DEPARTMENT OF LABOR
OFFICE OF THE SECRETARY

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and
NATURAL RESOURCES

Possibilities of making new opportunities for employment through the settlement and development of agricultural and forest lands and other resources

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Benton MacKaye

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W.S. - Dept. of Labor

PREFATORY NOTE.

DEPARTMENT OF LABOR,
OFFICE OF THE SECRETARY,
Washington, D. C., June 14, 1919.

This report on "Employment and Natural Resources" is the result in part of a general investigation of land as an opportunity for workers, which, in accordance with general instructions from the Secretary of Labor, was begun in the autumn of 1915. The object of the investigation has been to disclose the possibilities in the United States of securing permanent and profitable employment, for our returned soldiers and other workers, in the settlement and community development of our unused areas and of the various resources—soils, forests, ores, and waters—contained in such areas.

This publication, aside from its introduction to the general subject of utilizing resources for the purposes of labor, is limited to the consideration of agricultural and of forest lands. The study shows that the efficient development of the unused, or the improperly used, lands of these two classes presents an opportunity in this country for reducing at once both unemployment and the cost of living. This requires, however, that development be conducted in accordance with certain basic principles. One of these consists in public control sufficient to eliminate everything resembling—even remotely—the speculation in, or private appropriation of, natural or community-made values. Another is the utilization of increased efficiency, wherever possible, to reduce labor time, and thus enlarge the opportunity for employment.

A portion of the study required for the preparation of this report was made by the author, Mr. Benton MacKaye, while he was still a member of the Forest Service (United States Department of Agriculture). Part of the field investigation and the preparation of the original draft, together with the accompanying maps and figures, were made at the expense of that organization. To a very large extent, therefore, the present report has been made possible through the courtesy and assistance of the Forest Service, and the Department of Labor is desirous of recognizing its obligations in this regard. The department heartily appreciates also the valuable suggestions and helpful cooperation, in connection with this work, which have come from members of the Office of Farm Management (De-

partment of Agriculture) and of the Reclamation Service (Department of the Interior).

There is also being published by the Department of Labor at this time, as part of the general investigation referred to, a report by Mr. Leifur Magnusson, on the "Disposition of the Public Lands of the United States with Particular Reference to Wage-Earning Labor." This has been prepared for the purpose of giving, in condensed form, some historical background of our public land policy, and thus to aid in a better understanding of the problem of remodeling this policy with reference to the interests of the wage earners of the United States.

W. B. WILSON,
Secretary of Labor.

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EMPLOYMENT AND NATURAL RESOURCES.

INTRODUCTORY.

The Secretary of Labor in 1915, in his annaul report for that year, announced a new policy with regard to the big problem of employment. The first step toward a solution of this problem had been inaugurated—that of organizing the United States Employment Service for bringing together jobs and men. The second step was then suggested—that of "making new opportunities for employment." The Secretary's first words on this new subject are the following:[1]

> It will not be enough to hunt "manless jobs" for "jobless men." Any efficient public-employment service of a national character must go beyond that. * * * In my opinion, therefore, the labor-distribution work of this department should extend to some such development of the natural resources of this country as will tend to make opportunities for workers greater than demands for work.

The policy here suggested was discussed by the Secretary at some length, and steps were taken to investigate the possibilities of developing the natural resources for the purpose recommended. Following this announcement of policy, a bill was introduced in the House of Representatives by Hon. Robert Crosser, of Ohio, in February, 1916, for the purpose of carrying out the Secretary's ideas. This was the so-called "national colonization bill,"[2] on which public hearings were held, during the first and second sessions of the Sixty-fourth Congress, before the House Committee on Labor. The Secretary of Labor appeared before this committee and indorsed the measure in principle.

The Secretary has developed his policy in his subsequent annual reports. With the entrance of the United States into the European War the prospective locating of the returning soldier became the uppermost question in this field, and the reports for 1917 and 1918 emphasize this particular problem. The latter report goes into the subject in some detail and urges upon Congress the need of immediate and thoroughgoing action. To carry out these recommendations measures[3] were introduced in the House of Representatives

[1] Third Annual Report of the Secretary of Labor (1915), pp. 41–42.
[2] H. R. 11329, 64th Cong., 1st sess.
[3] H. R. 13415, introduced Dec. 17, 1918; H. R. 15672, introduced Feb. 5, 1919.

by Hon. M. Clyde Kelly, of Pennsylvania, in the last session of the Sixty-fifth Congress. This proposed legislation was indorsed in principle by the Department of Labor at a public hearing before the House Committee on Labor, but no action on soldier employment was taken by that Congress.

"OPPORTUNITY FOR EMPLOYMENT."

For the benefit of the 4,500,000 men who went from this country into the recent war, and of the other millions in industry who were dislocated in their occupations by the war's activities, it is necessary to have a very clean-cut meaning for the expression, "opportunity for employment." The men and women who have been thus dislocated have the right to demand that they be relocated. Opportunity for employment, therefore, as used herein, means a definite relocation in industry. It means something decidedly more than the mere "handout" of a temporary job on public works or on private development enterprises. It means the opportunity of making a permanent living, of establishing a family, and of developing a career in some steady occupation.

Immediate employment of a temporary nature, on road construction or similar activity, would amount to a real opportunity, provided it be made to lead directly to some form of permanent occupation, such as a home upon the land. A transition of this sort may well be effected through the proposal which has been made of following road building with farm building in colony units. An emergency job, however, handed to a man as a stop-gap from starvation, and without future prospects, is a species of charity only one stage better than a gift of cash to purchase a meal.

Employment, moreover, as understood herein, must be not only permanent but profitable (i. e., profitable to the worker). This is required in order to be in keeping with the department's organic act which states that the "purpose of the Department of Labor shall be to foster, promote, and develop the welfare of the wage earners of the United States, to improve their working conditions, and to advance their opportunities for profitable employment."

OPPORTUNITY, NOT WORK, SHOULD BE INCREASED.

To advance the opportunities for profitable employment by no means requires that labor itself should be increased. On the contrary, these opportunities depend largely upon decreasing the labor necessary in getting something done. They depend largely upon the increase of efficiency and the saving of labor. Increased efficiency, through improved machinery or otherwise, can be used, if so desired, to reduce labor time without reducing wages.

This policy could well be applied in carrying on public works. This would result in distributing the work which is available among a greater number of workers, thus lightening the labor effort for each one and making more jobs for those unemployed. And so long as unemployment continues, increase of efficiency should be made, as far as practicable, to reduce the working day and absorb the labor surplus. The opportunities for work, therefore, not the work itself, should be increased.

THE PRIMARY SOURCES OF EMPLOYMENT.

"Land," in its broad sense, is the ultimate source of all employment. Land in this sense includes much more than agricultural soil. The latter, to be sure, is one of the major resources. But it is only one. In addition to the *soils* we have the *forests*, the *ores*, and the *waters*. These are sometimes referred to as the "big four" natural resources; they constitute "land" in the comprehensive meaning as used in this report.

The immediate use of these resources constitutes the extractive or primary industries (agriculture, forestry, mining), which are the basis of manufacturing and the other secondary industries. The latter can not long develop ahead of the former. The creamery is dependent on the dairy farm, not the dairy farm on the creamery; the abattoir is likewise dependent on the range; the sawmill on the logging operation; and the smelter on the iron mine. When, as at present with the lumber industry, the manufacturing operation develops ahead of the extraction operation (sawmilling develops ahead of logging), then overproduction is stimulated and industrial processes become dislocated. This makes for waste of material and uncertainty of employment, as well as financial failure. New opportunities for employment, therefore, should be sought as far as possible in the primary rather than in the secondary industries—in the initial development of the land and the land's resources.

This initial development requires two lines of preliminary work—mechanical construction and economic organization. These vary for the different resources.

The first step in developing the agricultural resource—the farm lands of the country—should be to connect these lands with the city markets. The most efficient way of doing this, in perhaps the majority of cases, is by means of a system of good concrete roads on which a motor truck service can be established.

Following road building should come farm building. This requires leveling land, fertilization, erection of buildings, and the installation of improvements. In some parts of the country it also requires reclamation of various kinds. Farm building, under mod-

ern methods, is conducted on the basis of the community unit, not the isolated-farm unit. Each community should be organized for doing cooperative business.

The forest industry requires the building of logging railroads, the improvement of drivable streams, the erection of sawmills and other plants. In order that this industry may provide permanent and profitable employment it must be organized upon a stabilized basis and run under the methods of forestry and timber culture, and not, as at present, under those of ordinary lumbering and "timber mining." Upon this basis the permanent forest community can replace the temporary lumber camp and the worker with a family replace the hobo with a blanket. The opportunity for thus reorganizing this industry is present in the 135 million acres of national forests in the various timbered parts of the country.

Coal and other minerals occur extensively in several fields on the United States public domain, both in the Western States and in the Territory of Alaska. These fields offer the opportunity for reorganizing the mining industry upon a better basis. Under proper Government control operations could be conducted on the public lands tending to set a standard of profitable employment and suitable living conditions for the industry in all regions. The mining community, organized perhaps in connection with an agricultural unit, could replace the typical "mining camp."

The effective control and utilization of the water in our rivers and streams will require eventually a vast amount of construction—reservoirs, river works, power plants, transmission lines, etc. There are four main uses for these water resources—sanitation, irrigation, navigation, power. The potential utility for these several purposes of the country's stream flow has been thus far only meagerly developed. Much of this flow runs to waste each year in destructive floods. The storage and use of this surplus water, under proper public direction, would be of untold public benefit; it would provide many opportunities for profitable employment and would result ultimately in vast saving of human labor.

EFFECT OF DEVELOPMENT ON COST OF LIVING.

One of the biggest facts in our economic life is the rise in the cost of living. This has been specially evident since the beginning of the European war. Wages, to be sure, have been rising as well as prices, but not nearly in proportion thereto. The *real* wages of the American working man—the relation of *paid* wages to cost of living—have been rapidly falling.

This fact is shown strikingly by the figures of the Bureau of Labor Statistics. These figures show that real wages, based on cost of food,

have fallen nearly one-third during the past 12 years. Where the average worker earned one dollar in 1907 he earns to-day the equivalent not of one dollar but of 69 cents. That is to say, where a man earned a dollar's worth of food in 1907, he can to-day earn only 69 cents' worth. These figures in dollars and cents show a growing tendency toward lower living standards for labor. Each time, therefore, that a period of unemployment occurs the situation is just so much worse than it was the time before.

There has also been a decline in the per capita production of food supplies; and along with it a reduction in the country's proportionate rural population—from 59.5 per cent in 1900 to 53.7 per cent in 1910. At the same time about half the farm land in the country is still unimproved. The shifting of labor from agricultural to urban industries, and the associated falling off in food production, would seem, therefore, to constitute important reasons for the prevailing high cost of living.

This point is emphasized by many writers and the plea made that means should be taken to get more people to go "back to the land." Their analysis of the problem is briefly as follows:

The high cost of living in the country and the condition of poverty are caused, among other things, by an undue scarcity of agricultural products on the one hand, and by a congestion of labor in nonagricultural industries on the other. With this condition goes a large area of idle land. If, therefore, workers can be transferred from the factories and urban industries to these idle lands, then labor congestion generally will be relieved and the food supply reinforced. This would create new opportunities for the people actually going upon the land; it would tend also to raise wages for producers generally and to lower prices to consumers. In this way poverty and the cost of living would be reduced.

The idea here expressed is an appealing one. But it must not be forgotten that true access to land is achieved only through industrial processes. Industry, indeed, is the "pipe line" from land to men. Through it comes the material for their welfare—food, clothing, and shelter. Any obstruction in this pipe line is an obstruction to men's access to the sources of life. Any clogging of any kind in the management of industry—through duplication, tolls for unnecessary "services," or undue friction on wheels or on men—results in increasing the struggle for existence.

The man who actually goes upon the land has not necessarily any greater access to the *products* of the land than he had before. A high-salaried clerk in a metropolis "skyscraper" has certainly much more access to the fruits of the land than many farmers; and "tenement conditions" exist in the open country as well as in the city slum.

Real access to land is through industry and there is no shorter cut. The only way to improve this access is to improve industry. Mere living in the country will not make a living. In any project, then, for developing natural resources to reduce living costs, or to provide profitable employment, all unnecessary industrial obstructions, whether physical or financial, must be weeded out.

TO PROVIDE ALTERNATIVE EMPLOYMENT.

Unemployment, as characterized by the report of the Commission on Industrial Relations, is not a matter of degree but is "an absolute actuality from which there is no relief but soul-killing crime and soul-killing charity." The report then proceeds to analyze the situation concisely as follows:[1]

> A careful analysis of all available statistics shows that in our great basic industries the workers are unemployed for an average of at least one-fifth of the year, and that at all times during any normal year there is an army of men, who can be numbered only by hundreds of thousands, who are unable to find work or who have so far degenerated that they can not or will not work. Can any nation boast of industrial efficiency when the workers, the source of her productive wealth, are employed to so small a fraction of their total capacity?
>
> Fundamentally this unemployment seems to rise from two great causes, although many others are contributory. First, the inequality of the distribution of income, which leaves the great masses of the population (the true ultimate consumers) unable to purchase the products of industry which they create. * * *
>
> The second principal cause lies in the denial of access to land and natural resources even when they are unused and unproductive, except at a price and under conditions which are practically prohibitive.

The recommendation of the commission regarding this problem comprises the two lines of action recommended by the Department of Labor. These are: (1) To perfect a system of placing together the idle man and the idle job; and (2) to create new employment. On the latter point the commission report suggests the creation of a special board in the Federal Government, together with similar boards in the various States and municipalities, to devise programs for performing public work of construction and land development, including road building and reclamation. From numerous sources in recent years the suggestion has come that some public agency is needed to carry on public works during periods of industrial depression.

But if during normal years our workers are unemployed on the average "at least one-fifth of the year," then there is even in normal times a degree of industrial depression. In other words, our workers do not obtain from our industries 100 per cent opportunity for employment; they obtain only 80 per cent opportunity. And for

[1] Final Report of the Commission on Industrial Relations (1915), p. 34.

the time they *are* employed the "real wages," as above shown, have been steadily declining. In many of the industries, moreover, labor conditions are notoriously bad. In the long run, therefore, the employment provided by ordinary industry is insufficient in amount and unsatisfactory in kind.

In addition, then, to the offer of employment held out to American workers by the regular industries an alternative offer could at all times be available, the employment being made to expand or contract according as the industrial "depression" were greater or less. Employment of this kind, in order to be a real alternative, would, of course, have to be conducted under entirely different auspices from that offered by ordinary industry. It would need to be administered by the public itself through Government agency—Federal, State, or municipal. The work would have to carry out a true public need and have to be carried on in accordance with the highest standards of labor.

"Some such development of the natural resources of this country as will tend to make opportunities for workers greater than demands for work"—this is the suggestion of the Secretary of Labor, made in 1915, for making new opportunities for employment. By making more jobs than men we relieve the pressure of men on jobs. This could be done by offering alternative employment in a comprehensive construction program for developing, without industrial obstructions, the country's natural resources. This program would be carried out, under legislation which has been proposed in Congress, through a public "construction service" in which suitable standards of labor would be maintained. By no one single stroke, perhaps, could more be done to stimulate wholesome labor standards in American industry, or to reduce living costs, than by an extensive and effective application of such a policy.

SUMMARY AND CONCLUSIONS.

OUTLINE OF DEPARTMENT'S LAND POLICY.

The recommendations of the Secretary of Labor, in his last annual report (1918), regarding new opportunities for employment, constitute a definite policy for utilizing land for the benefit of labor. As already stated, legislation for carrying out this policy was introduced in the Sixty-fifth Congress. The program thus worked out aims at the fullest possible opportunity to secure alternative employment. It comprises the development of agricultural, forest, mineral, and water resources.

DEVELOPMENT OF AGRICULTURAL LANDS.

One-fourth of the area of the United States (478 million acres) is improved agricultural land; another fourth of the country (475 million acres) is, according to estimates, capable of being improved for farming purposes. More than one-fourth of the country's area (510 million acres) consists of grazing land; the remainder consists for the most part of permanent forest land. Of the 475 million acres still to be developed for farming purposes, over 80 per cent occurs within present farm boundaries—chiefly in the settled portions of the Central States and elsewhere in the eastern half of the country. The remainder (85 million acres) consists of reclaimable waste lands outside of present farm bounds. Only a small portion of profitable farm land remains on the public domain.

Agricultural land on the western public domain formed, perhaps, the main opportunity for alternative employment and a new career to the average worker 50 years ago. This land was taken up for the most part through the homestead law of 1862. Under the terms of this law the settler could get from the Government, in fee simple and without charge, a total of 160 acres of land on condition of maintaining a residence thereon for a term of years and making certain improvements.

Need of colonization.

One grave objection to the homestead law was (and is) the principle upon which it was based, namely, that raw land without improvements is all the settler needs wherewith to make for himself a farm and a home. In the fertile portions of the open prairie requiring little or no reclamation, and in favorable spots elsewhere, the settler who was hardened to the pioneer life was, to be sure,

often able to equip himself for farming through his single-handed methods. But he was always under the heavy handicap that comes from the lack of cooperative effort, and his less fortunate or less robust comrade was unable to keep up. Nor did the aid through irrigation provided for in the reclamation act of 1902, or the general processes of reclamation as practiced—whether on the arid, swamp, or cut-over lands—do as much as was generally expected to improve the pioneer's condition. This was because the processes were not carried far enough. It is not enough merely to provide desert land with needed water or to drain swamp land of surplus water. Experience in the Australian countries, under conditions closely resembling those in this country, points to the need of supplementing irrigation, drainage, or stump clearing by the processes of leveling and breaking the land and equipping fully the farms for use.

The Australian system of land settlement is based upon the principle that the agricultural worker deserves an even chance with the manufacturing worker, and so the farm as well as the factory should be equipped before, and not after, operations begin. Agriculture under this system is handled through the community unit as against the isolated farm unit. Not only is each farm prepared for use through initial cultivation of the soil and the erection of farm buildings but the community itself is organized for cooperative action in marketing produce, purchasing supplies, obtaining credit, and in providing for social as well as economic needs. Hence a portion of land is usually reserved at the center of each community for the location of cooperative warehouses, stores, and banks, as well as for schools and churches. At or near this center a demonstration farm may be established on which pure-bred cattle and other stock are raised and sold at cost to settlers; and this farm may be used also as a training school for incoming settlers. The opinion is growing, both in that country and in all the British countries, that the individualist type of land settlement, as practiced in "homesteading," should be supplanted by the colonization or community type which has been practised so successfully in Australia; and the British plans for after-the-war settlement are based largely upon this colonization principle.

Land tenure dependent on use.

Another vital defect in our homestead law, as passed by Congress, is that no provision is made that the tenure of land shall be based upon use. By giving away land in absolute fee simple title, minus any restriction, nothing exists either in the letter or the spirit of the law to prevent the settler from parting with his title the same day he receives it. In this way a right to use land becomes a right also to barter land. By providing thus for the divorcement of private owner

and user the road is opened wide to tenancy. So obvious is this fact that we should not have waited, as we have done, for bitter experience to confirm it. Again we should take a lesson from the Australians and adopt their methods of making private tenure dependent upon use. This principle is emphasized by the Secretary of Labor in his latest annual report.

