names

MEREDITH F. BURRILL, Director

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**T**HIS Board, established in 1890, is the official authority on the use of geographic names by the Federal Government and is the agency charged with bringing about uniform usage of geographic nomenclature and orthography. The Board decides all disputed questions concerning geographic names; determines, changes and fixes place names within the United States and its Territories and possessions; maintains central files of information on geographic names; prepares gazetteers and standardizes procedures for preparation of gazetteers by other agencies and establishes rules for guidance and standard procedures for naming hitherto unnamed places and for transliterating geographic names from languages that do not use the Latin alphabet. The Board also serves as an informal authority in non-Government use of place names and gives information on these names, their pronunciation and their locations from its extensive files. Pronunciation of place names has assumed an importance which it has never had before, by reason of the combination of radio broadcasting and the interest in war names all over the world. Governmental agencies, the press, and radio are being assisted in their use of geographical names as an important step in bringing about uniform usage. The Board also maintains contact with comparable agencies in foreign countries looking toward the development of uniform geographic nomenclatures and orthographies.

During the latter part of the fiscal year, the Board has been enlarged and reorganized primarily to perform functions required in connection with the operations of the armed forces. The enormous increase in map production by the armed forces not only calls for a correspondingly large number of name decisions, but requires that they be made promptly. Use of varying names for a place or feature on military maps not only complicates the geographical name prob-

lems by wide circulation of improper names, but also creates confusion in field operations, the accurate transmission of messages and the transportation of materials and men.

Many geographical names in foreign countries have quite different forms when transliterated or translated and may have more than a single form in the language of the country. These foreign name problems are being dealt with in a wholesale manner by the promulgation of standard rules and procedures for treating names in specific foreign countries or regions and by the preparation of gazetteers, place name indexes and special lists of alternate names and geographical positions. Simultaneously, decisions are being rendered on the most pressing questions involving individual geographic names. These actions have made possible the uniform usage of names on a large number of maps and charts made by several agencies for use by the armed forces.

Procedures have been improved by division of labor and specialization of personnel to make decisions at the rate of hundreds per week; to answer a constant flow of inquiries concerning these and other geographical names, and to assemble and maintain the necessary files and records. Staffing of the reorganized Board, which will have a total personnel of 135, including approximately 45 professional geographers—most of whom will be regional specialists devoting themselves to a particular part of the world—was still in progress at the end of the fiscal year. Since there was no precedent for many of the specialized positions, intensive training programs have been devised to train the nonprofessional personnel for this work. A remarkable increase in production has been achieved in a brief period. The Board's library now includes more than 2,500 bound volumes, 1,000 pamphlets, 55,000 separate maps and a large number of atlases.

During the fiscal year prior to the reorganization of the Board, 284 decisions were rendered by the executive committee at 11 meetings. A cumulative report is being prepared which will include these and all previous name decisions, totaling some 24,000.

# Division of Personnel Supervision and Management

MRS. J. ATWOOD MAULDING, Director

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**M**ANPOWER and its utilization has been the major problem of the Division during this fiscal year as it has been in the whole Nation, and our efforts have been largely directed toward its solution with relation to the Department's needs. In the early fall of 1942 the Secretary of the Interior called upon the bureaus and offices of the department to canvass their personnel situations and to determine whether (1) any activities not essential to the war program could be discontinued or postponed; (2) any time-consuming procedures and record keeping could be eliminated during the war program; (3) any rearrangements of work might be made which would release employees or make the filling of existing vacancies unnecessary; (4) any employees not being used at their highest skills or to their fullest capacities could be assigned more effectively within the bureau; and (5) whether training programs could be inaugurated to meet specialized needs. The bureaus diligently went about putting their houses in order.

The Division has given more than usual attention to the fullest utilization of the Department's own personnel to avoid drawing on the outside manpower pool, and its inventory of employee qualifications has aided not only in recruitment but has provided better individual placement. Some idea of the success of the Division's efforts is indicated by the fact that during the calendar year 1942, 71 percent of the vacancies above the entrance grades in the District of Columbia were filled from within the Department. This process, of course, was far from sufficient to meet the greater needs of our war program which demanded specialized experience. A particularly difficult situation has been the recruitment of engineering aids for the Geological Survey's strategic mapping program. All known sources of recruitment have been tapped; at the request of the Department and the Civil Service Commission, qualifying courses have been introduced



in a number of universities and colleges, and the Department has even appealed to the families of its own employees to provide trainees.

In the recruitment process the policy has been to secure as many women, older men and physically handicapped persons as might be found qualified. It is significant that at the end of this fiscal year the Department has 1,500 more women on its rolls than it had when Pearl Harbor was attacked. Many older physicians in the Indian Service communities have been employed to meet the shortage, and many other older men and physically handicapped persons have demonstrated their ability to carry on for our men who have entered the military service, of whom there were approximately 5,000 at the close of the fiscal year.

On March 12, 1943, the Secretary designated a Committee on Deferral of Government Employees for the Department to carry out the provisions of Executive Order No. 9309 of March 6, 1943. The committee is composed of the Assistant Secretary as chairman, the Director of the Bureau of Mines and the Director of Personnel. Because of the specialized war work which is being done in the Department, and which requires professional and technical employees, and because of the scarcity of replacements in these fields, a considerable number of draft deferment requests have come before the committee.

The unusual scarcity of qualified stenographers compelled the Division to carry on throughout the year a training session for the orientation of new appointees and for bringing those of substandard qualifications to a productive level. Other training projects were carried on, an outstanding one being a course in departmental administration involving the general subjects of administration, fiscal accounting, personnel, office and property management and public relations.

During the year classification procedures were studied, simplified, and accelerated. The classification office acted upon 21,530 cases. Effective February 1, 1943, regulations were issued providing for the application of a 25-percent differential to salary classification rates outside of continental United States.

During the year over 60,000 personnel actions were processed. This number is higher than in previous years, partly due to a higher rate of turn-over which averaged 31.9 percent in Washington and 55.4 percent in the field.

Certain acts of Congress which became effective during the fiscal year had an important bearing on the work of this Division. Public Law 821, approved December 22, 1942, and Public Law 49, approved May 7, 1943, provided for overtime pay and compensation. Public Law 806, approved December 17, 1942, provided for an accumulation

of annual leave up to 90 days. The Revenue Act of 1942 provided for a Victory Tax deduction; and later in the fiscal year the Current Tax Payment Act of 1943 required a withholding tax from the salaries of employees.

The transfer of the Indian Office, National Park Service and Fish and Wildlife Service to Chicago early in the fiscal year required some adjustment in processing procedures. Pay roll and leave work formerly handled in the Division was also decentralized to the bureaus. During the fiscal year there were 27 retirements for age, 77 optional retirements and 38 for disability. Fifteen employees were reemployed after reaching retirement age.

The number of grievance cases and disciplinary actions in the Department during the year was small and my observation is that the morale of employees throughout is high. The staff of the Division while working under trying conditions has cooperated to the fullest extent in carrying out the responsibilities placed on them.





# Office of the Solicitor

WARNER W. GARDNER, Solicitor<sup>1</sup>

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**T**HE chief task of the Solicitor's Office during the past year has been the development of streamlined processes designated to channel the resources of the Nation into use in the war program. Impediments to the mobilization of war resources, created by a national coal strike, shortages of oil, power, and transportation, and a variety of obsolete laws and cumbersome administrative practices, were dealt with, and very largely overcome. To make possible swift action on matters of first importance the legal machinery of the entire Department had to be streamlined and the accumulations of old cases that impeded prompt legal action had to be liquidated. That efforts in this direction were reasonably successful is indicated by the fact that the work of the Solicitor's Office was substantially on a current basis at the close of the fiscal year.

While the chief efforts of the Department's lawyers were directed toward clearing the channels of national war production, constant vigilance was maintained against inroads upon the permanent interests of the Nation in the conservation of its natural resources and in the preservation of the civil rights of its citizenry. A difficult coal strike situation was so handled that the Department has cast no discernible shadow upon any of the rights of the 3,000 coal operators and half-million miners involved. The civil rights of the citizens of Hawaii and Puerto Rico were vigorously protected and amplified, despite the close impact of the war upon these island territories. In Hawaii the Department was successful in securing a substantial restoration of civil authority, which had been temporarily surrendered to the military on the day of Pearl Harbor. In the case of Puerto Rico the Solicitor's Office devoted much energy to the mapping of

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<sup>1</sup> Nathan R. Margold resigned office on July 9, 1942, and Felix S. Cohen served as Acting Solicitor until August 26, when Mr. Gardner took office.

appropriate legislative measures for the strengthening of Puerto Rican self-government. The natives of Alaska found respect accorded to land rights which had long been violated or ignored; exclusive possession of six areas was assured to Indian and Eskimo groups in the first application of the act of May 1, 1936 (49 Stat. 1250); the War Department officially agreed to recognize the aboriginal rights of Alaskan natives in the large areas taken over for military purposes and the Department reaffirmed its recognition of aboriginal fishing rights in Alaskan coastal waters.

Seeking to combine efficient utilization of natural resources with a scrupulous regard for human rights and long-range national interests, the lawyers of the Department have had to meet new problems and new demands with prompt and resourceful counsel. If at the end of the year the Department can look back and see the accomplishments of the operating bureaus which fill the preceding pages of this volume, rather than a series of unsurmounted legal problems, then the attorneys of the Department can feel that they have done their job.