Specific test for profitable agricultural land.

Another important consideration practically unprovided for in the homestead law is that of land classification and the selection of lands suitable for profitable agriculture. On this point the Secretary of Labor says:[1]

> It goes without saying that no colony should be established on land which can not be profitably farmed. The specific test for such land is the estimated yearly compensation to be obtained by the settler for his own use as a result of his labor. This compensation amounts to the difference between the gross money return and all fixed expenses. The latter include interest and amortization charges for reclamation and improvements, payment for taxes and the use of land, and general running costs. If the compensation over and above these expenses amounts at least to a fair wage, then the labor of farming the land amounts to profitable employment. Otherwise it does not.

With lands found by this test to be profitable for farming the costs of reclamation and equipment (following the practice of other countries), should be charged against each farm allotment and be paid off, at low interest rates, over a long term of years on the amortization plan. Any loans made to the settler should also be handled by this plan. The yearly charge for the use of land (to include taxes and everything under the head of "rental") should then be kept low enough so as to allow the settler, out of gross receipts, the "compensation" referred to in the above statement.

To hold the rental down to this basis requires that ultimate absolute tenure be retained in public hands. With the ultimate title in private hands the land values made by Government reclamation, State loans, etc., go to the farmer, not as the land user but as the land owner.

Land found by the above test, suggested by the Secretary, to be unprofitable for farming should be used for growing timber, if possible, or for some other useful purpose.

Lessons from Canada.

The Australian system of community settlement forms the basis very largely for the reconstruction plans of the British Empire. Canada has already made a start in community settlement by the establishment in 1917 of the returned soldier colony at Kapuskasing in the Clay Belt of northern Ontario. The Australian system was

[1] Sixth Annual Report of the Secretary of Labor (1918), p. 144.

introduced the same year into our own country by the State of California in the establishment of the Durham colony in the Sacramento Valley.

Land classification is one of the fundamental lessons which Canada has to teach. The Province of New Brunswick has made an excellent start in this line. All of the Crown lands in this Province are being covered systematically by a soil survey showing clearly the relative fertility of the various areas. Fertility is of course only one factor in locating profitable farm land—the other main factor being market conditions. By following up the soil survey by the market survey the test given by the Secretary for determining true agricultural land could be applied.

Town planning is another matter in which Canada has made a good start. Pioneer work in this regard has been done by Mr. Thomas Adams, town planning adviser to the Commission of Conservation at Ottawa. He has worked with the large city, the small town, and the agricultural community. His plans for laying out townships save from one-quarter to one-third the road mileage by having the roads radiate from a community center instead of being laid out in the customary way along the section lines. These plans also provide for segregating forest lands and for dividing the agricultural lands into farm allotments of efficient areas for family use. The farm areas will vary, of course, in accordance with the fertility of the soil. Town planning should be based upon an adequate land classification, but the two lines of work do not in fact always go together in Canadian practice any more than in our own.

Expropriation of land, as a means of obtaining areas for the settlement of returned soldiers, is a measure which is likely to be adopted by a number of the Canadian Provinces. The same mistake was made in Canada regarding the use of the Crown lands as was made in this country with our public lands. In each case the "homesteading" method was used and an absolute fee simple title to 160 acres was granted to each settler. In both countries, also, much land has been disposed of by railroad and other grants. To-day the results of this shortsighted policy are showing up. Now that the Canadian Government wants lands for the returned soldiers, the lands are not to be had. Areas of the kind and amount needed have gone into private hands.

The Dominion Government, therefore, is now encouraging the several provincial governments to pass measures for expropriating idle land through the instrument of taxation. The plan is to allow the private owner to assess his own land; the Province then to tax such land on the basis of the assessment or else buy it at or near the value set. If the full duty of our own Government toward the returned

soldiers and other workers is carried out, the United States may have to follow Canada in this expropriation policy.

Farm colony and city market.

Before the farm colony is actually organized and established it should be carefully located with reference to the city market. For dairy and other products that can be sent in small containers the motor truck is a more efficient transporter than the railway or waterway, and through a system of marketing facilities already inaugurated by the Post Office Department the postal motor route bids fair to make farm producer and city consumer directly accessible to each other. In view, then, of the big future possibilities of the motor transport postal service the farm colony should usually be located on the post road.

DEVELOPMENT OF FOREST LANDS.

The permanent forest area of the United States is estimated to be 450 million acres, or nearly one-fourth the total area. Of this acreage 150 millions are contained in the Rocky Mountain and Pacific States, 90 millions are estimated as permanent farm woodlots in the Eastern States, and the remainder (210 millions) occurs throughout the mountainous and lesser settled portions of the Northeast and the Southern States, and of the Great Lakes region. About one-half of the far western forest lands are owned by the Government in national forests, and most of this land supports a virgin timber growth. The eastern forests have been cut over and very largely depleted, and are almost all in private ownership.

The problem of "the lumberjack."

"No one who has the interest of America at heart," says the Secretary of Labor in his latest annual report,[1] "can look forward with tolerance to the growth or continuance of a body of migratory workers who in the nature of the case must have * * * a hatred for the law which they have never known except in its repressive aspect."

The "migratory workers" here referred to are the "lumberjacks" or "timber wolves" of the forests of the Pacific Northwest. The conditions surrounding these men have received national attention during the past two years on account of the strategic industrial importance of lumber operations in the conduct of the war. These conditions were made the subject, in part, of investigations conducted in 1917 by the President's Mediation Commission, of which the Secretary of Labor was chairman. This investigation showed that about 90 per cent of the lumberjacks were unmarried and that

[1] Sixth Annual Report of the Secretary of Labor (1918), pp. 221–222.

the annual labor turnover in the lumber camps was over 600 per cent. "There has been a failure to make of these camps communities. It is not to be wondered, then, that in too many of these workers the instinct for workmanship is impaired. They are—or, rather, have been made—disintegrating forces in society."[1]

The reason why the lumber workers are migratory is because the lumber industry is migratory. Forest trees have been treated not as wood plants to be grown and cultivated, but as wood deposits to be exploited. Just as we are exhausting our mineral deposits beneath the surface, so we are exhausting our timber "deposits" above the surface. We are practicing not timber culture but "timber mining."

The ill effects of such a system upon the consuming public and the country at large have long been dwelt upon. But the inevitable effects upon the worker involved have hardly been mentioned. The lumber industry as now conducted being essentially migratory, employment therein is essentially unstable. The lumberjack must live in a camp and the man with a family is excluded as a worker. "Timber mining," being itself a tramp industry, is a breeder of tramps; it is an industry of homeless men.

Forest community versus logging camp.

In order that the forest industry may be put upon a basis in which the wandering "hobo" woods worker may be supplanted by the family man it will be necessary in each case that a continuous yield of timber be forthcoming yearly from an area small enough to permit of the establishment of homes on some central site to which the men can return after each day's work. The size of the forest working unit should depend, therefore, upon the facilities for transportation.

Forest operations conducted in this way would, of course, have to be planned ahead upon a long time basis, following the practice on the State-owned forests of the European countries. This might require in some cases the purchase of scattered private timber holdings within and adjacent to the national forest boundaries. One-eighth of the land within these boundaries is at present alienated and held in private ownership. Another method would be to adopt some cooperative arrangement with the owners whereby they would receive each year a part of the net returns from the whole operation, such part being in proportion to the amount of the timber owned by them as compared with the total amount of timber on the tract.

A typical drainage basin in the western national forests may be assumed to contain 100,000 acres of productive forest land. Suppose a series of operations be planned whereby the mature timber on this tract is to be cut off in 50 years. If the right methods of cutting are used, by the end of this 50-year period the younger trees

[1] Report of President's Mediation Commission, 1918, p. 14.

will have grown so that the tract will be ready to be cut over again. In this way the tract can be kept continuously productive for all time. Suppose the permanent annual yield from this tract is 20,000,000 board feet. This yield would provide continuous employment for more than 150 men, who, with their families, would make a population of about 800. About half the men would be employed in the sawmill and half in the chopping operations. The sawmill, located perhaps at the entrance of the valley, would support a permanent community of about 400 people. The logging operations in the woods would support another permanent community of 400. This community would have to be relocated from time to time as different portions of the tract were being operated. But since the employment would be continuous the forest workers could at all times live in their homes with their families and maintain a community life.

Measures should be taken to see that the populations supported by the sawmill and the forest operations would develop into real communities and not mere shack towns. Aside from the maintenance of proper housing and living conditions, there are two or three fundamental community standards. These include provision for voting and self-government, for schools, churches, and educational facilities, and for cooperation among the workers to secure their economic and social welfare. It has been estimated by the United States Forest Service that the forests of the country, under a proper system of timber culture, could provide permanent employment for over 700,000 men, and thus support a population of about 3,500,000.

Summing up the possibilities of replacing logging camps by forest communities, the Secretary of Labor says:[1]

> By placing each logging unit under forestry so as to obtain therefrom a continuous timber yield, the lumber camp and the "bunk house" can be converted into a forest community. The woods worker could then have a home as permanent, at least, as that of his fellow workers in other industries, and the so-called "wobbly" would be in process of extinction.
>
> This change can not, of course, be accomplished all at once. But a beginning can be made in time to benefit the soldiers now returning from the war. The opportunity for this beginning is offered in the 150 million acres[2] or more of our national forests. Forest management of the kind required could be carried on in some cases through the present system of "timber sales"; in other cases it has been suggested that the Government conduct its own logging operations. This policy has already been initiated by the United States forest regiments, not only in France but on our own Pacific coast, where spruce has been cut for airplane stock. The problems of marketing thus arising would have to be taken up in each case. One important market will consist of the coming needs of the Government itself for vast quantities of timber.

[1] Sixth Annual Report of the Secretary of Labor (1918), p. 145.
[2] Including the national forests in Alaska

One very important forest region in which to replace timber mining by timber culture is the North Pacific coast, where a third of the country's remaining standing timber is located and where the labor problems are among the most urgent. Another important region for this purpose is on the other side of the continent—the Northeastern States—which have nearly a third of the country's population and a forest growth badly in need of rehabilitation.

DEVELOPMENT OF COAL LANDS.

Along with the "timber wolf" of the logging camp the underground worker of the mining camp deserves the special and serious attention of those whose duty it is to advance the welfare of American wage earners. This is recognized in the department's policy with respect to the great extractive industries of lumbering and mining.

Whether or not conditions in the mining industry are sufficiently realized by the public, they are understood by the workers themselves and by some, at least, of the mine owners. Mr. Francis S. Peabody, of Illinois, who was chairman of the committee on coal production of the Council of National Defense, in speaking at a hearing on the mineral-land bill before the Senate Committee on Public Lands on June 13, 1917, said:[1]

> We have the cheapest production of coal in the world * * * and have used it like drunken men. We have wasted our substance by taking the nearest coal because we could produce it cheapest. We have had no thought of conservation of life. We kill three men in this country for every one man killed on the other side, with more dangerous mining conditions on the other side.

The opportunity for developing the coal-mining industry under a policy which will do away with these unnecessary evils and set up proper standards of labor is presented in coal lands still owned by the Federal Government or by certain of the Western States. One of the big undeveloped coal fields lies in the San Juan Valley, in northern New Mexico and southern Colorado. This is in the United States public domain and a proposition has already been put before Congress to build a Government railroad to tap this region. Lignite coal deposits, still undeveloped, occur in the State lands of North Dakota. The legislature of this State, in the 1919 session, adopted a measure providing for a beginning of the developing of these lands by the State. Perhaps the best opportunity for developing public coal lands is in the Territory of Alaska—in the Matanuska, the Bering River, and other fields.

With regard to the application of his land policy to coal-land development the Secretary of Labor says:[2]

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[1] Hearings before the Senate Committee on Public Lands, 65th Cong., 1st sess., on S. 45, June 13, 1917, pp. 19–20.

[2] Sixth Annual Report of the Secretary of Labor (1918), p. 145.

Mineral land which may be utilized as an opportunity for the employment of American soldiers now returning consists for the most part of the coal fields which still remain in the public domain. Some of these are located in the Western States. The most important, however, lie in the Territory of Alaska. These Alaskan fields have been permanently reserved, part of the coal to be mined under a leasing system and part to be retained for Government use. A Government railroad has been built into the Matanuska coal fields, and these under present law can be further developed in a way to set fair labor standards in the mining industry and for those seeking employment in this northern land.

The Alaskan coal leasing law, 1914.

The first coal-land law embodying a leasing system to be passed by Congress was signed by President Wilson on October 20, 1914.[1] Under this law the President is directed to reserve—not only from sale but from lease—certain coal lands for Government and public purposes. These lands "may be mined under the direction of the President when in his opinion the mining of such coal in such reserved areas, under the direction of the President, becomes necessary by reason of an insufficent supply of coal at a reasonable price" for the Government railroads and other works, for the Navy and national protection, and for "relief from monopoly or oppressive conditions." These reserved lands shall not exceed 12 square miles in the Matanuska coal field, nor 8 square miles in the Bering River field, nor one-half of the coal-land area elsewhere in the Territory.

Aside from these lands the Secretary of the Interior is directed to lease any or all other coal lands in blocks, to any one lessee, not to exceed 4 square miles in area. A royalty shall be charged on a tonnage basis and an annual rental (to be credited against the royalties as they accrue in any one year) of $0.25 per acre for the first year, $0.50 per acre per annum for the next four years, and $1 per acre each year thereafter. In this way the full natural value of the coal deposits is obtainable to the Government, and a method provided to prevent the holding of lands out of use. The values collected are to be spent for the benefit of the Territory of Alaska.

Coal for local and domestic use is provided for free of charge under certain reasonable limitations.

Definite labor standards are stipulated, including the eight-hour day for underground workers and provision for their safety.

The Alaskan coal-land law is the first constructive measure, on this particular matter, to be passed by Congress. It has been in operation about four and a half years. During this time the European war has been waging, work on the Alaskan Railroad has had to be restricted, and Alaska in general has had to be considered as "nonessential territory." Very little development, therefore, either of coal lands or other resources, has taken place.

[1] 38 Stat., p. 741.

Methods of handling coal lands on the western public domain.

The original method of dealing with coal lands on the public domain consisted of outright sales of such lands at prices per acre not lower than the minimum prescribed in the law. This method applied both in the United States and in Alaska. The consequent tendency was for lands to be sold at or near the minimum value rather than at their true value. The result was speculation and attendant ills.

A check was placed on this old-time method. James R. Garfield, Secretary of the Interior from 1906 to 1909, introduced a new method of handling coal lands by selling them at their actual appraised value. He had the coal lands of the public domain classified by the Geological Survey and their actual value appraised upon the basis of the estimated tonnage of coal contained in such lands. Areas like those which formerly sold at the minimum price per acre of $10 or $20 were often sold for $500 per acre. This method has been used ever since. The result has been the reduction, if not the prevention, of speculation in coal lands on the public domain.

But this Garfield system was unsatisfactory from two points of view: The conservationists considered it a makeshift. They maintained that the method of alienating the fee-simple title to natural resources of this kind was fundamentally wrong. Instead of selling the lands they should be utilized under a leasing system in which the ultimate control of such lands, and of the industry to be conducted thereon, should be in the Government itself. Instead of selling the lands, even upon the basis of an appraisal, the product of such land, namely, the mineral itself, should be disposed of by means of a royalty of so much per ton. Only in this way could the true, natural values be collected for the public benefit. Only in this way, they maintained, could public control be exercised over the industry involved. The speculating interests, on the other hand, desired a reversion to the pre-Garfield system of getting absolute control through fee simple and of buying the lands at or near the minimum price required in the law.

Congress for 10 years has had before it the problem of determining upon a policy for the coal lands of the public domain. With regard to the Alaskan lands a policy of Government ownership was decided upon. The law of 1914 provided that the title should remain vested in the United States and that the lands be developed, as already explained, either through private lease or Government operation. With regard to areas in the Western States, two alternatives are presented to Congress: Either to provide for retaining title, as was done in Alaska, or else to go back to the pre-Garfield system of speculating in coal lands. The choice is one of going forward or going back.

The application of the land-development policy of the Secretary of Labor to the mining industry in continental United States is dependent upon the retention by Congress of the coal-land title in the western public domain and the adoption of the Alaskan system. A bill for disposing of the western coal lands, together with oil, phosphate, and other mineral lands, was passed by both Houses of the Sixty-fifth Congress, but did not finally become law.

This measure appeared on the surface to be an attempt to go forward and backward at the same time. It contained leasing provisions taken almost word for word from the Alaskan coal-land law. But it contained also a section providing for the sale of coal lands under the pre-Garfield system—that is, for selling the lands on an acreage basis and without official tonnage estimates—rather than by the present (Garfield) method of selling on a tonnage basis officially estimated. Thus the measure would have alienated control and opened the land to speculation. Its enactment, therefore, would have been a backward step and would have effectively blocked the Secretary of Labor's policy as applied to these coal lands.

Possibilities in colonizing Alaska.

The Government railroad in Alaska, in addition to tapping the Matanuska coal fields, will open up vast areas now inaccessible. It is estimated that Alaska contains, in its valleys which lie between the ice-covered mountains, about 65 million acres of potential agricultural land now covered by a meager growth of timber. The projected lines of Government railways are going to penetrate, in Alaska, the last American frontier. In view of the combination of mineral, forest, and agricultural resources to be opened in that vast country, nearly all of which is still public land, Alaska should present one of the most promising areas now left on the globe for those seeking a new start in life. Another Scandinavia here awaits development. The Government railroad is the first big step in this development. If this new country is to be an opportunity for the soldier and the worker, and not for the speculator, a colonization policy based upon the principles discussed should be the next step in its development.

DEVELOPMENT OF WATER RESOURCES.

Rivers and streams, as already stated, are useful for four main productive purposes—power, sanitation, irrigation, and navigation.

Water power is the rival of coal in the generation of electrical energy for the latter's varied uses. It bids fair to be the main potential source for lighting, heating, and mechanical industry in the household, the farm, and the factory. The supply of coal is definitely limited; the power in a stream goes on forever. The

labor required in mining coal is arduous and dangerous. The labor required in utilizing the stream is in large measure limited to that of original construction. By substituting wherever possible the "white coal" of falling water for the black coal from the underground, the latter is left for the smelting and other uses for which it alone will suffice, and a vast energy, requiring in the long run almost insignificant labor effort, can be placed at the service of mankind.

The horsepower capable of being developed under present conditions in the rivers and streams of the United States is estimated to be in the neighborhood of 60,000,000. This power could be greatly increased through the storage of flood waters. Thus far only about 8,000,000 horsepower has been made actually available. A project to develop this unused latent power would require a vast amount of construction on reservoirs and other works. This would provide many opportunities for alternative employment and yet would result ultimately in a great saving of human labor.