In the effort to streamline the legal work of the Department an extensive reorganization plan was mapped out and initial steps were taken toward its effectuation. The purpose was to centralize the professional supervision of legal service, while providing for more nearly complete legal service within the several bureaus, and for greater decentralization in administrative and fiscal matters on the Bureau level. The legal personnel work of the Department was coordinated under the direction of the Solicitor, and steps were taken to centralize in the Office of the Solicitor all legal work involving litigation, property acquisition, patent law, fiscal matters and personnel law. At the same time, the assignment of attorneys formerly carried on the Solicitor's pay roll to the pay rolls of the various Bureaus and Divisions of the Department made possible a substantial reduction in the budget of the Solicitor's Office.

## LEGISLATION

Adjustment of the machinery of government to war needs was a primary objective in the departmental legislative program of the past year. Although substantially limiting its drafting efforts to legislation of importance to the prosecution of the war, the Legislative Division participated in drafting some 61 statutes which were enacted by the seventy-seventh and seventy-eighth Congresses during the past fiscal year. Another 40 or so statutes affecting the Department were enacted after the submission of reports prepared or reviewed by

this Division. Perhaps the most important of the statutes affecting the work of the Interior Department enacted during the past year is the Columbia Basin Project Act of March 10, 1943 (Pub. Law 8, 78th Cong.), providing for nonspeculative settlement of a vast agricultural area in family-size farming units, as a part of the Columbia Basin project.

## MINES

The expansion of Bureau of Mines activities, under the impact of pressing war needs, carried with it a growing burden of legal work for the Mines Division of the Solicitor's Office. Urgent military requirements for helium required the making of contracts for the enlargement and construction of processing plants, as well as a series of additional contracts with owners of oil and gas wells, manufacturers of equipment, and other interested parties. Other contracts for the erection of pilot plants and related facilities for metallurgical investigation, special contracts covering exploratory drilling for strategic minerals, and cooperative agreements between the Government and various schools, universities, and other research institutions, added to the drafting work of the Mines Division.

The work of the Division under the Federal Explosives Act of December 26, 1941 (55 Stat. 863), shifted in emphasis during the past year from the initial development of a system of control to the actual enforcement of the act and the regulations. During the year more than 80 violations were reported to the Department of Justice and a number of convictions were secured. Forty proceedings were instituted for the revocation of licenses, and of those concluded, 20 terminated in license revocation. In no case has the holder of the revoked license appealed from the decision. Considerable effort has been directed toward securing the cooperation of State officials in the enforcement program. This has involved analysis of State laws, extensive correspondence and negotiation with State officials, and the preparation of model State legislation, adopted by the Council of State Governments as part of its program of State war legislation proposed to the State legislatures convening during the year.

Among other principal activities, the work of the Mines Division in connection with the general revision of bituminous coal prices culminating in the Secretary's minimum price order of September 30, 1942, and the preparation of Secretarial Order No. 1763, defining the rights of the Government in inventions by employees, together with the subsequent administration of that order, deserve particular mention.



## PROPERTY ACQUISITION

The work of the Property Acquisition Division has in large measure been turned into wartime channels. It has handled the legal work involved in the acquisition of three helium plant sites, together with pipe line rights-of-way and gas reserves for the future, and plant sites for sponge iron development work. It has stationed two attorneys in the field to conduct the title work in connection with the war mineral exploration program. The title work formerly done in the General Land Office has been transferred to this Division, with apparent savings in manpower and time. Including also the land acquisitions of the National Park Service and of Indians and Indian tribes, there have been about 2,200 matters disposed of during the fiscal year. At the years' end, no piece of work had been in the Division for as long as a month.

## PUBLIC LANDS

The Public Lands Division has continued to implement the conservation policy of Congress and of the Department with respect to the public lands and natural resources. It prepared a number of departmental decisions upholding the interest of the public in mineral deposits. One of these revoked an order which had the effect of limiting potash permits to a very few persons; another held that sodium borate lands are disposable by lease without loss of title to the Government, and a third held that certain extensive railroad grants are limited to rights-of-way for railroad purposes without impairing the right of the United States to the underlying minerals. The Division has handled three cases in the District Court of the District of Columbia; it was successful in all of them. The Division has prepared new Department-wide regulations on practitioners which, after issuance by the Secretary, replaced the archaic rules which have been in force for many years. It has contributed to the speedier conduct of Department affairs by establishing the legality of extensive delegation of powers by the Secretary to six of the Department's bureaus. While the flow of work has continued at substantially the same volume, about 6,100 items a year, the number of pending matters at the close of the fiscal year, 160, is at a record low.

The General Land Office continued its large-scale cooperation with the War and Navy Departments and by the end of the fiscal year had made available a total of more than 15 million acres of land for military purposes; in addition, lands and mineral deposits were withdrawn for the use of the war subsidiaries of the Reconstruction Finance Corporation. Included within the total of more than 35,000 items

relating to the administration of the public lands, the legal staff participated in drafting legislation and orders which would stimulate development of needed mineral resources.

The legal work in the Geological Survey has related in the large to the oil and gas leases on the public domain, including the approval of plans for the unitized development and operation of oil and gas areas. In the latter connection a procedure was developed through which the proposed general regulations for unit plans were published with an invitation to interested persons to file criticisms and suggestions, as a result of which hearings will be held to insure the fairest possible regulations.

The legal staff of the National Park Service has been reduced by about one-half, consistent with the diminished operations of the Park Service, with the result that a somewhat heavier individual burden has been handled by the remaining part of the staff. Slightly less than 200,000 acres of land were added to the Park Service areas during the fiscal year. Perhaps the major part of the legal issues has related to the problems raised by the contracted staff and program of the Park Service and the ways in which the areas may be administered and protected pending their full post-war use. The work of the legal staff, as of the Service in general, has been carried on under the additional handicap of the transfer of headquarters from Washington to Chicago.

## CONSERVATION

The Conservation Division, in addition to its customary duties, has taken on new work in the course of the year. It has assumed the review of the work relating to the Office of the Coordinator of Fisheries, and the questions of personnel and fiscal law have been centralized in this Division. With the establishment of a formalized responsibility for these questions, they have grown considerably in number and it is to be supposed that the Department has received corresponding advantage from expert counsel on these questions.

The legal work of the Division of Territories has been shaped by the extraordinary impact of the war upon our Territories and island possessions. An example is the organization of central control of imports into Puerto Rico and the suspension of the coastwise shipping laws for Puerto Rico in order to help meet the threat of mass starvation which submarine sinkings and shipping shortages brought to Puerto Rico in the summer of 1942.

The legal work of the Fish and Wildlife Service has adapted itself, although handicapped because of removal of the headquarters of that Service to Chicago, to the war needs, requiring a diminution in the

wildlife refuge program and a corresponding increase in the functions relating to commercial fisheries. Executive Order No. 9204 of July 21, 1942, established the Office of Fishery Coordination, and Food Directive No. 2 of the Secretary of Agriculture delegated to the Secretary of the Interior the food production powers conferred upon the Secretary of Agriculture by Executive Order No. 9280 of December 5, 1942, so far as these powers related to the production of fish. Under the authority of this order, regulations were prepared which served to concentrate and to utilize more effectively the equipment of the Alaskan salmon industry and the pilchard industry on the west coast.

The services of the Legal Division of the Bureau of Reclamation were largely directed during the past year to the preparation of contracts for the construction of dams and reservoirs and for the disposition of power and irrigation water developed thereby. Although War Production Board orders late in 1942 suspended construction on a number of Bureau projects, incidentally giving rise to many novel legal contract problems, the negotiation of long-range programs of water control proceeded at an accelerated pace. Interstate compacts relating to the Republican, Belle Fourche, Yellowstone, and Missouri Rivers, the Columbia Basin project, and the Central Valley project demanded a considerable part of the energies of the legal division of the Bureau, together with many other smaller projects. In the field of litigation the Bureau conducted or participated in a number of cases, including cases dealing with: (a) the scope of the Secretary's authority to contract with individual water users (*Fox v. Ickes*, 137 F. (2d) 30 (U. S. C. A. pp. D. C., 1943)); (b) the valuation of reservoir and power sites (*United States v. Washington Water Power Co.*, 135 F. (2d) 341 (C. C. A. 9, 1943)); and (c) the limits of State and Federal authority in interstate streams (*Nebraska v. Wyoming and Colorado* (pending before U. S. Supreme Court)). Except for an adverse decision in the intermediate appellate court in the case of *Fox v. Ickes*, the cases which reached decision were won.

The legal work of the Grazing Service has been accomplished under unusual difficulties due to the fact that three chief counsel have been on duty during the course of the fiscal year, one having entered the military service and the second having retired because of ill health. However, the legal work was current at the close of the year.

## INDIANS

The task of keeping Indian property in the hands of the Indians demanded legal action by the Indian Division on a wide front against