There is grave danger, however, that a large part, if not the greater part, of the labor conservation thus made possible would be lost unless the control of this great public utility be kept in public hands. Fortunately, as yet most of the country's potential water power remains in public hands; its control is vested in the United States Government. But if the Government were divested of this control the opportunity for proper public development would be practically lost.

In the use of water for sanitation and allied purposes, in household and city, the labor saved in the modern system of "running water" over the primitive system of "hauling water" needs only to be mentioned. Through the process of irrigation, where fertile soil can get water in the time and quantity needed, the product of the farmer's labor on an area is far beyond that where this process is lacking. Transportation of a given tonnage by water, as well known, requires far less labor, both in original construction and maintenance, than that by rail; and where speed is not essential, the waterway should, as far as possible, be made to relieve the railway.

FEATURES OF NEEDED LEGISLATION.

"The main features of legislation required to carry out the department's development policy may be briefly summed up. Practically all of these features are embodied in legislation which has been proposed in Congress.

A national board authorized to cooperate with States.

Executive authority for carrying out legislation should be vested in a national administrative board of appropriate cabinet officers,

including the Secretaries of Labor, Agriculture, and Interior, this board to work through a competent director who should be empowered to make written, specific, cooperative agreements with any State or municipality through such officials as may be authorized to cooperate with Federal agencies in the kind of work contemplated."

To enable the board to carry out the land-development policy which has been outlined, the legislation must provide for three things—for securing the requisite land, for securing the necessary money, and for vesting the board with the requisite powers.

The placing of discretionary powers in the hands of a national board or department is, of course, always open to the dangers of arbitrary action by a bureaucracy. An antidote for bureaucracy often suggested is that of "decentralization." There is no question that matters affecting solely the interests of any one local community should be controlled by that community. Most local affairs, however, affect national affairs, and this is so particularly in the matter of using natural resources, for natural resources are also national resources. What happens to the soils, the forests, the ores, or the water powers in any one State affects the people of the entire Nation. The opportunity of utilizing land in any State affects not only the worker in that State; it affects every worker in America. To place these matters wholly in State hands, therefore, as sometimes suggested, is not only wrong in principle but works toward a very practical evil—it withdraws the disposal of our national resources from the searchlight of national attention.

Bureaucracy is something by no means limited to the Central Government; it applies to the State and the local government, and to the private corporation. A better antidote than decentralization is cooperation, but there seems to be no "cure-all" for the evil. Arbitrary power is one kind of bad government, and there are several other kinds; but this does not mean that we should cease to vest power in officials. Cooperation, coupled with constructive criticism both from within and from outside the Government, marks a definite line along which we can work to reduce, and finally abolish, that combination of arbitrary power and inefficiency which we call "bureaucracy."

Land and taxation.

The board should be authorized by Congress to reserve permanently for the purposes of the act any land—whether agricultural, forest, mineral, or other—in the public domain, as well as any water rights in control of Congress, rights of way, or other easements. The board should also be empowered to make purchases, through condemnation proceedings and otherwise, of lands in private ownership. Where the result of reserving or purchasing

land is to deprive any State, county, or other local government of taxes which it could otherwise collect, provision should be made that payment in lieu of taxes be made to such local government out of rentals collected from the land users by the national board or cooperating State authority. The securing of land for settlement purposes by general expropriation, as contemplated in Canada, may become necessary.

The fee-simple title to all lands reserved or purchased by the Federal Government or by any State should be held permanently by the Government or State. The individual settler, as land user, should, for the reasons given herein, hold a tenure dependent upon use—either a perpetual leasehold or other restricted estate. Such tenure could be transferred at any time, through the proper action, from the settler to his heirs or assigns; and arrangements should be made in the case of transfer that the settler be reimbursed by the Government for improvements made at his expense.

Extra values given to land in the vicinity of settlement areas due to improvements made on such areas at State or Government expense should be collected by the State through special taxation. This is necessary to prevent values created at public expense from going into private pockets as well as to protect the public settlement project from the demoralization coming from private speculation and local real estate booms. Taxation of this kind might require changes in the State constitution.

The Federal Government, in cooperating with any State, should stipulate that land values created through Federal improvements be thus collected by such State. Under this arrangement, properly safeguarded, the Government could well be expected to take the initiative in creating local values. In so doing, however, clean-cut measures should be taken to see that these values go where they belong—to the settler and worker in the equivalent of fair wages, to the legitimate investor in a fair return, to the local community in sufficient taxes, but not to the speculator in unearned profits.

Finances.

Farm building and other public works could be financed either through direct appropriation or through bond issues. The latter method should be limited usually to self-supporting enterprises; to projects like reclaiming land which can be paid for, with interest, by the land user on the amortization plan; or else to projects like road building, which can be paid for by special taxes on the increased value of abutting lands. In such cases some provision would have to be made, either directly or through the State, for reimbursing the Federal Government. The latter would then be spending no money at all, since all funds advanced would be returned with interest to the

Treasury, and thus the credit only of the Government would be needed.

In cooperating with any State for carrying on development projects therein it is customary to restrict the amount paid or advanced from the Federal Treasury to sums not exceeding 50 per cent of the necessary costs. The national board should be authorized to make the necessary assessments and collections for reimbursing the Government for advances made.

Expenditures of varying amounts are proposed in the land settlement measures which thus far have been before Congress. Appropriations for purposes of agricultural development alone vary from $100,000,000 to $500,000,000. The latter sum would probably provide for from 75,000 to 150,000 families, depending on the size of allotments and the cost of land and improvements.

Powers and duties.

"In addition to the powers necessary for securing the needful lands and finances the national board should be authorized, through rules and regulations to be formulated thereby, and through cooperation when desirable with separate States or municipalities, to carry out certain functions, including the following:

To locate areas of land suitable to be settled and colonized in convenient community units and to be developed for farming, forest, or other purposes.

To conduct soil, forest, and other surveys for classifying and determining the most profitable uses for such lands and to prepare plans for developing the same for these uses.

To take proper measures to carry out the plans when formulated, including the providing and equipping of ready-made farms and of facilities for farm operation.

To pass upon the qualifications of applicants for the lands in the communities to be settled.

To supervise the colonies when once established."

To organize cooperative buying, storage, and marketing facilities in connection with motor transport postal routes or otherwise.

To organize facilities for obtaining credit and insurance.

To provide for the construction and upkeep of post roads and other public improvements which will aid or advance the use of any land-development project.

To provide means for collecting money advanced for purchase of land, making improvements thereon, and for loans and other purposes.

A public "construction service."

As a means for carrying out development plans and providing for the construction of public improvements, the national board, in cooperation with States and with labor organizations, should be further

authorized to organize a body of men—returned soldiers and other workers—to form a public construction service. Such a service is provided for in proposed legislation. As far as possible, it should be organized on the principle of collective bargaining and in units of "cooperative crews." This method is working well in construction work on the railroad now being built by the United States Government in Alaska, where the cooperative crew has very largely replaced the private contractor.

For any construction service thus organized Congress should provide proper standards of labor. These should include safe working conditions, proper living conditions, provision for a scale of minimum wages, and a basic working-day of eight hours—this to be increased only in cases of necessity, and to be reduced in proportion to increased efficiency. Employment in such service should, of course, be entirely voluntary and the workers should have full power to organize among themselves for their economic and social welfare. The purpose should be to create nothing like an "industrial army," but, rather, an opportunity for immediate employment in construction and development work which would lead to permanent employment on the land developed.

THE IMMEDIATE PROGRAM—TO LINK FARM COLONY AND CITY MARKET.

In view of the double possibility of securing alternative employment and of reducing the cost of living, the first immediate step which might well be provided for in carrying out the Labor Department's policy, consists of an immediate construction program to link together the farm colony and the city market. Marketing facilities connecting farm producer and city consumer have already been established through the parcel-post system of the Post Office Department. In the city of Washington, D. C., at the Park View schoolhouse, which is also a postal station, dairy and other farm products are being delivered by motor truck from the various outlying rural communities and distributed at cost to the local city housekeepers. Thirty-six motor-transport postal routes have been established in different parts of the country, and the Post Office Department has worked out plans for extending this service. In connection with these plans the department has also a project for building 15,000 miles of post roads, this being wholly a Federal program and not having to wait upon State initiative.

Farm produce which can be carried in small containers is more directly and efficiently transported by motor truck than by rail or water, and a motor-transport postal system will sooner or later be developed throughout the country to supplement the railway system. Farm colonies should be located on these postal motor routes. By

utilizing a "construction service," as provided for in proposed legislation, to build post roads which have been planned by the Post Office Department many thousands of men could be set at work at any time and any unemployment situation could be promptly relieved. By following road building with farm building—in colony units on the motor routes—immediate employment on the roads could be made to lead to permanent employment on the land.

A policy like this of developing new farming communities intimately associated through postal marketing facilities with the urban communities would tend to form outlets for the congested centers of population. To the worker in particular it would offer an alternative job; to the people in general it would offer more direct access to the land.

In the main body of the report which is to follow only two out of the four natural resources will be taken up. As already indicated there are good possibilities for making opportunities for alternative employment through the opening of the public coal and mineral lands, and through the vast construction work of developing the water power and other uses of our rivers and streams. But these possibilities have not thus far been investigated in any detail by this department. Hence they will not be considered except incidentally in the pages to follow. Attention will be limited, therefore, to the possibilities of providing permanent employment on the agricultural and forest lands of the country.

The report comprises four chapters. The first chapter presents in brief outline a geographic view of the original, actual, and potential utilization of the territory of the United States. The second chapter discusses the salient principles which seem to be required in any land utilization seeking the real benefit of returned soldiers and other workers. The last two chapters examine various methods, either in practice or proposed, for applying these principles in actual cases. Chapter III takes up methods applying on farm lands, and Chapter IV those applying on forest lands.

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CHAPTER I.

GENERAL VIEW OF LAND UTILIZATION IN THE UNITED STATES.

To obtain a comprehensive view of the possibilities of developing land and natural resources in the United States, for the purpose of making new opportunities for employment, three stages or conditions in the utilization of the country's land area are here described: (1) The original or past condition; (2) the actual or present condition; and (3) the potential or possible future condition. The transition from original to present land conditions, and the probable future changes from actual to potential conditions, are also described.

All but a trivial proportion of the area of the United States consists of farm, forest, range, or barren land. Water surfaces (lakes and rivers exclusive of the Great Lakes) cover one and three-fourths per cent of the total area, but these are excluded from the acreage considered herein. Extensive areas are underlaid by coal and other mineral deposits, but most of the surface of these areas can be used independently from the mining operations. The total surface area to be required exclusively for such operations is very limited. Although the mineral and water resources of the country are the equals in importance of the agricultural and forest resources, the area required for their utilization is proportionately so small that they are not included in this chapter. Areas occupied by roads and railway trackage are assumed as being absorbed in the various land classes considered.

SECTION 1.

ORIGINAL CONDITION OF LAND SURFACE.

There are five physical features of the land surface of the United States, in its original condition, which are of interest in the present problem of land development. They are shown on map 1, facing page 36. Each of them requires some explanation:

(1) The region of the *original eastern forest.* This reaches from the Atlantic on the east to an irregular but fairly definite limit of forest growth on the west. This limit traverses territory now forming parts of the States of Texas, Oklahoma, Kansas, Missouri, Illinois, Iowa, Wisconsin, and Minnesota. (See map 1.) Practically all of this region was originally covered with a fairly dense forest growth.

Three types of growth form the eastern forest. These are (a) the *northern mixed growth* (of pine, hemlock, spruce, birch, maple, and other trees) reaching from the "Northwoods" of Maine through New York and Ontario to the northern Lake States; (b) the *central hardwoods* (of oak, ash, elm, and many other species) reaching from southern New England through Pennsylvania into the Ohio Valley and adjoining States; (c) the *southern conifers* (of hard pine in the uplands, and cypress in the swamps) reaching along the Atlantic and Gulf coastal plain.

Three types of topography occur in the region of the eastern forest. One of these consists of the eastern ranges of the mountain zone, the largest range being the Southern Appalachian. Another type of topography consists of the swamp and overflow land and extensive river bottoms; these occur on the Atlantic and Gulf coasts, in the lower Mississippi Valley, in northern Minnesota, and elsewhere. The third type consists of the rolling intermediate land, forming the bulk of the region.

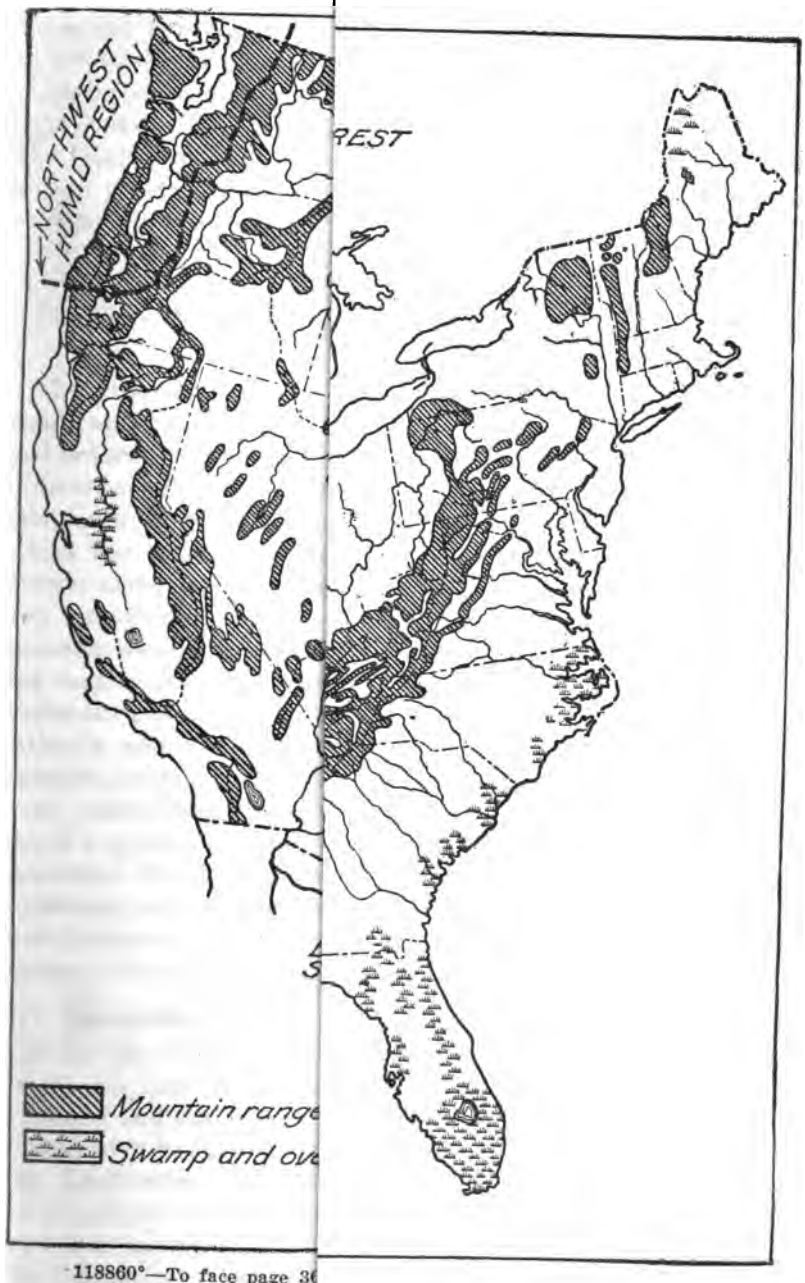
(2) The *central prairies* lying between the region of the original eastern forest and the semiarid region of the West. These form a level to rolling, treeless area, except for deciduous growth along the river courses.

(3) The *semiarid region of the West* (including the smaller *arid* region of the extreme Southwest). This covers the bulk of the area having an annual precipitation under 20 inches; it reaches from California on the west to a line roughly parallel with the one hundredth meridian—about the middle of the country. The "sagebrush country" characterizes most of the semiarid region.

(4) The *northwest humid region*, lying in western Oregon and Washington. This region has an annual precipitation of from 30 to 100 inches and more. It includes both mountain and lowland zones. The western flank of the Cascade Range has the highest annual rainfall in the country.

(5) The *mountain zone* (east and west), as shown on the map, is more or less mixed in with the other physical features. The main ranges of this zone are: The northeastern ranges (the White and Green Mountains in New England and the Adirondacks in New York); the Southern Appalachians (from Pennsylvania to Alabama); the Ozarks (in Missouri and Arkansas); the southern and the northern Rockies; the Sierras of California; the Cascades of Oregon and Washington; and the Coast Ranges along the Pacific.

The forest growth varies greatly in different parts of the mountain zone. The heaviest growth of the country goes with the heaviest rainfall of the country—on the western flank of the Cascades (in Washington and Oregon). The chief tree here is the giant Douglas fir. A heavy growth (of sugar pine and other conifers) occurs in



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the Sierras; another fairly heavy growth (bull pine and other conifers) occurs in the northern Rockies, and a lighter growth of timber (pine and spruce) occurs in the southern Rockies. Practically no hardwoods occur on the western side of the country. The main body of hardwood timber is in the southern Appalachians. These mountains contain tulip poplar, oaks, hickories, and other valuable woods. The Ozarks contain a mixture of hardwoods and pine; the northeastern ranges grow spruce, maple, birch, and the other trees of the northern forest.

SECTION 2.

TRANSITION FROM ORIGINAL CONDITION TO PRESENT LAND UTILIZATION.

The physical features which have been described and shown on map 1 apply especially to the original condition of the United States and before the land area was put to any extensive utilization. The difference between the original and the present condition of this land area is, of course, a very marked one. The transformation which has taken place began with the first clearings made in the forests along the Atlantic coast by the early English settlers. For two centuries after these first clearings, however, only a trivial impression was made upon the original American landscape and upon the vast resources of the continent. French, Spanish, and British explorers penetrated various parts of the continent from both the Atlantic and Pacific sides; various claims were made for the respective mother countries; and the original 13 British colonies became established from New Hampshire to Georgia. One of the world's greatest empires lay all but untouched at the time the American Republic was making its start in life. This empire was to become, almost every acre of it, the actual property in fee of the new American State, and the history of this State has been in large measure the story of the settlement of its "public domain."

(a) The public domain.

When the Thirteen Colonies became free and independent States they came into the possession of the territory between the Atlantic seaboard and the Mississippi River. One by one the separate States turned over to the Federal Government their claims to land west of the Alleghenies. This Federal land consisted of two parts, that north of the Ohio River known as the Northwest Territory and that now occupied by the States of Mississippi and Alabama. This land, being vested in the Federal Government, became the original public domain of the United States, and the common ownership of this domain, by the Union of isolated communities then forming the

States, is claimed to be one of the prime factors in holding that Union together in the critical days of its infancy.

The original public domain covered about 220 million acres, and this is shown on map 2 (opposite page) by the *unshaded* portions of the "territory of the original thirteen States." To this territory the following additions were made:

Louisiana Purchase, 1803.
Florida Cession, 1819.
Oregon Territory, 1846.
Mexican Cession (including California and the present Southwestern States), 1848.
Gadsden Purchase, 1853.

Texas was annexed to the Union in 1845, but none of the land within its borders, as these were finally determined, ever became part of the United States public domain. Alaska Territory was purchased from Russia in 1867 and added to the domain. Aside from this Territory, covering over 378 million acres, the total acreage contained at one time or another in the public domain of the United States is something over 1,442 million acres. This is 76 per cent of the total area of continental United States.

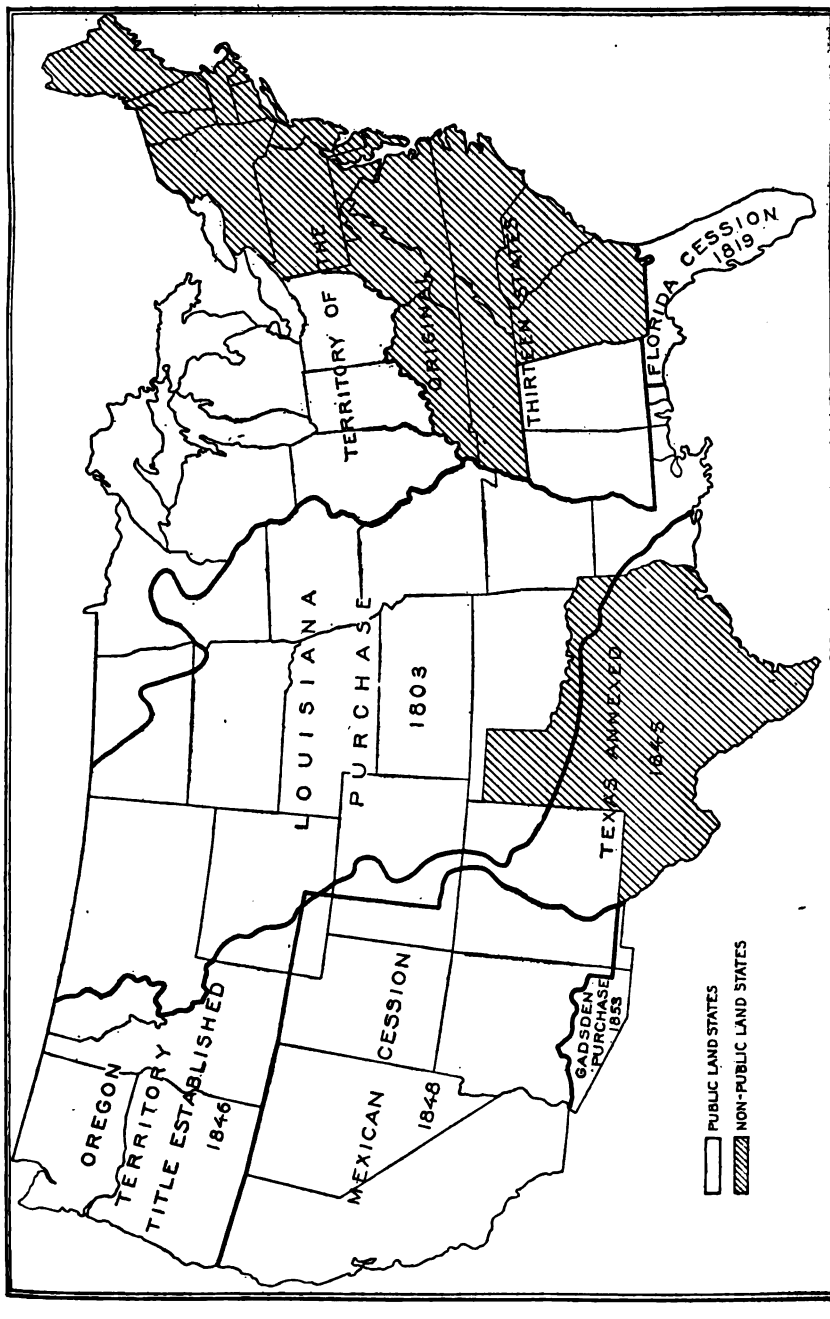
The so-called "public-land States" are those which have been formed out of the public domain. They are indicated by the unshaded areas on map 2 and comprise the following groups:

States formed wholly out of the "Northwest Territory"—Ohio, Indiana, Illinois, Michigan, and Wisconsin.
The Southeastern States of Mississippi, Alabama, and Florida.
All States west of the Mississippi River, except Texas.

The legal subdivision of land in these States is based on the uniform system of surveys provided by Congress for the public lands. According to this system, the land is divided into rectangular townships numbered with respect to their position north or south from a given parallel, or "base," and east or west from a given "prime meridian." Each township is supposed to be 6 miles square, containing 36 square miles, or "sections." A section (640 acres) may be divided into "half sections" (320 acres each) or into quarter sections (160 acres each). The quarter section in turn may be divided into two "eighties" or four "forties." A diagram of a township is shown in figure 1, page 40. Upon this rectangular system of surveys, lands under a single ownership may be scattered among many sections, quarter sections, forties, etc., in a very complex way. This system is used by Texas on its State lands, and very largely by the Canadian Provinces on the Crown lands. The non-public-land States in the East have no single system of legal subdivision.

The main feature of the public-land policy of the United States (so far as there has been any definite policy) has been the *disposal*

of the land. Until about 1840 the land was disposed of chiefly by means of contract, credit, or cash sales, in both large and small par-



Map 2.—TERRITORIAL GROWTH OF THE UNITED STATES.

cels, to individuals and private companies. The preemption system of selling at low prices to settlers on the ground was in vogue from

1841 until 1891. Extensive land grants, especially between 1840 and 1870, were made by Congress to States and to corporations. Each State as it entered the Union was granted certain sections in each township (usually sections 16 and 36) to be appropriated by the State for the maintenance of common schools within its borders (see fig. 1). Grants of selected land were made for State universities, agricul-

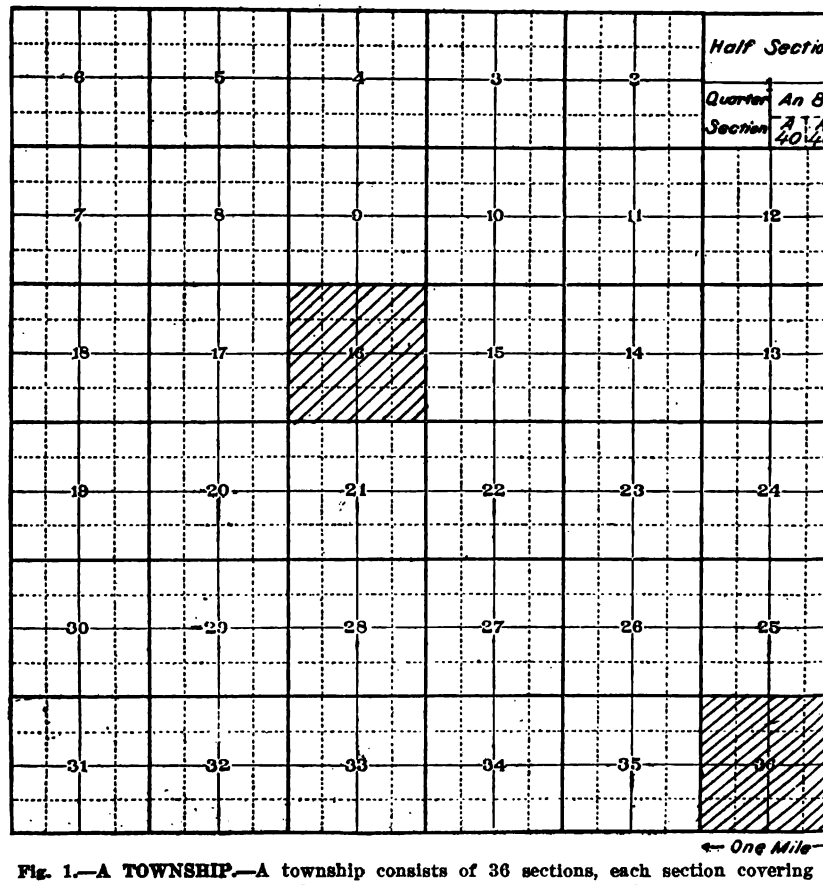
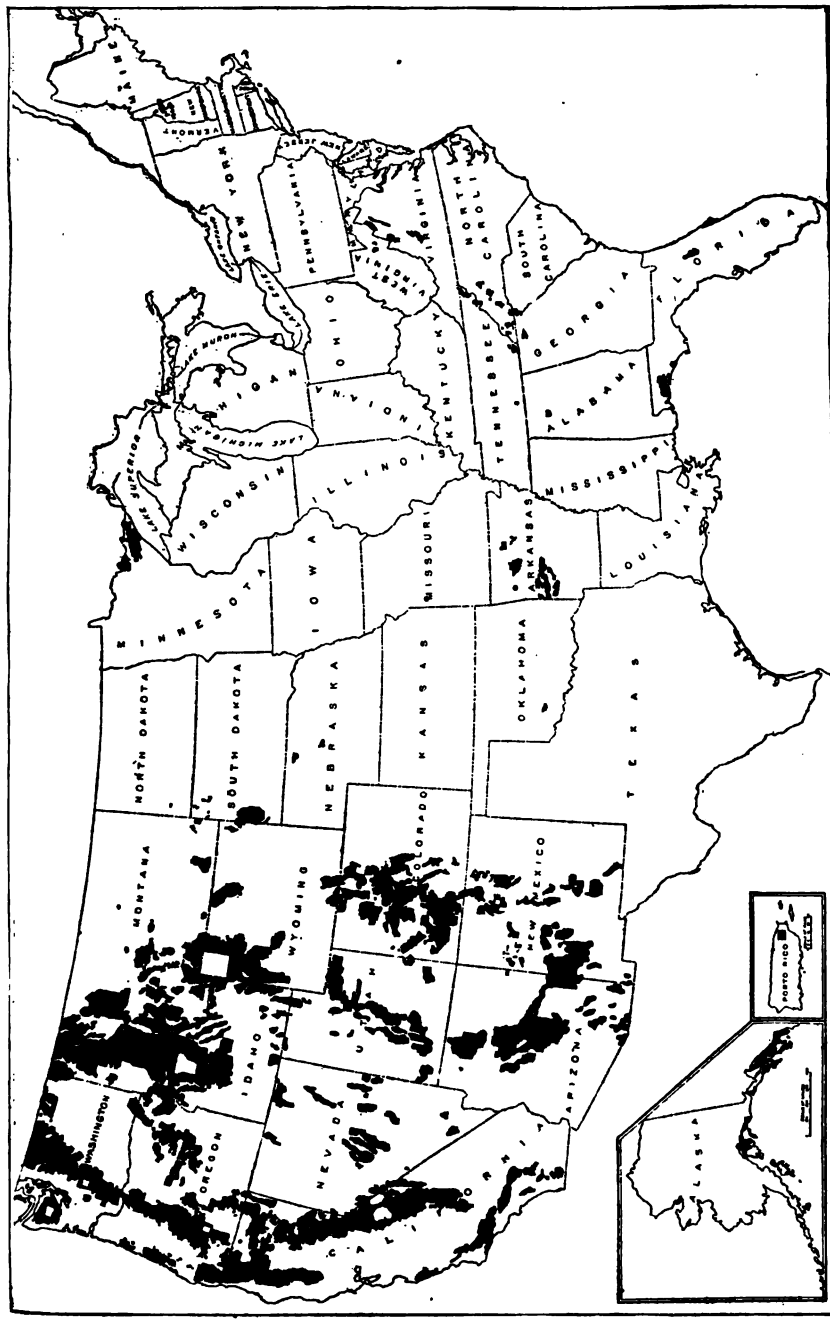


Fig. 1.—A TOWNSHIP.—A township consists of 36 sections, each section covering 1 square mile or 640 acres. Each township, therefore, covers 23,040 acres. To each public-land State as it entered the Union grants were made by the Government of sections 16 and 36 (shaded in figure), to be used for raising money for maintaining common schools. Legal subdivisions of a section are shown in upper right-hand corner.

tural colleges, public buildings, internal improvements, and various other purposes. Practically all of the swamp lands were granted to the respective States. Huge grants were made to the Pacific railroads, as well as to railway companies in the Middle West. Under these grants the title to the odd numbered sections within some limit (20, 30, or 40 miles) on each side of the right of way was vested in

the railroad companies. Grants were made for certain wagon-road projects in the far West. In 1862 the homestead law was passed de-



Map 3.—THE NATIONAL FORESTS.—Timberlands owned by the United States Government in these forests comprise nearly half of the permanent forest land in the mountain zone of the country.

signed to be applicable only to agricultural land. Laws were also passed for the disposal of other kinds of land—coal lands (1873),

desert lands (1877), timber and stone lands (1878). By means of the grants and the various classes of laws here referred to, about seven-tenths of the total public domain have now been disposed of and gone into private ownership.

In contrast to this feature of public-land disposal there has been a strong movement during the past 30 years for the *retention* of public land. The main class of land now retained permanently by the Government is that comprising the national forests. The bulk of these lie along the divides of the western mountain ranges as shown on map 3, page 41. They have been established by presidential proclamation under authority of a law passed in 1891. A number of national parks and monuments have been reserved by the Government. Another large class of reserved land is that contained in the Indian reservations, but since this land is gradually being allotted to individual Indians and thus passing into private hands, it can not be said to be permanently retained. The Alaska coal-land law of 1914 reserves to the Government the title to all coal land in that Territory, part of the land to be handled under a leasing system and the rest to be held for Government operation when needed. Laws have been contemplated, but not passed by Congress, for retaining grazing land and having it used under Government regulation. This method of handling grazing lands in the national forests has proved very successful. Although most of the grazing and all of the agricultural lands left in the public domain are still unreserved, the principle of retaining the title to public mineral and public forest land has now made its start.

In addition to the retention of forest land within the public domain Congress has passed legislation for the *acquisition* of forest land outside the public domain. This legislation, known as the Weeks law, passed in 1911. Under this authority several forest areas have been purchased in the Southern Appalachians and in the White Mountains of New England.

In addition also to the retention and acquisition of land by the Federal Government, the latter has taken definite steps toward the *development* of land. The "Reclamation law" of 1902 provides for the Government construction of irrigation works for reclaiming desert lands on the western public domain. The Alaskan railroad law of 1914 provides for the Government construction and possible operation of a railroad line for opening the Matanuska coal fields and for connecting the Yukon Valley with the southern coast.

Table 1 presents a general statement of the disposition, on June 30, 1918, of all land (outside of Alaska) at any time forming part of the public domain.

TABLE 1[a].—*Disposition of land once in the public domain (June 30, 1918).*

	Million acres.	Per cent.
Total area of the United States	1,903.3	100.0
Territory at no time part of the public domain	461.1	24.2
Territory at some time part of the public domain	1,442.2	75.8
Area disposed of	1,015.0	53.3
State grants	177.1	9.3
For common schools (secs. 16 and 36, 2 and 32)	77.5	4.1
Swamp lands	65.0	3.4
For all other purposes	34.6	1.8
Land patented under railroad and wagon road grants	[b] 126.9	6.7
State grants for benefit of railroad corporations	37.8	2.0
Corporation grants (direct)	85.9	4.5
Wagon roads	3.2	.2
Disposed of in designated ways	292.4	15.3
Early private sales	45.4	2.4
Homestead entries since passage of law in 1862	178.3	9.3
Desert-land entries since passage of law in 1877	7.9	.4
Timber-culture entries since passage of law in 1873	9.9	.5
Timber and stone entries since passage of law in 1878	13.4	.7
Coal-land entries since passage of law in 1873	.6	(c)
Indian land allotments	36.9	2.0
Otherwise disposed of	418.6	22.0
Area remaining in United States ownership	427.2	22.5
National forests	134.5	7.1
National parks and monuments	6.1	.3
Indian lands (unallotted)	34.2	1.8
Withdrawals and reservations (estimated)	30.0	1.6
Unreserved and unappropriated	222.4	11.7

[a] From annual reports, June 30, 1918, of the Secretary of the Interior, the Commissioner of the General Land Office, and the Commissioner of Indian Affairs, and from other official reports in the Departments of the Interior and of Agriculture.
[b] The original grants by Congress exceed this area by about 35,000,000 acres, which is the acreage remaining unpatented but subject to future acquisition by the corporations.
[c] Less than one-tenth of 1 per cent.

Of the 427 million acres of one-time public domain which still remain in the ownership of the United States over 90 per cent occur in the 11 far western States (the Mountain and Pacific States). The disposition, on June 30, 1918, of the land in each of these States is analyzed in Table 2 (next page).

Table 2 shows that about 51 per cent of the area of these far western States remains in the hands of the Government. The national forests occupy about 130 million acres in this region, or perhaps two-thirds of the mountain zone area included in the States named. The other reserved land consists chiefly of national parks, national monuments, Indian reservations, and of coal and other kinds of land withdrawn from entry pending valuation. Of the 222 million acres of land remaining in the public domain, and open to entry under the various land laws, the larger part is estimated to be valuable chiefly for grazing purposes; but this acreage contains also much worthless desert land as well as some areas which through irrigation are capable of being used for farming purposes.

TABLE 2a.—*Disposition of land in the Mountain and Pacific States (June 30, 1918).*

(All areas given in million acres.)