a variety of adversaries—defaulting lessees, adverse claimants under old railroad grants, State tax collectors, and ordinary trespassers. The policy of congressional protection of Indian homesteads was put to the test in argument before the Supreme Court in the case of *Board of Commissioners v. Seber* (No. 556, Oct. term, 1942, decided April 19, 1943), in which tax officials of Oklahoma sought to deny the Constitutional power of Congress to exempt Indian homesteads from State taxation. The argument of the Solicitor in support of congressional power was upheld by a unanimous court. He registered a less complete success in the case of *Oklahoma Tax Commission v. United States* (Nos. 623, 624, 625, Oct. term, 1942, decided June 14, 1943), where the court upheld the exemption of restricted lands in Oklahoma from State inheritance taxation but, by a five to four vote, declared restricted funds to be subject to such taxation in the absence of clear congressional enactment to the contrary. Other important Indian litigation included *United States v. Garaventa Land and Livestock Co.*, 129 F. (2d) 416, upholding the right of the Pyramid Lake Indians in reservation lands occupied for many decades by squatters; *Arenas v. United States*, — F. (2d) —, upholding the tribal status of Palm Springs Reservation lands; and *United States v. Santa Fe Pacific Railroad Co.*, 314 U. S. 339, in which, following a favorable decision in the Supreme Court (1941) further proceedings were initiated in the trial court looking to the recovery of land and damages under the formula established by the Supreme Court. While the protection of Indian rights of property and personality represented the most important part of the work of the Indian Division, the exigencies of war placed upon the Division a number of special responsibilities involving the maximum utilization of Indian resources in the program of war production. During the current year the backlog of old cases which once acted as a drag upon the application of legal energies to current problems was substantially eliminated and the work of the Indian Division is now on a current basis.

The Legal Division of the Office of Indian Affairs, in addition to its usual load of routine legal business, had to handle a number of peculiarly complex problems arising out of the war. The acquisition of extensive Indian lands for military purposes created not only difficult problems of land acquisition but equally difficult problems relating to the resettlement of the Indians concerned. A task of peculiar complexity handled by the Legal Division of the Indian Office was the negotiation of many-sided agreements with Indian water users and others to make possible diversion of water required for production of badly needed copper in Arizona. The Probate Division of the Indian

Office, despite severe setbacks through loss of personnel to the armed services, and by reason of the moving of its offices and records to Chicago, managed to keep its work close to a current basis and to take on a considerable increase of jurisdiction conferred by the act of December 24, 1942 (Public Law 833, 77th Cong.) which transfers probate jurisdiction over small restricted estates of Five Civilized Tribes Indians from the State courts to the Secretary of the Interior.

# Division of Information

ROBERT W. HORTON, Director

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**D**URING the past fiscal year the Division of Information has maintained in skeletal form the editorial, photographic, radio and publication sections authorized by Congress in 1938.

Dissemination of official information through the daily press, the radio, pictures and in printed publications generally has been limited to the preparation and distribution of such pertinent facts and regulations as those dealing with the Federal administration of the Nation's coal mines, and to information concerning the Department's programs for the development and conservation for war purposes of metals, power, oil, fuel, helium, food, land, water, and timber.

Important economies in the use of postal facilities and paper supplies were effected during the year, and the distribution of all publications of the Department was restricted to conserve manpower and materials. The educational work of the motion-picture unit, drastically curtailed during the fiscal year ending June 30, 1942, was suspended this year for the duration of the war.

## RADIO SECTION

With the increasing use of radio in those United Nations' war activities which originate in this country, the Radio Section with its modern broadcasting and recording studios, proved of great value to many agencies of the Government.

Within the past year, the Radio Section has cooperated in the preparation or production of radio and transcription material with the following agencies and offices: Navy Department, War Department, Coordinator of Inter-American Affairs, the Public Health Service, the Office of Education, Bonneville Power Administration, Bureau of Reclamation, National Capitol Parks Service, Petroleum Adminis-



tration for War, Solid Fuels Administration for War, Federal Coal Mines Administration, War Manpower Commission, Office of War Information, Department of Agriculture, Office of Strategic Services, State Department, Labor Department, Federal Securities Agency, Office of Civilian Defense, and the U. S. Maritime Commission.

### PHOTOGRAPHIC SECTION

The photographic laboratories furnished a considerable number of documentary photographs to the various offices and bureaus of the Department, thereby creating a savings of thousands of words of descriptive matter in official reports and scores of work-hours on the part of Interior employees. Illustrations and pictures produced in the laboratories proved to be of great value from a documentary standpoint before congressional committees, in conducting investigations, in promoting morale, in keeping the public informed of the progress of Departmental war projects, and in many other ways.

The personnel of the photographic unit, in addition to their work for the Department, cooperated with outside Government agencies in the production of material involved in their war programs. Photographic work turned out during the 12 months included educational pictures for textbooks, guidebooks, pamphlets and travel literature requested by scientific, trade, and general circulation magazines and publishing organizations.

### PUBLICATIONS SECTION

The functions of the Publications Section have been so realigned that it may operate more logically as part of the Division of Information. The Section now takes part in the issuance of publications as an editorial consultant and publisher, instead of functioning, as it formerly did, mainly as a liaison office between the Department and the Government Printing Office. The result is that a unit of the Division of Information now concentrates upon the essential parts of our publications, (the material and the manner of presentation) instead of mere physical appearance.