	Aggregate area.	Land held by United States Government.					Remaining land.[b]
		Total.	National forests.	National parks and monuments.	Indian lands (unallotted).	Unreserved and unappropriated (open to entry).	
Mountain and Pacific States	753.5	389.0	130.2	5.9	32.6	220.3	364.5
Mountain States	550.0	306.0	88.3	4.2	29.3	184.2	244.0
Arizona	72.8	52.5	11.8	.8	18.6	21.3	20.3
Colorado	66.4	24.4	13.4	.3	.4	10.3	42.0
Idaho	53.4	31.0	17.7	(c)	(c)	13.3	22.4
Montana	93.6	28.8	16.0	1.1	3.5	8.2	64.8
Nevada	70.3	61.1	5.3	.....	.7	55.1	9.2
New Mexico	78.4	31.4	8.3	(c)	4.0	19.1	47.0
Utah	52.6	40.4	7.4	(c)	1.5	31.5	12.2
Wyoming	62.5	36.4	8.4	2.0	.6	25.4	26.1
Pacific States	203.5	83.0	41.9	1.7	3.3	36.1	120.5
California	99.6	40.8	18.9	1.0	.4	20.5	58.8
Oregon	61.2	28.8	13.1	.2	1.2	14.3	32.4
Washington	42.7	13.4	9.9	.5	1.7	1.3	29.3

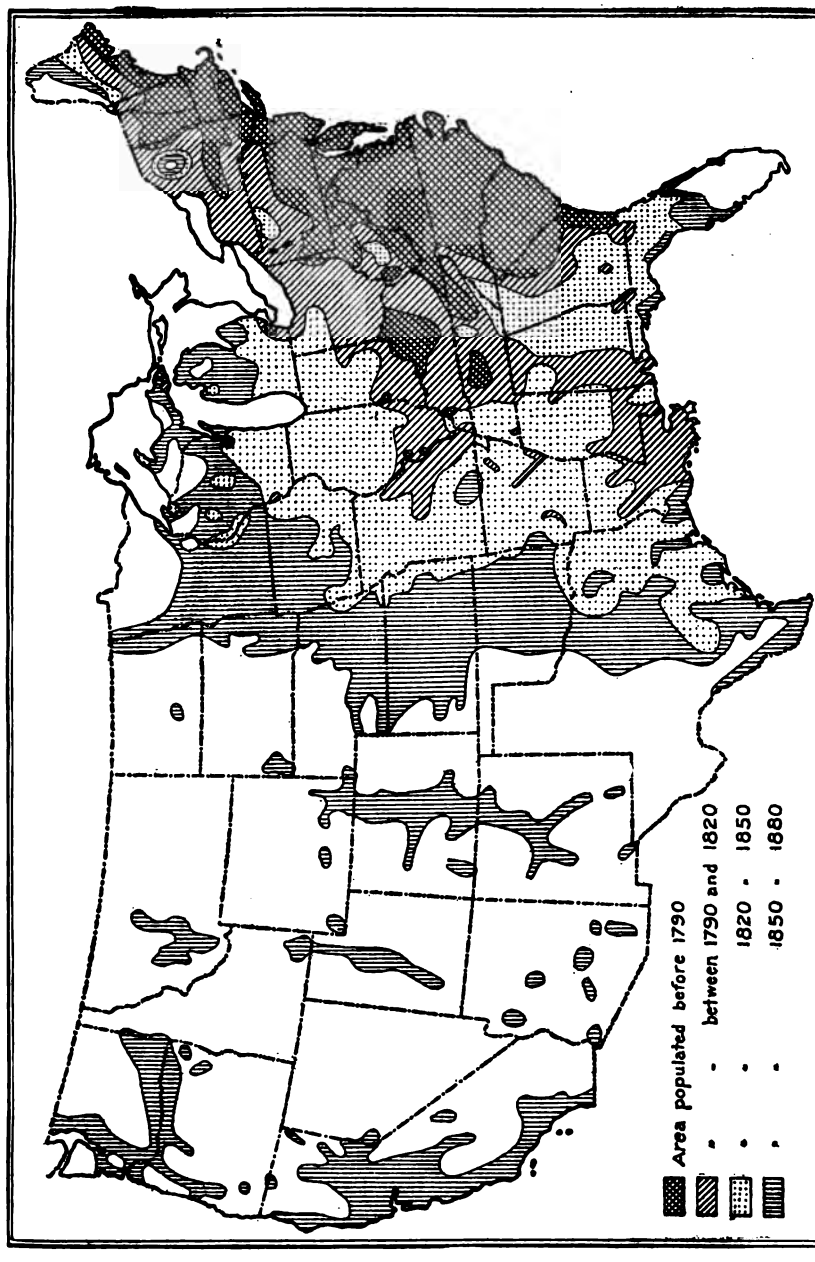
	Proportion of State area in unreserved public domain.	Proportion of State area held by United States Government.
	Per cent.	*Per cent.*
Mountain and Pacific States	29.2	51.2
Mountain States	33.5	55.7
Arizona	29.3	72.2
Colorado	15.5	36.8
Idaho	24.9	58.1
Montana	8.7	30.7
Nevada	78.4	87.0
New Mexico	24.4	40.0
Utah	60.0	76.8
Wyoming	40.7	58.3
Pacific States	17.7	40.7
California	20.6	41.0
Oregon	23.4	47.0
Washington	3.0	31.4

[a] From annual reports, June 30, 1918, of the Secretary of the Interior, the Commissioner of the General Land Office, and the Commissioner of Indian Affairs, and from area table of national forests.
[b] Mostly in private ownership, but includes some State lands as well as coal land and other withdrawals from the public domain.
[c] Less than 100,000 acres.

(b) The frontier of population.

What is here called the "frontier of population" is the line between territory having more than two persons per square mile and that having less than two persons per square mile. The migration of this frontier from east to west across the continent is indicated in map 4 on the opposite page.

The rural population at the time of the first United States census in 1790 was almost entirely east of the Allegheny Mountains; and



Map 4.—MIGRATION OF THE FRONTIER OF POPULATION, 1790 to 1880.

the "frontier" as above defined, and as shown on map 4, embraced central and southern New England, eastern New York and the Mohawk Valley, southern Pennsylvania, and the South Atlantic

States to eastern Georgia. But even at this early time the frontier was broken. A small, isolated area populated from 2 to 18 persons per square mile already existed along the Ohio River in what is now Kentucky. The rest of the country was unbroken wilderness, except for a few small settlements.

Thirty years after, in 1820, the population had spread across the Alleghenies, and the Ohio Valley rivaled in numbers the Atlantic Coastal Plain. The frontier now stretched roughly from Detroit to St. Louis, and thence to Georgia, embracing also a strip of thinly populated country through Alabama and Louisiana.

After another 30 years, in 1850, the frontier had pushed northward into Michigan, Wisconsin, and Iowa; westward across Missouri, Arkansas, and eastern Texas; and southward through Mississippi, Alabama, Georgia, and northern Florida.

By 1880 it had pushed northwest through Minnesota to the Red River Valley and the eastern Dakotas, and farther westward across Nebraska, Kansas, Oklahoma, and central Texas. A number of thinly populated areas had formed through the far West—centering in the localities of Denver, Salt Lake, and Butte; and along the Columbia River and the Pacific coast. Only two localities in the western half of the country—those around Denver and San Francisco—had a rural population of more than 18 per square mile.

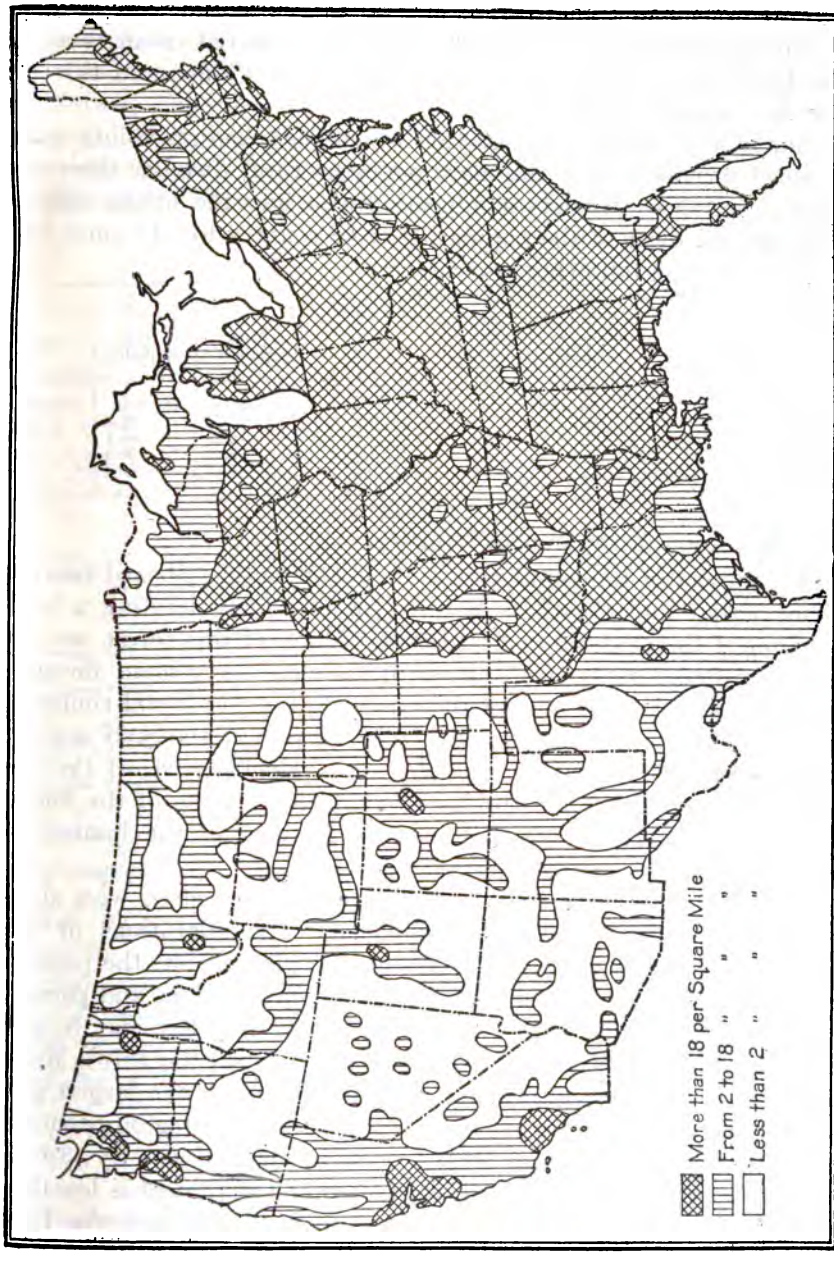
At the present time the frontier in continental United States has practically disappeared, and the area of the country may be divided, on the basis of the 1910 census, into three grades which are shown on map 5, opposite page.

1. Territory having between 18 and 45 persons per square mile, or about 105 acres per family. This embraces almost all of eastern United States and includes small areas in the vicinity of several western cities—Denver, Salt Lake, Spokane, Seattle, Portland, San Francisco, and Los Angeles. About one-third of the area of this grade in the East contains more than 45 persons per square mile.

2. Territory having between 2 and 18 persons per square mile, or about 320 acres per family. This bounds on three sides the more populous territory just described—on the north in the upper parts of New England, New York, and the Lake States; on the west through the Great Plains from the Dakotas to Texas; and on the south along the Gulf coast and in northern Florida. It extends also along the great western valleys and the Pacific coast.

3. Territory having less than two persons per square mile. This territory comprises most of the semi-arid region of the West and several remnant corners of the East. The latter include the forest and swamp sections of northern Minnesota and of Maine, and the Everglades of southern Florida.

The census figures on increase and decrease of population between 1900 and 1910 indicate a general migration from the more pop-



Map 5.—DENSITY OF RURAL POPULATION, 1910.

ulous to the less populous territory. In about half of the counties throughout the "grain belt," from New York to Kansas, and in the more cultivated sections of Texas and the Southeastern States,

the population actually decreased. And in most of the remaining counties of the grain belt the percentages of increase were very low. On the other hand, increases of more than 70 per cent were made in northern Minnesota, southern Florida, in scattered counties along the Gulf coast, in most sections on the Great Plains, and through the far-western valleys.

But in addition to the migration which has taken place into undeveloped territory from the more populous rural districts there has been from these districts a migration also into the urban centers. The general drift of the population from country to city since 1880 is shown by the following percentages:

Year.	Rural population.	Urban population.	Total.
	Per cent.	*Per cent.*	*Per cent.*
1880	70.5	29.5	100.0
1890	63.9	36.1	100.0
1900	59.5	40.5	100.0
1910	53.7	46.3	100.0

(c) Migration of the lumber industry.

The spread of the population from the Atlantic seaboard into the Ohio Valley and elsewhere resulted, of course, in leveling a large portion of the original eastern forest. Much of this forest was cut off, not to produce lumber, but simply to clear the ground for agriculture. For lack of market the finest kind of hardwood timber in the Ohio Valley was cut and burned in the pile by the early settlers. Thus a large part, and perhaps the most valuable part, of the central hardwood forest was thrown away. The clearing of the forests by the settlers, therefore, was usually no part of the lumber industry.

The lumber industry has also migrated from east to west along with the country's general development. The migrations of this industry are indicated in figure 2, page 49, which shows the percentage of the Nation's lumber supply cut in certain regions and periods.

The original home of the American lumber industry may be said to be in Maine, the old "Pine Tree State." Until the 1870's Maine and the other Northeastern States continued to cut the largest percentage of any region in the country. In 1850 this region produced more than half of the total lumber made in the Nation. By 1880 its proportion had fallen to about one-fourth and at present is less than one-tenth. (See fig. 2.) Lumbering in Michigan and the Lake States got going about the middle of the century, and the proportionate cut of this region rose steadily until about 1890. During the last quarter of the century it was the main seat of the lumber in-

dustry. Since 1900 the cut has sharply declined, and at present the proportion is about that of the Northeastern States, 10 per cent. But during (and before) this decline, the cut of the southern region had been steadily rising, and at present the main seat of the industry is in Louisiana and adjoining States. The cut is about half that in the Nation. The decline of the cut in this region will soon be at hand, and then the industry will be centered in the Pacific States, where the cut has been gradually rising since 1880. At present about one-fifth of the Nation's lumber comes from these States.

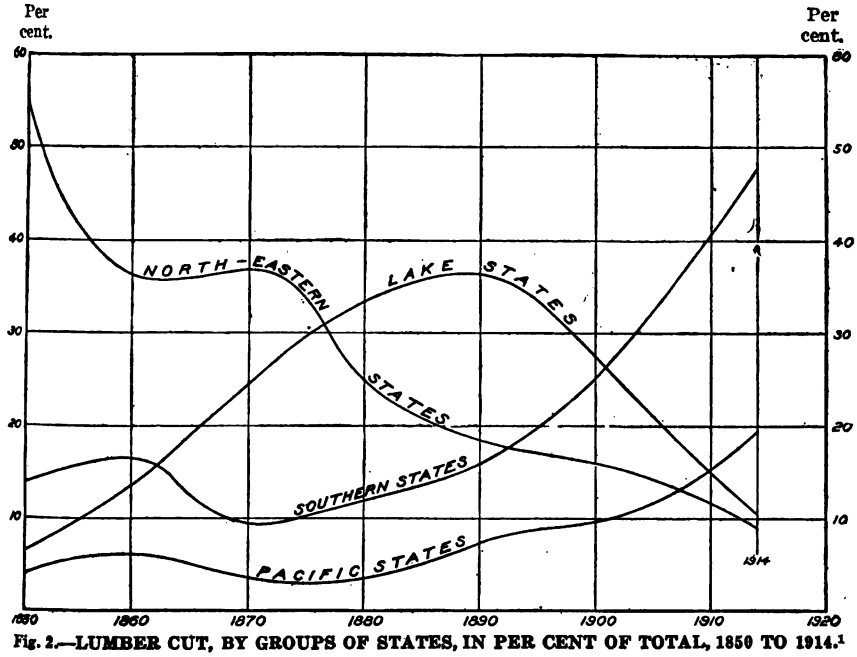


Fig. 2.—LUMBER CUT, BY GROUPS OF STATES, IN PER CENT OF TOTAL, 1850 TO 1914.[1]

Thus the lumber industry has been, and still is, passing over the country in a series of waves. Except for a few virgin patches here and there the whole of the original eastern forest has been cut over and about half of it has been entirely cleared for agriculture. Most of the forests of the West, however, are still in virgin condition, especially in the mountainous sections.

SECTION 3.

PRESENT LAND UTILIZATION.

The results of the land development above sketched are presented on map 6, facing page 50. This shows an approximation, based on census and other data,[2] of the present land utilization of the United

[1] Report No. 114, Office of Secretary, U. S. Dept. Agri., p. 6. [2] See map 6.

States. This utilization is here indicated by means of six classes of territory, as follows:

Class (1) territory.—Of this, more than 75 per cent consists of land improved for farming, i. e., either cultivated or used for pasture; the remainder (being less than 25 per cent) consists of one or more of several kinds of land—woodland, cut-over timberland, swamp land, unbroken prairie, range, and waste land. The bulk of this class (1) territory, as shown on map 6, is contained in the grain belt extending from Ohio through the Central States into the Dakotas. Isolated portions of this class occur as far east as New York, as far south as Texas, and as far west as California. Small portions of it are dotted throughout the far Western States, where land has been reclaimed through irrigation.

Class (2) territory.—Of this, not less than 50 nor more than 75 per cent consists of land improved for farming; the remainder (not less than 25 nor more than 50 per cent) consists of the other kinds of land above enumerated. The bulk of this class (2) territory is contained in areas surrounding the grain belt and other portions of class (1).

Class (3) territory.—Of this from 25 to 50 per cent is improved; the remainder (50 to 75 per cent) being as above enumerated. In this class, then, there is more unimproved land than improved land. More than half of the area here consists either of unimproved farm land, of farm woodland, or of land entirely outside of farms. This class (3) territory, as seen from the map, occurs in many regions. In New England, New York, and Pennsylvania the unimproved portions are largely farm woodland; on the Atlantic and Gulf coastal plain they are largely farm woodland and cut-over timberland outside of farms; in Texas they are largely unbroken prairie and range lands.

Class (4) territory.—Of this less than 25 per cent is improved; the remainder (more than 75 per cent) consists of the various kinds of unimproved land. In the State of Maine the unimproved portions are found chiefly in the second growth woodlands outside of farms, while elsewhere in the Northeast they are included mostly in the farm woodlands. In the Lake States the unimproved portions are for the most part the cut-over timberlands; on the Atlantic and Gulf coastal plains, the cut-over and swamp lands; on the great plains from Texas to the Dakotas, the unbroken prairie and range lands; on the Pacific coast and generally in the West they consist mainly of range lands.

Class (5) territory.—Of this less than 20 per cent is in farms; the remainder (more than 80 per cent) consists of grazing land, timbered, cut-over, swamp, and desert land. The bulk of this class (5) territory lies in the "semiarid region" of the far western States; here it consists chiefly of land used or usable for grazing stock, though large parts of it are permanent desert land. A portion of

and waste land.
" " "
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nd.
10%), improved for farming.

Map 6.—pon topographic map studies.

this class occurs also in the northern Lake States, where it consists chiefly of timbered, cut-over, and swamp lands. Another portion occurs in Florida, where it consists in the main of swamp and timbered land. A small but important portion of this class (5) territory occurs in the Puget Sound region of western Washington, where it consists mainly of Douglas fir land—part of it heavily timbered and part logged off.

Class (6) territory is contained within the "mountain zone" (east and west). More than 90 per cent of it consists of timbered, cut-over, range, and barren land; the remainder (less than 10 per cent) is improved for farming. With the exception of parts of the eastern mountain ranges in Pennsylvania and neighboring States, this class (6) territory coincides with the "mountain zone."

The present land utilization of the United States, indicated graphically on map 6, is shown by means of approximate acreages in Table 3. This table shows the area of the United States according to certain *present* land classes and geographic divisions.[1]

TABLE 3.[a]—*Area of the United States by* **present** *land classes and geographic divisions.*

(All areas are given in million acres.)

Geographic division.[b]	Aggregate land area. A.	Land in farms.			
		Total. B.	Improved. C.	Unimproved. D.	Woodland. E.
Total United States	1,903.3	878.8	478.4	209.6	190.8
New England	39.6	19.7	7.3	4.5	7.9
Middle Atlantic	64.0	43.2	29.3	4.6	9.3
East North Central	157.0	117.9	88.9	10.9	18.1
West North Central	326.5	232.7	164.3	50.4	18.0
South Atlantic	172.7	103.8	48.5	6.5	48.8
East South Central	115.0	81.5	43.9	5.3	32.3
West South Central	275.0	169.2	58.3	66.9	44.0
Mountain	550.0	59.5	15.9	39.5	4.1
Pacific	203.5	51.3	22.0	21.0	8.3

[a] The figures given in Tables 3 and 4 are very rough estimates which have been compiled by compromising somewhat conflicting figures taken from the following sources:
Bowman, Isaiah: Forest Physiography.
Bradfield, Wesley: "Standing Timber in Woodlots," Report of the National Conservation Commission (1908), Vol. II, pp. 181–190.
Greeley, W. B.: "Reduction of Timber Supply through Abandonment or Clearing of Forest Lands." Ibid. pp. 633–644.
Local State and County Records.
U. S. Census, 1910, Vol. V, Agriculture, and Statistical Atlas.
Zon, R.: "Future Use of Land in the United States," Circular 159, Forest Service, U. S. Department of Agriculture.