# Interior Department Museum

H. L. RAUL, Museum Curator

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THE Interior Department Museum illustrates graphically to the public the accomplishments of all of the Bureaus of the Department. Its exhibits are continually in process of change or modification so that bureau activities and progress will be reflected. The museum visualizes and explains the history and organization, as well as the current activities of the Department, and serves in maintaining contact with the public through a progressive program which is carried out in cooperation with the bureaus and by direct contact with the public.

Approximately 50,000 persons visited the museum during the past year. The Visitors' Register recorded visitors from every State in the Union, and from Alaska, Hawaii, Puerto Rico, Argentina, Australia, Canada, Chile, China, Colombia, Cyprus, Egypt, England, Guatemala, Mexico, Peru, Uruguay, and Venezuela.

With the assistance of the Bureau of Reclamation, the Reclamation exhibit gallery has been extensively redesigned and the installations have been completed. Included are a large mural painting of more than 12 feet in length by Kathryne C. Dimmitt representing Grand Coulee Dam, together with a scale-model of Grand Coulee Dam. Another new scale-model shows a typical concrete cooling system.

The museum during the past year has, upon request, cooperated with numerous agencies, including the National Archives, Smithsonian Institution, The Boston Art Museum, Junior Board of Commerce of Washington, and The American Society of Civil Engineers. Assistance has been rendered to school organizations and other groups in preparing study courses relating to Conservation, the National Parks, Reclamation, and other subjects in which the Department is engaged.

An animated diorama recently installed in the Bureau of Mines gallery illustrates Bureau of Mines inspectors at work in a mine. A silhouette, which is 6 feet in length and which depicts the methods employed in early surveys of the public lands, was designed in the museum and installed in the General Land Office gallery.

New books which have been added to the museum collection, include *The Biography of William Howard Butler, 1856-1934*, painter of the full-length portrait of Gen. Hugh Lenox Scott, now in the possession of the Department, and the recently issued *Catalog of the Type Specimens of Mammals in the United States*, by Arthur J. Poole and Viola S. Schantz of the Fish and Wildlife Service. A conversion lens extension for the sound-motion picture equipment has been supplied by the Bureau of Mines for the special showing of educational films of the Bureau.

A quantity of exhibit material has been received from the Division of Territories and Island Possessions and from the National Park Service.

The special exhibits displayed during the year included a panel containing the text of the Atlantic Charter; panel exhibits showing the flags of the United Nations, and the flags and coats-of-arms of the American Republics. Another special exhibit of general interest featured the Seal of the Department of the Interior together with stamps relating to the Department and events in the history of the United States. A retrospective special exhibit was designed to include a group of historic prints made from original photographic negatives taken by the late William Henry Jackson (1843-1942), official photographer of the United States Geological Survey, and member of the historic Hayden expeditions of 1871-72. The early Jackson photographs, made with cumbersome wetplate cameras carried on muleback, were largely instrumental in influencing the act of Congress which established Yellowstone National Park, the first park of the great National Park System of the United States. Also among the special exhibits shown during the year was a rare cormorant and wolverine parka, made by Eskimos at Mekoryuk village on Nunivak Island, Alaska. Another timely exhibit, included an elaborate display in three exhibit cases in the Geological Survey gallery showing specimens of strategic minerals from which are produced the metals required for the construction of war implements. Many relatively rare minerals shown are of vital importance in the production of essential war materials.

The specimens displayed were indicative of results obtained in the intensive search for additional sources of these minerals in the United States, Alaska, and Latin America.



Conducted tours of the museum galleries were held throughout the year for teacher groups, and public and private school classes.

Since its establishment by the Secretary, on March 8, 1938, as a new instrument in the field of Government-public relations, the museum has been a focal point of educational interest in the Nation's Capital. It has grown in usefulness to the Department and in popularity with the public.



# Civilian Conservation Corps

CONRAD L. WIRTH, Representative, Department of the Interior, Advisory Council, CCC

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LEGISLATION abolishing the Civilian Conservation Corps was passed on July 2, 1942. The appropriate bureaus of this Department acted promptly in accordance with Title II, Public Law 647, Seventy-seventh Congress, and with instructions of the Director of the CCC which provided for the immediate disbandment of active camps, the separation of personnel and prompt disposition of property. These agencies, that is, the General Land Office, the Office of Indian Affairs, the Bureau of Reclamation, the National Park Service, the Grazing Service and the Fish and Wildlife Service, had virtually concluded all of their CCC affairs by the end of the fiscal year.

The largest and longest task was to inventory, offer, and transfer all CCC properties in possession of the Department, including camp buildings and their operating accessories, automotive and other heavy construction equipment, light equipment, tools of all kinds, engineering equipment and supplies, office equipment, furniture and supplies and in many cases beds, bedding, kitchen and dining room equipment, food, etc. These properties were transferred to the War Department, Navy Department, and Civil Aeronautics Administration for war use or, in succeeding priorities, to other Federal agencies, to State, county, municipal agencies, and nonprofit organizations for the promotion of conservation, education, recreation or health.