[b] The several geographic divisions are shown on map 7, and include States as follows:
New England.—Maine, New Hampshire, Vermont, Massachusetts, Rhode Island, Connecticut.
Middle Atlantic.—New York, New Jersey, Pennsylvania:
East North Central.—Ohio, Indiana, Illinois, Michigan, Wisconsin.
West North Central.—Missouri, Iowa, Minnesota, North Dakota, South Dakota, Nebraska, Kansas.
South Atlantic—Delaware, Maryland, District of Columbia, Virginia, West Virginia, North Carolina, South Carolina, Georgia, Florida.
East South Central.—Kentucky, Tennessee, Alabama, Mississippi.
West South Central.—Louisiana, Arkansas, Oklahoma, Texas.
Mountain.—New Mexico, Arizona, Colorado, Utah, Nevada, Wyoming, Montana, Idaho.
Pacific.—Washington, Oregon, California.

[1] The several geographic divisions are shown on map 7, page 53.

TABLE 3.—*Area of the United States, etc.*—Continued.

Geographic division.[a]	Land outside of farms.				
	Total. F.	Timber, cut-over, and swamp lands.[b] G.	Irrigable. H.	Range. I.	Barren and other. J.
Total United States	1,024.5	394.2	40.0	510.0	80.3
New England	19.9	18.9	.....	.....	1.0
Middle Atlantic	20.8	18.2	.....	.....	2.6
East North Central	39.1	36.0	.....	.....	3.1
West North Central	93.8	28.3	2.3	58.3	4.9
South Atlantic	68.9	66.1	.....	.....	2.8
East South Central	33.5	31.8	.....	.....	1.7
West South Central	105.8	37.6	2.6	61.6	4.0
Mountain	490.5	91.4	23.1	329.9	46.1
Pacific	152.2	65.9	12.0	60.2	14.1

[a] The several geographic divisions are shown on map 7, and include States as follows:
New England.—Maine, New Hampshire, Vermont, Massachusetts, Rhode Island, Connecticut.
Middle Atlantic.—New York, New Jersey, Pennsylvania.
East North Central.—Ohio, Indiana, Illinois, Michigan, Wisconsin.
West North Central.—Missouri, Iowa, Minnesota, North Dakota, South Dakota, Nebraska, Kansas.
South Atlantic.—Delaware, Maryland, District of Columbia, Virginia, West Virginia, North Carolina, South Carolina, Georgia, Florida.
East South Central.—Kentucky, Tennessee, Alabama, Mississippi.
West South Central.—Louisiana, Arkansas, Oklahoma, Texas.
Mountain.—New Mexico, Arizona, Colorado, Utah, Nevada, Wyoming, Montana, Idaho.
Pacific.—Washington, Oregon, California.

[b] The swamp lands here included are for the most part covered by some form of forest growth.

These land classes require some brief explanation:

The area of the country is first divided into "land in farms" (46 per cent) and "land not in farms" (54 per cent).

Improved land in farms—including both cultivated and pasture land—covers about one-fourth of the total area of the country, and one-half the area in farms. It covers about 478 million acres, as shown in column C. Of this acreage about 50 per cent is in the grain belt above mentioned and 20 per cent in the southern coastal plain.

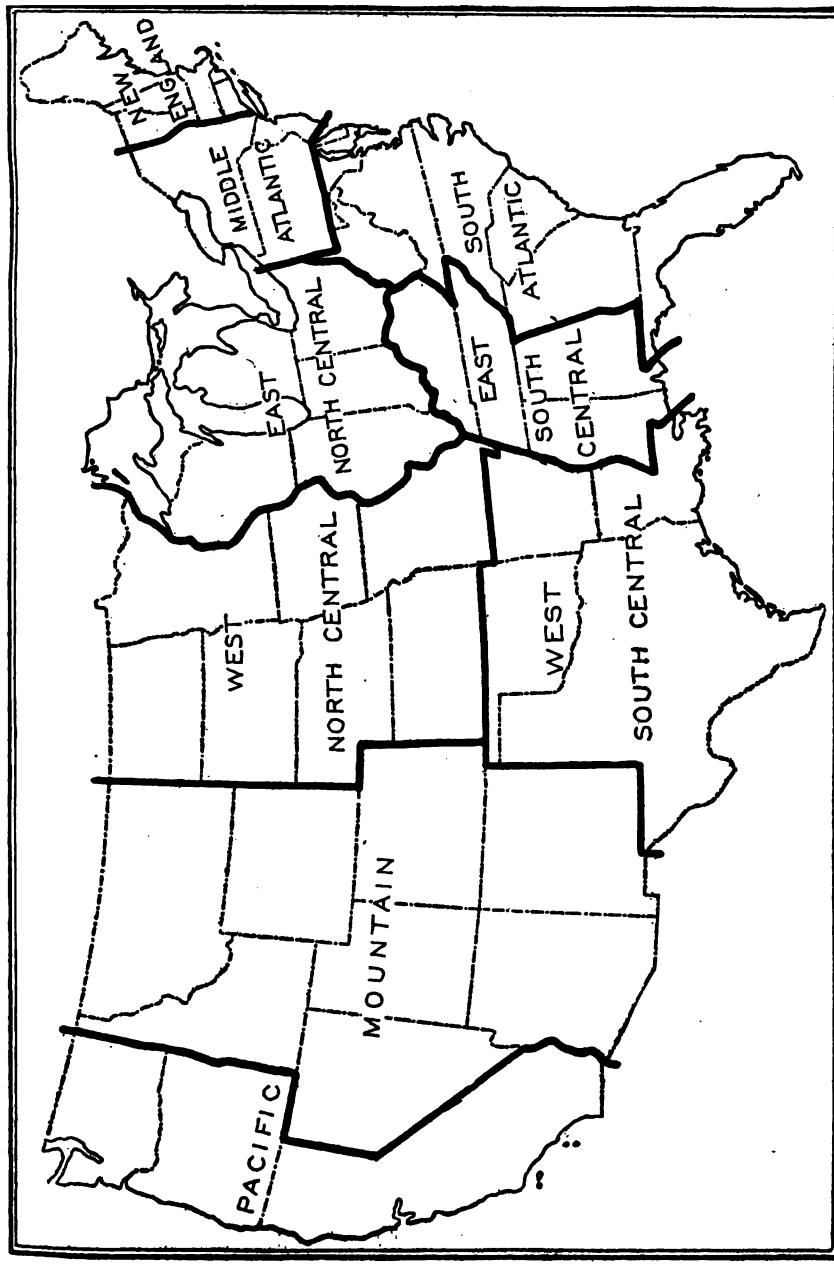
Unimproved land in farms consists of the unbroken fields, the neglected fields, the "brush lots," the "stump lots," the undrained marshes, the sand plains, and the other waste spaces found within the farm bounds. This land covers nearly 210 million acres (column D). Of this acreage nearly 50 per cent consists of unbroken fields and prairie land in the Great Plains region from the Dakotas to Texas.

Woodland in farms covers 191 million acres (column E). Of this acreage about 65 per cent is in the Southern States and 20 per cent in the North Central States.

The remaining land classes are outside of farms.

Timber, cut-over, and swamp lands cover nearly 395 million acres (column G). Data are not available for separating, in any reliable way, the three types of land comprised in this class.

At least a fourth of the above acreage is covered by virgin timber, this being chiefly in the Rocky Mountain and the Pacific States.



Map 7.—GEOGRAPHIC DIVISIONS.—(Referred to in Tables 3 and 4.)

Most of the forest areas, however, have been cut over to greater or less extent, the cuttings varying from light culling to complete "skin-

ning." The cut-over lands, therefore, vary from "stump-lands" to areas fairly heavily timbered.

The permanent swamp land here included covers nearly 53 million acres, according to studies made by the Department of Agriculture.[1] Most of this is covered more or less by forest growth, though a portion of it consists of open marsh land.

An extra area (*not* here included) consists of wet grazing land and of other lands which become periodically swampy or overflowed. The Department of Agriculture estimates this area to be about 26 million acres, which, with the above acreage of permanent swamp, makes a total of 79 million acres of wet lands in the country. Seven-tenths of these wet lands are in the Southern States and half of the remainder in the northern Lake States.

The *irrigable* area (column H) covers 40 million acres along the valleys in the western half of the country. Probably less than half of this is in the remaining public domain. In addition to this irrigable area, it is estimated that about 20 million acres have already been irrigated. The 1910 Census places the irrigated acreage at 13,738,000, distributed among the various geographic divisions as follows: West North Central, 367,000 acres; West South Central, 169,000 acres; Mountain, 9,518,000 acres; and Pacific, 3,684,000 acres.

The *range* covers 510 million acres, or over one-fourth of the total area of the country (column I). This consists of land actually used for open grazing outside of farm units, or else capable of such use to greater or less extent. Most of it is in the "semiarid region," though many million acres of it occur in the western mountains, mixed with the forest growth.

The "*barren and other*" *land* covers about 80 million acres (column J). This class consists chiefly of the permanently barren land scattered throughout the country. The largest single body of such land is in the Arizona and California desert. Many patches of desert land also extend through the Great Basin and elsewhere in the semiarid region. Permanently barren areas consist also of the alpine crests of most mountain ranges, of swamps that can not profitably be drained, of sterile sand plains unfit even for forest growth, and of other waste places which for one reason or another are unreclaimable. In addition to the barren land, there are upward of five million acres occupied by cities and towns, besides a small percentage used for mining operations and miscellaneous purposes not named above. Such areas, together with the unreclaimable barren places, constitute this class of "barren and other" land.

[1] From "Swamp Lands of the United States," a letter (Apr. 20, 1908) from the Secretary of Agriculture to the Senate, published as S. Doc. No. 443, 60th Cong., 1st sess.

SECTION 4.

POTENTIAL LAND UTILIZATION.

A number of estimates[1] have been made which bear on the possible future or potential acreages to be devoted to the several main uses of land in this country. On the basis of these estimates a statement has been prepared of the area of the United States according to *potential* land classes and geographic divisions. This statement is given in Table 4:

TABLE 4.[a]—*Area of the United States by* ***potential*** *land classes and geographic divisions.*
(All areas are given in million acres.)

Geographic division.[b]	Aggregate land area. A.	Possible farm land. Total. B.	Improved and improvable. C.	Woodlot area. D.
Total United States	1,903.3	953.0	863.0	90.0
New England	39.6	11.8	9.4	2.4
Middle Atlantic	64.0	41.2	36.0	5.2
East North Central	157.0	124.9	115.5	9.4
West North Central	326.5	239.7	227.8	11.9
South Atlantic	172.7	115.1	92.1	23.0
East South Central	115.0	85.6	68.5	17.1
West South Central	275.0	179.9	158.9	21.0
Mountain	550.0	84.5	84.5	.....
Pacific	203.5	70.3	70.3	.....

Geographic division.[b]	Remaining land. Total. E.	Forest. F.	Range. G.	Barren and other. H.
Total United States	950.3	360.0	510.0	80.3
New England	27.8	26.8	.....	1.0
Middle Atlantic	22.8	20.2	.....	2.6
East North Central	32.1	29.0	.....	3.1
West North Central	86.8	23.6	58.3	4.9
South Atlantic	57.6	54.8	.....	2.8
East South Central	29.4	27.7	.....	1.7
West South Central	95.1	29.5	61.6	4.0
Mountain	465.5	89.5	329.9	46.1
Pacific	133.2	58.9	60.2	14.1

[a] Tables 3 and 4 have been compiled from figures given in sources enumerated in footnote under Table 3.
[b] The several geographic divisions are shown on map 7, and include States enumerated in footnote *b*. Table 3, on page 51.

The land classes shown in the several columns require (as with Table 3) some brief explanation:

The last two columns in Table 4 (columns G and H) are identical with the last two columns in Table 3 (columns I and J). In both

[1] See footnotes to Tables 3 and 4.

tables the "barren and other" land includes all areas for miscellaneous use as above described and all areas which it is not profitable to reclaim for any purpose, whether by irrigation, drainage, or other means. In both tables also the "range" refers to grazing land, where stock is run over broad areas, as against *pasture* land which forms part of the farm unit. The range here considered is limited to the western half of the country, and occurs, as already stated, chiefly in the semiarid region and partly in the mountain zone. It is assumed that the *whole* of the 510 million acres (as given in each table) can be used to some extent for grazing purposes, though at present only a portion of this area is so used. All land in the United States, therefore, not included as "range" or as "barren and other land" is assumed to be profitable for growing either farm or forest crops.

The possible farm land is estimated to cover 953 million acres, or half the total area of the country. This area is distributed among the several geographic divisions as shown in column B. The improved and improvable acreage (for cultivation and pasture) is 863 million, as shown in column C. The remaining 90 million acres of farm land are allowed for woodlots (column D). Outside of farms, the potential forest acreage is estimated at 360 millions (column F).

In section 3 the present land utilization of the United States was indicated on map 6 by means of six classes of territory. In this section the potential land utilization of the country will be indicated by six classes of territory equivalent to those above described. The locations of these classes can be given in general terms but no attempt is made to show them in map form. The potential classes referred to are the following:

Class (1) territory.—Of this more than 75 per cent will consist of land improved for farming; the remainder (less than 25 per cent) will consist chiefly of farm woodlots or of timber tracts outside of farm limits. It is assumed that any included "woodland, cut-over timberland, swamp land, unbroken prairie, range, and waste land" described above in connection with map 6, is going to be turned either into improved farm land or else into forest land under forestry management. But part of the territory will be, of course, permanently unreclaimable either for farming or for forest purposes. Thus the "barren or other land" above described will form part of the remaining 25 per cent of this class (1) territory. Such land indeed will make up also some portion of each of the classes of territory described below.

The bulk of class (1) territory will be contained in the future grain belt which will probably extend from New York State through

the Central States into the Dakotas on the north and into Texas on the south. Isolated portions of this class will occur also on the flood plains of the lower Mississippi and other main rivers crossing the Southern Coastal Plain, as well as in the main valleys of the far Western States where the land will be reclaimed through irrigation. Perhaps one-half of the 863 million acres of improved and improvable farm land shown in Table 4 will be included in this class (1) territory.

Class (2) territory.—Of this, not less than 50 nor more than 75 per cent will consist of land improved for farming; the remainder (not less than 25 nor more than 50 per cent) will consist chiefly of farm woodlots and timber tracts. Here, as with the class (1) territory (and with the other classes), it is assumed that all forest land will be under forestry management. And, as already explained, part of the land here and in other classes of territory will consist of "barren and other" land. A large portion of this class (2) territory will probably be contained in the Southern Coastal Plain between Virginia and Texas, where over half of the 90 million acres allowed for woodlots will be included.

Class (3) territory.—Of this, from 25 to 50 per cent will be improved; the remainder (50 to 75 per cent) will consist chiefly of timber and grazing land. Hence in this class there will be more timber and grazing land than improved farm land. All grazing land is assumed to be under range management just as all timber land is assumed to be under forestry management. In this class (3) territory the timber land will occur in the eastern half of the United States, and the grazing land in the western half. Nearly one-fourth of the 360 million acres of forest land (outside of farms) will here be included in the rough and rolling portions of the Southern Piedmont region, the Northern Lake States, the New England States, and other sections of the East. About one-fourth of the 510 million acres of range land will here be included in the Great Plains region extending from Texas to the Dakotas and Montana.

Class (4) territory will lie wholly in the eastern half of the United States. Less than 25 per cent of it will consist of improved land; the remainder (more than 75 per cent) will consist chiefly of timberland. This class (4) territory, of comparatively small area, will be limited to only a few regions—the swampy but timbered sections of Florida and the southeastern coast, the sandy sections of New Jersey and Cape Cod, the sandy and swampy portions of upper Michigan, the rocky portions of northeastern Minnesota, and the swampy and rocky portions of New England.

Class (5) territory will lie wholly in the western half of the United States and in the semiarid region. Less than 20 per cent of it

will be in farms; the remainder (more than 80 per cent) will consist largely of grazing land. About two-thirds of the 510 million acres of range land will be included, as well as over two-thirds of the 80 million acres of "barren and other" land.

Class (6) territory coincides completely with the "mountain zone" (in both halves of the United States). More than 90 per cent of it will consist chiefly of timber and grazing land, the remainder (less than 10 per cent) will be improved for farming. About half of the 360 million acres of forest land (outside of farms) will be included.

SECTION 5.

PROBABLE FUTURE CHANGES IN LAND UTILIZATION.

The main lines of past development in the United States from original to present conditions of land utilization have been traced in section 2. Presumable future changes in land development may now be indicated approximately by comparing the differences between the data shown in section 3 on present conditions of land utilization and those shown in section 4 on potential conditions.

Of the four main classes of land—farm, forest, range, and barren—the first two only are considered. It is estimated, as shown in Tables 3 and 4, that the present and potential areas of the open range lands and of the "barren and other" lands are the same. Industrial changes will, of course, occur on the range land, these consisting of the enlargement of the area to be profitably grazed. But no estimates are here made with regard to this development.

(a) Farm land.

The total acreage of potential farm land in the United States is estimated in Table 4 to be 953 million, including cultivated, pasture, and farm woodlot areas. The land here referred to is distributed at present about as follows:

	Million acres.	Per cent.
Total	953	100.0
Now in farms	868	91.1
Already improved	478	50.2
Not yet improved	210	22.0
In farm woodland	180	18.9
Now not in farms	85	8.9
Now timbered or cut-over land, or unreclaimed swamp land	45	4.7
Irrigable but not irrigated	40	4.2

According to this statement, an area of 478 million acres, or half the total future farm land of the country, is already improved, while 475 million acres remain to be developed.

Some 390 million acres will be developed from within present farm limits. About one-fourth of this acreage will probably come from unimproved farm land in the dry farming belt along the Great Plains from western Texas to the Dakotas, and another fourth from present farm woodland on the Southern Coastal Plain from eastern Texas to Virginia.

Eighty-five million acres, it is estimated, will be developed from all land at present outside of farm limits. The 40 million acres of irrigable land will occur in the far western valleys; perhaps 25 million more can be made available from the swamp lands and timbered and cutover lands of the Southern Coastal Plain, between 10 and 12 million from similar lands in the northern Lake States, and another 8 or 9 million from logged-off and swamp lands in the Pacific Coast and the Rocky Mountain regions.

But these 85 million acres do not comprise the total area of irrigable, swamp, and cutover lands. Many areas within present farm limits consist of one or another of these classes of land, although they are classed now as "unimproved" or "farm woodland." The total area of these three kinds of land now lying idle but capable of development for farm purposes is estimated at 100 million acres.

(b) Forest land.

The total area of forest land and woodland in the United States is at present about 565 million acres, 190 million being in farms and 375 million outside of farms. The total future forest area of the country will be about 450 million acres, 90 million estimated to be in farm woodlots and 360 million outside of farms. According to these estimates, then, the forest area of the country is to be *decreased* by about 115 million acres, this area being converted into improved farm land. The bulk of this reduction will be made in the 190 million acres of present farm woodland.

Almost all of the potential woodlot area of the country (90 million acres) will be formed out of present farm woodland. The figures in Table 4 indicate that almost 10 per cent of the potential farm land of the United States will be occupied by woodlots, though the proportion will vary in different regions. It will be lowest (less than 5 per cent) in the "central prairies" west of the Mississippi River. The woodlots here will be largely for wind protection and most of them will have to be planted. The proportion will be largest (about 20 per cent) in the New England, the Southern Atlantic, and the Gulf States.

Of the 360 million acres of potential forest *outside of farms* it is estimated that about half, or 180 millions, will occur within the "mountain zone," the other 180 million occurring *outside of the mountain zone* and in the form of timber tracts between the farms.

These tracts can be managed as State, town, and city forests. About 50 per cent of the acreage within such tracts will occur in the Southern States (from Virginia to Texas), about 20 per cent in the northern half of the Lake State region, and another 20 per cent in the Northeastern States. Throughout most of New England and parts of the middle Atlantic group, though these States are thickly populated, the farm-land acreage is at present actually decreasing and much of the land is reverting to forest growth.

It is an open question whether the farm woodlots will become universally a permanent part of the farm unit or whether they will become added gradually to the "timber tracts between the farms." From a physical standpoint the woodlot could be made a very important and useful feature of the farm unit. It could be made to yield a permanent crop of fuel wood, of wood for fencing and other domestic purposes, and of timber for the general market; its uses for protection from the wind and sun and for landscape purposes could be greatly extended. It is quite possible, however, that it is not going to be profitable from an economic standpoint for the individual farmer to attempt to grow a crop like timber, requiring a long time to mature. It may be, therefore, that the bulk of forest land within the farming sections, if it is to be used under forestry principles at all, will have to be handled by the town or State, or possibly under some form of cooperative organization of farmers.

Of the remaining 180 million acres of potential forest included in the "mountain zone" about 80 per cent will be in the western mountain ranges. The Pacific Northwest, including the Sierras, Cascades, and northern Rockies, contain the heaviest of the mountain softwood timber, and this region is at present the chief remaining "timber reservoir" for the Nation. About 10 per cent of the 180 million acres will be in the southern Appalachians, the chief future "reservoir" for hardwood timber.

CHAPTER II.

REQUIRED PRINCIPLES OF LAND UTILIZATION.

In any utilization of land designed for the real benefit of returning soldiers and other workers there are required a few basic principles which, whether or not they meet with general approval, should nevertheless be specifically stated at the outset. This is necessary in order to insure a common meeting ground, for unless the ends to be attained in developing any policy are made clear from the start there is always danger of misunderstanding, of working at cross purposes, and of cooperation upon a false basis. The soldiers and workers whose occupations have been dislocated by the war are not looking for privileges nor an "easy time," but it goes without saying that they should have every possible opportunity for making a good living with normal labor effort.

The principles considered relate to the use of natural resources in general. This is implied from the definition of "land" herein given. In this report, however, matters relating particularly to the use of mineral lands or the water resources are not taken up except incidentally. Attention is limited to the possibilities of making new opportunities for employment by developing those classes of land which form the bulk of the country's area—the agricultural and forest lands. Before taking up either of these separately the term "land" and the principle of its "highest use" will first be briefly discussed.

SECTION 6.

DEFINITION OF LAND (TO INCLUDE SOILS, FORESTS, ORES, WATERS).

"Land" in its broadest economic sense refers to any area of the earth's surface and the raw materials or natural resources therein contained. The main classes of natural resources are soils, forests, ores, and waters. Each of these and the bare land surface itself have their particular uses:

(1) *Soils*—for farming and grazing.

(2) *Forests and forest growth*—used not only for the production of wood and timber but for the protection and regulation of stream flow.

(3) *Ores or minerals*—for building, fuel, fertilizer, and other purposes.

(4) *Waters or stream flow*—having four main uses: Sanitation, irrigation, navigation, power. The use of water involves the prob-

lems of storage, drainage, and river regulation generally; it involves also the fisheries industry.

The main uses of *land surface* as such (aside from the resources contained) are for roads and transportation facilities; for building purposes, industrial and residential; and for parks and recreation facilities.

On the basis of the above analysis the land area of this country may be classified for use as follows:

Farming land—which will ultimately occupy, as already explained, about one-half the area of continental United States.

Grazing land—more than one-fourth the area of the United States.

Forest land—which will take up the largest part of the remaining fourth of the country.

Mining land—occupying scattered areas of trivial proportions.

Water surfaces (rivers, lakes, reservoirs, and inlets)—occupying also a very small proportion of the country's total area.

Urban, town, and town-site land—less than 1 per cent of the country's total area, though including probably much more than half of the country's total land values.

Recreation land—included either in urban land as parks or in forest land, or else specially reserved in national parks or monuments. The total area of such national reservations in the United States is at present over 6 million acres.

The area used for roads and transportation facilities and by small streams in water power and other developments is proportionately very small indeed and is assumed to be absorbed, as needed, in the above land classes.

The industries taking the primary part in developing natural resources may be called the *extractive* or land *industries*. The main ones are the following:

Farming of various kinds—(wheat growing, dairying, orcharding, truck gardening, poultry raising, cotton growing, etc.)—conducted within comparatively small farm limits.

Grazing or the stock industry, the raising of cattle, horses, sheep, etc., conducted for the most part over extended areas on the open range of the West.

The forest industry—at present in this country consisting of the lumber industry, but gradually being replaced by forestry.

Mining and quarrying—for iron, granite, coal, phosphate, etc.

The fisheries industry—conducted in the various bodies of water.

The utilization of land, to be complete, involves all of the natural resources, land classes, and extractive industries above enumerated, but, as already stated, attention in this report will be limited almost wholly to the resources of agricultural soil and forest growth.

SECTION 7.

THE "HIGHEST USE" OF LAND.

To which of the main uses of land just enumerated should a given area be put? The general answer to this question is given, so far as the worker is concerned, in the organic act creating the Department of Labor where the purpose of the department is laid down. A piece of land should be put to that use which will, consistently with the interest of the public as a whole, provide the most "profitable employment" to the worker.

There seem to be certain requisites for profitable employment. These may have to be applied in different ways in different industries. As far as possible there should be safe and healthful working conditions. Some definite rate of wages, determined with respect to character of work and cost of living, should be recognized in each case as a minimum limit below which compensation should not fall. Some basic working-day, whether eight hours or other limit, should be recognized in each case as a maximum period beyond which work should not continue except under particular conditions, including an increased wage rate. Labor effort should be conserved and efficiency stimulated. Increased efficiency and saving of labor should, as far as practicable, be made to result in reducing the working day, and thereby enlarging the opportunity for employment.

The application of these principles to farming is different from that to other industries. The cost of living for the worker in general industry is usually higher than that for the farmer, and his wage therefore should be proportionately higher. The income of the farmer for his labor is not customarily called a "wage," though it is, of course, the equivalent thereof. The gross money return of the farmer should be enough to pay him the equivalent of a fair wage in addition to the various farming expenses and fixed charges. The farmer's working day is usually far in excess of eight hours and his compensation should be judged accordingly.

A "fair wage," for the purposes of this report, may be defined as an arbitrary rate of compensation determined upon the basis of average real wages in the locality for the particular kind of work, such compensation being agreed upon by the interests affected. The term "real wages" refers to the ratio of actual paid wages to the cost of living. What is herein meant as the farmer's "wage" is the residual of gross returns from the farm after all running expenses and fixed charges have been met. This residual is equivalent to the actual paid wage in general industry.

Whether a given acre or area of land is chiefly valuable for farming or grazing or forestry or mining depends for one thing upon

the net money return, above fixed charges, which the particular industry will yield on the area from a given expenditure of labor. If, in the long run and from the same amount of labor effort, more money is to be earned from farming the area than from growing timber thereon, it may be said to be chiefly valuable for farming; that is, farming would prove to be more profitable employment than forestry.

In no case, from the worker's standpoint, should land be used for a purpose which will not yield a fair wage for a fair day's work. If the equivalent of wages made from farming a piece of land is found to be less than the minimum required to maintain a proper standard of living, such land should obviously not be used for farming. Farming in such case would not be profitable employment. But land of this kind will often produce a growth of timber with little or no expenditure of labor effort, and when this is so it may provide profitable employment as permanent forest land. There are, however, many millions of acres in the country where the land is so barren that neither a farm nor a forest crop would provide profitable employment. Unless such land contains valuable minerals it would in most cases be practically useless except perhaps for recreation purposes.

When an area of land developed for agriculture, forestry, or other industry is sufficiently productive to make for the worker a fair wage for normal labor effort, such land has use and value for employment purposes. And the particular use—whether farming, forestry, mining, etc.—whereby the land is made to yield the most profitable employment may be called from the standpoint of the worker, its "highest use."

But land may yield a service other than supplying products and providing directly for employment. Thus forest land besides supplying timber products may yield quite as important service in aiding the regulation of water resources. Where the permanence and stability of river and stream flow depend upon a forest cover on the steep, mountainous portions of the watershed, these lands, properly protected by forest growth and including possibly areas devoted to artificial reservoirs, are chiefly valuable for purposes of water storage and regulation. The highest use of such forest lands is for protective purposes.

And whatever may be the ultimate or potential *use* of a land area, it is likely originally to be in a *condition* quite different from that required for its highest use. Much fertile farming land may at present be covered with a growth of timber, or with stumps, or with swamp waters, or else be in an arid condition. Then some land is permanently barren—as desert lands and areas of rock in the mountains. And so land may be classified *according to its actual condi-*

tion, as timbered, or "stump land," or "swamp," or "barren," or "cultivated." The highest use of a given area depends, therefore, not only upon its intrinsic quality, but upon its immediate condition and the possibilities of changing it. It depends also upon the distribution of the different kinds and conditions of land. Thus highest use is a matter not alone of topography or soil fertility, but of certain economic questions as well.

Fertile soil, for instance, may exist in a locality which happens to be timbered, but if it occurs in unduly small proportions or occurs in patches too widely separated, it might be very poor economy to attempt to clear and cultivate it. In such a case the locality as a whole would probably be chiefly valuable for its forest growth. But even if the locality consisted mostly of fertile land, if the crops which will grow there can not be marketed, it would be an economic mistake to put it to farm use. In this case also it would be chiefly valuable for forest growth, at least until such time as there promised to be a market sufficient to absorb the agricultural crops.

But, again, a timbered locality or one in stumps may have a large proportion of fertile land and a good market for its potential crops and yet be wholly unsuited to agriculture. This happens when the labor of removing the stumps and making the land cultivable is too great. In many cases the cost of "stumping" land is prohibitive merely for the lack of proper credit facilities; but, in other cases, it may be prohibitive under any circumstances. This means that the labor of "stumping" the land (even under an adequate credit system) does not constitute profitable employment. Such land being fertile would be capable of growing timber, and so this, and not farming, would probably be its highest use; and labor so expended would probably constitute profitable employment. It is not enough, then, merely to pronounce an area as being "agricultural land" or even "fertile land"; any truly useful classification of land must determine which, within reasonable probability, is *profitable* agricultural land—profitable, of course, to the farmer himself who works the land. If it does not provide profitable employment as farm land (or until it does) it should be left for growing forests or put to some use which does assure profitable employment.

The specific test of the Secretary of Labor for determining what is profitable agricultural land has already been given. See page 19.

SECTION 8.

PRINCIPLES APPLYING TO THE USE OF AGRICULTURAL SOIL.

These principles relate to the following matters: (*a*) Community cooperation, (*b*) reclamation, (*c*) ready-made farms, (*d*) credit, (*e*) limitation of farm areas, (*f*) land tenure. Each of them is

embodied as a main feature of the land legislation of Australia. This legislation is probably as far advanced as any on the globe, and the conditions for which it has been made resemble very closely those on the American continent.

(a) Community cooperation.

One of the corner stones in American agricultural development is now being laid. This is the growing idea of community cooperation. Though somewhat new in this country it has been long established in several foreign countries. But in the United States it is developing into a Nation-wide movement. It applies to the marketing of crops, the buying of supplies, to insurance, the obtaining of credit, and to other economic needs; it applies also to the various pressing social needs of rural life. For the most part in the past the individual farm has been in America the unit of agricultural development, and the only unit with a purpose. The community, as such, has had no purpose; it has merely occurred where the farms become thickest—it has "just growed," like Topsy. The new idea reverses this emphasis. Under the cooperative principle the unit of development is not the farm but the community.

There was a time when the ideal of the "independent" farmer seemed to be to emulate the independence of the possessor of an isolated island. But the practical, everyday need of the farmer is breaking him away from this old theory. Farmers generally are beginning finally to realize the import of the American tradition, "hang together or hang separately." Only by holding together in a group can these hard-working citizens hold their own with the outside world. This they are learning fast. And not only their material welfare but their social and spiritual welfare, demands an end to a needless rural isolation. Hence the demand for the development of the rural community as a definite thing—as a concrete organism and not an assemblage of conflicting interests.

Aside from cooperation among the farmers themselves in the marketing of their produce, and in securing other economic needs, there are one or two other requisites of a true community life. One of these consists of proper school, church, and educational facilities. These are needed by the new community as a part of its original equipment, just as the house and the barn are needed by the ready-made farm as part of its original equipment.

Another requisite consists of definite facilities for social development. In this connection a movement is progressing in the country at large to make the schoolhouse the center of community education. This applies to adults as well as to children, and training in self-government is the first subject on the list. It is maintained that education and the franchise should go hand in hand and that the func-

tion of the public school should be enlarged to include the public forum. There could be perhaps no better opportunity for working out this principle than that offered by the new agricultural community freed from dogmatic precedents, and building itself in a fresh environment.

Closely connected with the social development of the community is the working out of a healthful and proper system of recreation. A movement is now well started in the country for establishing community theaters and dramatic presentations in connection with the school and the public forum, the object being to secure a social center in which is reflected the full life of the community.

(b) Reclamation.

Four-fifths of the estimated 475 million acres to be developed for agriculture in this country are within present farm limits and near the populous centers. The remaining fifth, as already described, consists of the arid, swamp, and cut-over lands in the far West, on the Southern Coastal Plain, and in the Great Lakes region. It goes without saying that a sane land system would provide for developing the near regions before the remote regions. The latter, however, as a matter of fact are being opened up. This development, therefore, should be guided in a way to secure, as far as possible, opportunities for profitable employment rather than the reverse. The problems of reclamation apply particularly to these undeveloped areas which may be divided into three classes:

(1) Arid and semiarid lands, which are reclaimed through irrigation;
(2) Swamp and overflow lands, reclaimed by drainage;
(3) Cut-over and logged-off lands, reclaimed by clearing of trees and stumps.

The cost of reclaiming many of these lands is too high to result in profitable farming, and so their highest use is of nonagricultural character. Many of the logged-off lands can be used for growing forests.

Reclamation might appropriately be called "land making," or more accurately farm making. To convert a water surface into a land surface, is for practical purposes, to create or make an area of land. Thus, a piece of land or a farm can be "made" by draining a pond or swamp. A farm can also be made by uncovering an area from the burden of left-over trees, logs, and stumps. Under these circumstances the future farm may be considered as a buried treasure—an area of potential productivity buried beneath swamp waters or logging débris. And again for all practical purposes a farm is made when an arid area is supplied with water through irrigation.

But to reclaim land and to really make a farm it is not sufficient merely to supply the area with water, or to drain off the water, or to clear off the stumps. These are only the first crude steps. The mistake has been made in this country of thinking that these steps constituted sufficient and complete reclamation—that when land was irrigated, drained, or cleared the farms would be ready for use. What is meant by complete reclamation may be shown by describing incomplete reclamation. A striking picture of the latter is given by Dr. Elwood Mead, a leading authority on land colonization in America and Australia. He assumes for illustration a thousand average settlers located on 50,000 acres representative of any typical irrigation project in western United States. He says:[1]

These settlers will be confronted by the following conditions: Aside from the main irrigation canals and the unformed dirt roads they will find that everything required to transform a desert into productive farms remains to be done. The land must be cleared of brush. The farm unit must be fenced. A house for the family and stable for the work animals must be built; and provisions made for a water supply for household use. Not being familiar with local conditions, they will not be able to buy to advantage, and they will be under pressure to buy quickly. Many will be victimized with bad horses and poor cows. It was stated on one visit to a project in July last that settlers had to pay $27 a thousand feet for lumber that was being sold to those who could buy in carload lots for cash for $11 a thousand feet. * * *

Much of the land to be irrigated is uneven, requiring a large expenditure to prepare it to be watered properly. In places the wind has heaped the sand and dust in mounds which have to be leveled down, and settlers have testified that it has cost $100 an acre to level some land of this character. To smooth off the inequalities, prepare the checks and borders, and build the small distributing ditches on a tract of 50,000 acres of land awaiting settlement will, on an average, cost somewhere between one and two million dollars, and that expenditure is just as essential to growing crops as the building of canals to provide the water.

To leave this costly preparatory work to be done by the settler who lacks experience, implements, and practical skill involves a ruinous waste of money and time. Nothing could be more inefficient. Careful consideration will, I believe, convince anyone that making land ready for the application of water is as essential to reclamation as the building of the canals and reservoirs.

The total cost of preparing the land for irrigation will, on the average, be as great as the cost of irrigation works; and the use of proper equipment, directed by practical knowledge and skill in preparing the land, would be just as advantageous as it has been to have the irrigation work carried out by the Government under the direction of skilled engineers.

The thousand settlers will require houses and some kind of farm buildings on each of these farms. If each one is left to buy his building material at retail, make his own design for the house, and hire carpenters if they can be found, as is now the practice, the following results will inevitably follow:

The cost of the material will be far greater than it would be if these houses were built by one authority who was able to buy the material at wholesale

[1] Hearings before the Committee on Labor, U. S. House of Representatives, on the Crosser colonization bill, pt. 2, Dec. 15, 20, 1916, pp. 87 and 88.

and pay cash for it. There will be many freak houses, lacking durability and comfort and detracting from the appearance of the district.

The time of the settler, which ought to be taken up with farm work, will be given over to bargaining for material, hunting for a builder, and doing things that a properly organized central office could attend to more effectively at one-tenth the cost. One thousand houses and an equal number of barns to shelter live-stock will cost at least $1,500,000 if any attention is given to durability and comfort. A saving of 50 per cent in value to settlers will result from having this done under one competent authority, according to a systematic plan.