Excluding camp buildings, which were credited to other accounts, CCC properties transferred by the six concerned bureaus of the Department of the Interior during the fiscal year 1943 were as follows:

General Land Office.....	\$147, 867	Grazing Service .....	\$1, 555, 483
Office of Indian Affairs..	3, 859, 944	Fish and Wildlife Service..	1, 730, 320
Bureau of Reclamation..	836, 887		
National Park Service----	8, 347, 256	Total.....	16, 477, 757





# INDEX

	Page		Page
BITUMINOUS COAL DIVISION-----	xviii, 95	BONNEVILLE POWER ADMINISTRATION—Continued.	
Bituminous Coal Act, Objectives of-----	96	Sales of Power for fiscal year 1943-----	119
Bituminous Coal Act, Origin of-----	98	Progress of Publicly owned Agencies-----	122
Bituminous Coal Division, Origin of-----	98	Sales, Contracts with Public Agencies as of June 3, 1943-----	121
Bituminous Coal Industry, benefits to-----	99	Sales, New for fiscal year 1943-----	120
Bituminous Coal Industry, outlook for-----	109	Sales, public market-----	120
Compliance-----	107	Sales, Summary of Contract Actions, fiscal year 1943-----	125
Consumer; Interest of protected-----	102	Sales, War market-----	120
Litigation-----	108	War Year, The-----	117
Marketing Agencies-----	106	War needs, Early realization of-----	118
Prices, Adjustment of flexible-----	104	War, Power pooled for-----	118
Rail-River, coordination of-----	104	War, Weapons for-----	117
Realization and Cost compared-----	100-101	BUREAU OF MINES-----	viii, 1
Stabilization, Mechanisms of workable-----	102	Administration-----	27
Stabilization, Method of-----	98	Finances-----	27
War Program, Contribution of act to-----	95	Personnel-----	27
BOARD ON GEOGRAPHICAL NAMES--	297	Property-----	27
Organization and functions--	297	Data for Limited Distribution-----	22
Personnel-----	298	Accidents and Health, Data on-----	23
BONNEVILLE POWER ADMINISTRATION-----	xx, 117	Anthracite and Coke, Data on-----	25
Bonneville System, Growth and operation of-----	128	Economics of Mineral Industries-----	22
Bonneville System, Extension of-----	128	Foreign Minerals, Data on-----	25
Bonneville System, Operations-----	129	Future Work Outlined--	5
Bonneville System, Power Pool, Northwest, The-----	129	Metals, Data on-----	22
Bonneville System, Power Supply Problem, The-----	130	Nonmetallics, Data on--	24
Post-War Construction Program-----	131	Petroleum and Natural Gas, Forecasts and data on-----	24
Sales of Power, Future-----	125	Objectives and Results in Brief-----	1-5
Market Development, Results of-----	126	Public Reports-----	26
Market, Post-War, The-----	127		

	Page		Page
<b>BUREAU OF MINES—Continued.</b>		<b>BUREAU OF RECLAMATION—Con.</b>	
Safety and Related Activities.....	17	Water conservation pro- gram, progress of.....	73
Antisabotage.....	20	Water for war industries..	68
Coal-Mine Inspection.....	19	WPA disbanded.....	82
Explosives Regulation.....	20		
Health in the Mineral Industries.....	21	<b>CIVILIAN CONSERVATION CORPS</b> .....	317
Safety Work.....	18	Abolished.....	317
Appropriations and Ex- penditures, fiscal 1941- 44.....	23	Properties transferred.....	317
Expenditures, fiscal 1943.....	29-31		
Technological Work.....	6	<b>COORDINATOR OF FISHERIES (See also Office of the Coordinator of Fisheries)</b> .....	269
Coal and Coal products..	12		
Explosives.....	16	<b>DIVISION OF INFORMATION</b> .....	311
Helium.....	16	Photographic Section.....	312
Petroleum and Natural Gas..	14	Publications Section.....	312
Research and Explora- tion, Metallurgical.....	6	Radio Section.....	311
		War Program.....	311
		<b>DIVISION OF PERSONNEL SUPER- VISION AND MANAGEMENT</b> .....	299
<b>BUREAU OF RECLAMATION</b> .....	xiv, 61	Bureau transfers.....	300
Bashore, Harry W., appoint- ment of.....	85	Employee morale.....	300
CCC disbanded.....	82	Manpower shortage.....	299
Conscientious objectors, camps for.....	82	Training Program.....	300
Construction cost of Recla- mation projects, Summary of.....	88	Transfer of Personnel.....	301
Contracts, revised repayment negotiated.....	81	War Program.....	299
Crops produced, Value of....	69		
Crop Values, cumulative 1906-42.....	71	<b>DIVISION OF POWER</b> .....	xxi, 133
Decentralization Plan com- pleted.....	84	Central Valley.....	136
Federal investment in- creased.....	87	Contracts.....	136
Food production, plans to in- crease.....	64	Facilities, expansion and uti- lization of.....	134
Funds, accretions to.....	86		
Japanese Evacuees.....	81	<b>DIVISION OF TERRITORIES AND IS- LAND POSSESSIONS</b> .....	xxi, 139
Leased lands.....	80	Alaska, Territory of.....	142
New Legislation enacted....	82	Alaska, Railroad, The.....	144
Page, John Chatfield, resig- nation of.....	85	Hawaii, Territory of.....	145
Population of area served..	63	Philippine Islands.....	154
Post-war program.....	76	Puerto Rico.....	147
Power for war.....	66	Virgin Islands.....	151
Relief, Decrease in requests for.....	81	War Program.....	139
Sabotage, Protection against..	77		
Settlement and Economic data 1942.....	78	<b>FISH AND WILDLIFE SERVICE:</b>	
Soil and Moisture problems studied.....	80	Fisheries, Biological investi- gation of.....	xxvii, 225
Special studies.....	76	Angling Resources, Man- agement of.....	247
Warne, William E., appoint- ment of.....	85	Fish protection and engi- neering developments..	248
War work streamlined by laboratory.....	77	Great Lakes area.....	245
		Middle Atlantic area....	243
		North Atlantic area....	242
		Pacific area.....	244
		Pollution studies.....	249
		South Atlantic and Gulf areas.....	244
		Shellfish investigations..	246



	Page		Page
FISH AND WILDLIFE SERVICE—Con.		GENERAL LAND OFFICE-----	XXIII, 161
Food production, stimulation		Alaska -----	168
of -----	229	Fire control -----	168
Fishery products -----	229	Settlement problems ----	169
Consumer relations -----	233	Cadastral engineering serv-	
Fishery economics, im-		ice -----	166
provement of -----	231	Field examination, Branch	
Fishery exploratory in-		of -----	167
vestigations -----	233	Historic land use policy ----	162
Fishery market news ser-		Land classification and re-	
vice -----	232	search -----	165
Fishery statistics, dis-		Land for livestock -----	164
semination of -----	232	Minerals and military might	
Fishery technology, im-		Oregon and California Lands,	
provement of -----	230	timber from -----	164
Food and game fishes, propa-		Post-war problems and	
gation of -----	235	recommendations -----	170
Food and wildlife resources,		Public lands -----	172
conservation of -----	239	Homesteads, sales and	
Injurious birds, control		other entries -----	173
of -----	241	Land exchanges -----	176
Predatory animals and		Land grants -----	175
injurious rodents, con-		Leases and permits ----	173
trol of -----	239	Receipts and expendi-	
Fur animal production -----	259	tures -----	176
Fur fiber studies -----	260		
Nutrition studies -----	259	GEOGRAPHICAL NAMES, BOARD ON	
Furs and hides, Wartime use		(see also Board on Geographi-	
of -----	238	cal Names) -----	297
Migratory bird investiga-			
tions -----	262	GEOLOGICAL SURVEY -----	XI, 33
Banding birds and game		Alaskan Branch -----	38
meat -----	264	Conservation Branch -----	50
Rabbit and furred-game		Land Classification -----	51
meat -----	234	Mineral lease super-	
Refuges, National wildlife --		vision -----	52
Refuges, National wildlife --		Field Equipment -----	56
War program, Aids to -----	226, 227	Funds -----	57
Wildlife, Biological investi-		Geologic Branch -----	34
gations of -----	265	American Republics ----	38
Wildlife conservation laws		Military Geology -----	37
and regulations -----	249	War Minerals -----	34
Alaska Fishery laws and		Library -----	56
regulations, adminis-		Publications, Work on -----	55
tration of -----	252	Topographic Branch -----	42
Alaskan Game Law, en-		Field Surveys -----	44
forcement of -----	251	General Office work ----	42
Wildlife disease investiga-		Map Information Office --	44
tions -----	261	Water Resources Branch --	46
Wildlife - management re-		Activities for War and	
search cooperative -----	261	Peace -----	49
Wildlife resources, economic		Cooperation with States	
investigations of -----	257	and Municipalities --	47
Control methods -----	257	War Service -----	48
Forest and range wild-		Work with other Federal	
life -----	259	Agencies -----	47
Marsh management ----	258		
Pest plants, control of --	258	GRAZING SERVICE -----	XXV, 187
Red squill supplies ----	257	Equipment and supply -----	189
Upland game-bird man-		Federal Range Code -----	194
agement -----	258	Food for war -----	193
Waterfowl foods, propa-		Funds -----	188
gation of -----	258		
Wildlife restoration, Federal			
aid in -----	236		

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