This is not all that will be gained by the creation of ready-made farms in accordance with the plans outlined in this bill. If the settlers bring families, these families must live while the house is being erected. If they board in the nearest towns, this involves great expense which becomes immediately a source of anxiety to the settler who sees the money he has accumulated for development being absorbed in living expenses. If in order to save this expense the family attempts to live in tents while the house is being built, illness often results and this adds to the expense and discouragement of all concerned. I have seen the wives of settlers age 10 years in 10 months as a result of this disheartening struggle with obstacles which ought to have been removed and which will be if this bill, or one which carries out its principles and purposes, shall become a law.

Only those who have had direct familiarity with our present unorganized and unplanned development can realize how inefficient and how costly it is.

The conditions here described by Dr. Mead on the irrigation projects have their close counterpart on such areas as the cut-over lands of the northern Lake States and the logged-off lands of the North Pacific coast. Here also the reclamation is incomplete. The timber is removed in whole or in part. An acre or two on each farm is often cleared of stumps and a house and shed built by the land company. The company often stands ready to supply the incoming settler, without extra cost, with a limited supply of seed, fruit trees, poultry, etc.

But most of the work of building the farm remains to be done. The bulk of the stumps must be removed. The powder used for blowing these out must usually be bought at retail, and its cost is needlessly high. Comparatively seldom is provision made for the use of efficient stump-pulling machinery. The settler can not, in the first years at least, make a living by working the farm, and so he is required during part of the time to get outside work at wages. But such employment is too often so far distant that the farm must be grossly neglected to earn the needed cash. Usually no provision is made for having farm equipment or live stock supplied at cost; and the expense entailed for these necessary things must either be met by immediate cash payments or else on short-term payments with interest rates around 8 or 10 per cent. And all this quite aside from the charges made for the use of the land itself.

Reclamation in one sense, perhaps, can never become complete. With a farm, as with everything else, there is always room for improvement. A farm may require a generation or more to reach its highest usefulness, but this is no reason why it should not be made ready for use before attempting to use it.

(c) The "ready-made farm."

The "ready-made farm" is one fully prepared for cultivation before settlement begins; it requires, in addition to such things as the ditching and clearing of land, the erection of the immediately essential buildings and improvements. On the ready-made farm the settler and his family can start their new life with a comfortable home for themselves and housing for their stock. The settler or agricultural worker should no more be expected to go upon the farm before it is made and equipped than the manufacturing worker should be expected to go into the factory before it is made and equipped.

There are a great many cases, to be sure, where the settler in the ordinary course of his farm work, has days at a time (or hours at a time) when he could devote his energies more profitably to clearing up portions of his land than to any other use. Such periods might otherwise be wasted. Under these circumstances land clearing and other improvement work carried on at odd times by the settler singly (or with his neighbors) might prove to be the most efficient method of land clearing. The ready-made farm is one equipped and developed to a point sufficient for starting business in a practicable way, but not one necessarily that is developed to finality.

In sharp contrast, however, to such a common-sense procedure is the one which in this country has been usually adopted. The settler is expected to work his farm before it has been sufficiently prepared; not to build a farm and then use it, but to do both together. The circumstances of the agricultural industry have forced the use in most cases of this makeshift scheme, something not tolerated in any other industry.

In this connection the claim is often made by private colonizers and others that it is "cheaper" for the settler to clear his own land than to have the work done for him in accordance with plans for a ready-made farm; that if enough area is cleared in advance to locate buildings and a garden, so that the settler can begin farming between the stumps, then it is cheaper for him to clear his land by himself at odd times as he goes along than for him to be burdened with the debt involved in large-scale stump-pulling operations. It is claimed that the large-scale operations often will not pay on land where the settler's single-handed methods *will* pay. Whether

or not such claims are valid depends, of course, upon what is meant by "cheaper" and upon what is meant by "pay."

Suppose the cost of clearing the stumps from a prospective farm, when cleared by an organized stump-pulling crew, is $150 an acre, and that $50 of this cost is for powder and machinery and $100 for direct labor paid for at some normal rate of wages (say 25 cents an hour); and suppose that the ultimate value of this land after it has been cleared is $100 an acre:

Of course, it would not pay to invest $150 in land whose final value will not exceed $100. Nevertheless, some men claim that it might pay to clear such land if the settler does it himself. If, they say, the settler himself cleared the land as he went along, it would cost him only $50 an acre (the cost of powder and machinery), for he could put in his own labor and would not have to pay himself anything. Thus $100, the cost of labor at a given wage rate, is wholly saved. If this wage rate is $2.50 per day the operation of clearing 1 acre would require one man's time for 40 days ($100 divided by $2.50). If, then, the investor, as a financier, puts into the hundred-dollar land $50 in powder and machinery, and also puts in *the money to pay for 40 days' labor* ($100), then the operation will *not* pay; but (according to this reasoning) if the settler, as a worker, puts into the hundred-dollar land $50 in powder and machinery and also puts in *the actual 40 days' labor* (worth $100), then the operation *will* pay.

Those who argue in this way probably have in their minds—perhaps unconsciously—that the ultimate value of the land will really be more than $100 an acre; that the value some time will even exceed $150, and hence that it might well pay the settler to put in labor now on which he can realize later. If this is so, then the same rule would apply to the investor who puts in his money instead of his labor. In the above illustration (where $100 is the true ultimate value of the land) the spending of money by the investor to pay for 40 days' labor would not be for him a profitable investment, and likewise the spending of 40 days' labor by the settler would not be for him profitable employment.

It might be, however, that it is not possible in the particular pioneering locality to obtain work at regular wages. It might be that the wage attainable in such a region is only half that possible to get for equivalent work in outside settled regions. Perhaps no local work whatever at paid wages is to be had. Such conditions have been in fact the typical ones in the pioneering frontier belt in its migration across the continent. The early pioneers—whether in the Ohio Valley or elsewhere—did not receive "wages" for their labor. But many if not most of those who succeeded in finally establishing a home and an opportunity to live on the soil probably felt repaid for

their labors. During the years that the early pioneer was cutting a farm out of the wilderness he was establishing himself for life—he was paying for his farm, not in money but in labor. Why, then, should not the settler in this time as in old times, even though for a number of years he may receive far less than the equivalent of regular wages, be encouraged to develop his farm and establish himself through the use of the single-handed methods?

The reason why the settler should not be required to develop his farm by these methods is simply because they involve usually a gross and needless waste—a waste of land, of time, and of human effort, and the sacrifice, in case of failure, of all that the settler has put into the project—years of toil besides the money investment. The labor required to build a farm in the early days of the Nation's development was greater than that required to-day in our more advanced general development. The future opening of the land need not, with proper management, be subject to the heartbreaking handicaps of the past. With proper management the settler of to-day need not lose the time and effort required in an earlier age. Methods in practice in the Australian and other countries show distinctly how to save this loss in time and energy. And the Nation has no labor to squander in the very necessary opening of its remaining lands for use.

The ready-made farm is the tangible product of a policy of complete reclamation, for the latter is merely the preparation of land for actual use. If the agricultural worker deserves an even chance with the manufacturing worker, then the farm as well as the factory must be fully equipped before, not after, operations begin. From the standpoint of conserving land and resources, and especially from the standpoint of the conservation of human energy, agricultural reclamation should not be left half done.

(d) Credit.

The matter of reclamation was treated above chiefly from a mechanical standpoint. Reclamation is a very old art and the mechanics of it are far advanced, though the methods of large-scale land clearing and stump disposal are still somewhat in an experimental stage. But the mechanics of the problem is the smallest part of it. A more difficult question is that relating to credit or financial management—how to finance an operation for getting lands immediately in a cultivable condition and to actually producing so that the cost can be spread over future years and taken out of the proceeds thus made available.

A specific illustration of the problem of credit may be had by modifying somewhat the story of Robinson Crusoe's island. Considering

this island as being arid or swamp or timberland, Crusoe would have to reclaim some portion of it before he could even begin to raise a crop for his own food. His single-handed methods under such conditions would be so inefficient that he would probably die of starvation. If, however, a crew of men came to him from some neighboring island to make the fertility of his land immediately available to him, he might well be enabled, by his own future labor, to live in comfort and gradually repay the equivalent of the labor done for him. He would not have the power to do the work of needed reclamation within the short time required, but he would have the power to do this work in a longer time. The crew would have donated him no labor power at all; it simply would have enabled him to concentrate his own labor power when and where a large quantity of it was needed.

Here then are two forms of "self help": One is aided by outside civilization and the other is not; one enables a man to make a living and the other does not. If Robinson Crusoe in this case were a tax-paying citizen of a central government located on the neighboring island, he would seem to have the right to demand that "the State" use its credit as a leverage to aid him in his own self-help.

In canceling an immediate debt throughout a series of years, two kinds of payments are made: (1) the principal or actual amount of the original debt itself; (2) the interest on the portion of the principal remaining unpaid. The most systematic, business-like, and convenient way of canceling a debt during a number of years is to "amortize" it. By this method there is paid each year a stated sum or amortization charge, which is divided into two parts: One part consists of the interest on unpaid principal; the other part consists of payment on the principal itself. As more and more of the principal is paid off from year to year, the amount paid for interest steadily diminishes, leaving a steadily increasing portion of the stated annual sum as the part devoted to retiring the principal. At the end of a given period (varying in the practice of foreign countries from 40 to 75 years) the whole debt is canceled. By this method the settler is enabled to get the immediate use of a fully equipped farm.

Aside from the matter of high or low rates of interest, or cost of money,[1] efficient credit may be characterized as follows:

(1) A system (or scheme) which provides the use of cash at the times and in the quantities needed;
(2) which amortizes the debt in the way above described;
(3) which allows a period of amortization sufficiently long to keep the annual payments low enough to prevent needless hardship for the debtor:

[1] See section 11(b).

(4) which provides for reasonably safe security through liens on the improvements made, the land improved or property purchased; and also by such other means as are afforded through the organization of local community credit associations. By the latter method the personal character of the settler, as well as the value of his property, is available as security for the payment of his debts.

The Government, or State, is the logical agent to provide a system of credit embodying these features, and is the agent now being used for this purpose in most of the world's enlightened countries.

(e) Individual farm areas.

Since the total amount of available farm land for the use of the people as a whole is and always will be limited, it may be said that the amount of it made available to the use of each man, or group of men, should also be limited. This principle is recognized, though sometimes crudely, in the land legislation of this and other countries. Our homestead law (of 1862) provided for giving away to the individual settler—after certain requirements as to residence and improvements—160 acres of public land. The basis of this limitation was the idea that this acreage was on the average sufficient for the support of the settler and his family. With arid land, a larger area was assumed to be necessary, and the desert land law (1877) allowed for taking 320 acres.

The proper size for a farm depends of course not only upon the character of the land but upon its access to market. The truck garden in suburban territory may suffice with five acres; the dairy farm in rural territory needs an "eighty" or more according to the number of cows carried; the combination of general farm and cattle ranch in semiarid territory will need several times that area; while the true grazing industry requires some definite share of the open range. Some limit, however crudely determined, has long been favored as the correct principle in the appropriation of a farm area by any one land user.

What seems to be needed is not a farm unit of rigid and arbitrary area, but one of flexible area. To say that a farm of given character—worked by an average family under a certain set of conditions—has too big an acreage means that the net income which is made by the family is less than if the land were further subdivided. To say that a farm has too small an acreage means that the full time and normal working power of the family is not wholly utilized. There is in any particular case some acreage, determinable in greater or less degree, which will fully utilize labor power and secure the maximum return for normal effort. Such an acreage would make the most efficient farm unit for a family.

Considering the growth of cooperation among farmers, it may well be that the farm unit should be enlarged so as to provide for groups of users as well as for individual users. This would allow the advantages of large-scale and cooperative industry. There seems to be nothing objectionable in encouraging farmers thus to cooperate, so long as the actual workers on the soil get their full share of its proceeds and no exploitation is created either of labor or the food-consuming public.

(f) Land tenure.

The rights obtainable in a farm area should guarantee, first, security to the farmer and his family in the permanent use of the area, and, second, prevention of speculation in the right to such use. Rights of this kind can be given to the settler or farmer by possessing him with the proper title or "estate" in the land. Under the law of real property in the United States and in British countries there is no such thing, legally speaking, as the private ownership of the *land itself;* the private possessor is said to have only what is called an *estate* in the land. The ultimate title to all land in English law is "in the Crown"; in this country it is "in the State." The so-called largest estate possible to alienate is the fee simple. But there are quite a number of other estates recognized in the law of real property; some of these alienate only the right to use land; others alienate also the right to barter land.

The methods in certain Australian States for making land tenure secure are summed up by Dr. Elwood Mead as follows:[1]

> The State of Victoria found there was a tendency to speculate on the results of aid to settlers and to combine holdings after subdivision and again have nonresident ownership. It became necessary to insert conditions in land titles to prevent this. The plan adopted was for the State to retain title to the land for 12 years, the settler to hold it under a purchase contract. If he sold his interest he could only sell to some one approved by the State authorities and who was eligible under the land act, and that meant he must live on the land. The residence condition is perpetual. After the settlers get their freehold title, either they or some member of their family must live on the land eight months of the year or it is subject to forfeiture. * * *
>
> In New South Wales they have a different system; that State only gives a perpetual lease, * * * and the land is inherited by the settler's family exactly as it would be if he had a freehold title.

Speaking of the farm tenure provided under the German land system, Dr. Mead says:[2]

> At first these farms were leased to settlers. This was not a success. Then settlers were allowed to buy them outright or to pay for them as soon as possible. This also was unsatisfactory, because many of the settlers were dis-

[1] Hearings before the Committee on Labor, U. S. House of Representatives, on the Crosser colonization bill, pt. 2, Dec. 15, 20, 1916, p. 118.

[2] Ibid., p. 100.

posed to speculate and sell out whenever a profit could be secured. Under the present system the settler is not required to make any cash payment on the land, but has it for 50 years with an annual payment of 3½ per cent interest on the total cost. He must also meet the requirements of the State regarding cultivation and keeping up improvements, which are closely looked after. At the end of this 50-year period the payments on the land begin.

Two plans, then, are used by foreign Governments for providing the settler with secure land tenure—the perpetual leasehold and the restricted freehold. With either plan some provision should always be made, in the case of the transfer of an allotment from one settler to another or to the State, for reimbursing the settler for permanent improvements made at his own expense.

The opportunity to the individual settler of using land without paying tribute is fundamental in the Labor Department's land policy. The utilization of this opportunity requires the elimination of another opportunity—that of speculating in the right to use land. And the only practicable way of eliminating such speculation seems to be to hold the land under such control that the individual title thereto is dependent upon occupancy and use. Otherwise this title will become in the future, as it has in the past, an object of barter and commerce; and payment for rent or its equivalent over and above legitimate returns exacted by the landowner from the land user. Such payment amounts to tribute paid for skill or luck in speculation; it is collected by the holder of the fee-simple title.

If, then, the settler himself holds the fee title (and without encumbrance) he is secure from the tribute described. But the same device—individual fee simple—that protects the owner from paying tribute enables him to impose it upon others. There is nothing to prevent him from renting his land to another and exacting an unreasonable rental. And this is the too common practice. The system of individual fee simple is the basis of tenancy or its equivalent represented by a hopelessly small equity in the land. This system is general throughout the United States, and so is tenancy, or the equivalent thereof.

Tenancy has been steadily increasing in the United States. In 1880 the proportion of farms operated by tenants was 25.6 per cent; this percentage had risen in 1890 to 28.4, in 1900 to 35.3, and in 1910 to 37. Of the improved farm acreage in 1900 (414.5 millions) 53.4 per cent was owned by the occupants who actually operated it; this percentage had declined by 1910 to 48.9. But only a portion of the farms supposedly owned by their occupants and operators are free from mortgage. Of the 6,361,502 farms in the United States in 1910 only 2,621,283, or 41.2 per cent, were owned by the operators free from encumbrance.

Any colony or community settlement based on individual fee titles is doomed at the start; it is only a question of time—and no long time—when it will disintegrate into individual earldoms and tenancy be enabled to get foothold. The way to preserve its integrity and maintain a uniform system of individual use is for the colony itself or the State to hold the fee and thus control the individual use.

Individual title dependent on use is a vital part of the land policy of the Secretary of Labor. He makes this point clear in the following language:[1]

> Settlers should likewise be protected from the evils of land speculation. The liberal grants of former years to soldiers were of almost no value to the supposed beneficiaries, because of the speedy transfer to persons who were primarily interested in the resale of such lands at higher prices. Speculation and inflation are evils which it has been found possible to correct in the experience of our associated belligerents. I therefore favor the adoption of some form of tenure which will lay less stress upon titles and more upon actual use by occupants. The absolute tenure does not seem to be well adapted to public colonization, since it is useless to the working settler and attractive to the speculator. There are several other forms of tenure, including the perpetual leasehold, better adapted for our purposes.

The question of land tenure is considered below (sec. 11) from a somewhat different angle.

SECTION 9.

PRINCIPLES APPLYING TO THE USE OF FOREST GROWTH.

These principles relate to the following: (a) Timber culture as against "timber mining," (b) permanent forest employment, and (c) stability of the forest community. Though applied in some considerable degree in several of the European countries, they have thus far made little headway in the United States.

(a) Timber culture versus "timber mining."

The migration of the lumber industry from ocean to ocean has already been briefly traced (pp. 48, 49). The logging process which is there shown to be passing in a series of waves across the country has had but one main purpose—to shovel out the timber. The industry has been and still is conducted as a species of mining; the wood supply of the country has been treated as a deposit of timber aboveground, just as the iron supply must be treated as a deposit of ore underground. The lumber industry, as now generally conducted, is "timber mining," not timber culture. The latter on any appreciable scale has not been practiced in this country.

The deposit of timber in a given valley or logging unit is soon worked out and the operation shifted to another location. Each

[1] Sixth Annual Report of the Secretary of Labor (1918), p. 221.

operation is conducted from a logging camp located usually for only a few months at any one place. At some central point, the focus of several logging operations, stands a giant sawmill which is the center of a sawmill camp. In a few years the timber tributary to this center has been worked out and the mill machinery for the most part is ready to be junked. The whole enterprise, sawmill operation and logging operations, then moves into another locality, or perhaps goes out of business. In this way one valley after another has been cut off and left empty and one region after another largely depleted of its forest stock. Only a small portion of the young stock which should be growing is actually coming up.

This condition is not the fault of any particular lumbermen. It is not to the interest, usually, of the private timber owner to grow wood as a crop. It takes from 40 to 100 years to grow such a crop, and the owner will not wait that long. So he harvests his timber *capital* as fast as the market allows instead of harvesting the timber *income* each year. There are several reasons why the timber owner prefers to "mine out" his capital of standing timber rather than attempt to grow a series of forest crops. One is the natural desire for a man to realize on his investment during his own lifetime. But in many cases he is specially stimulated to liquidate his forest investment. The danger of fire, with the cost and uncertainty of fire protection, is one cause for this condition. Taxes on timber is another cause; and a suggested remedy for this is to levy the tax on the log after cutting, instead of on the standing tree. The payment yearly of 6 per cent interest on timber bonds, the equivalent of a mortgage on the forest stock, is another potent cause. This necessity in the case of many timber holders in the Pacific Northwest, where the lumber market is meager, compared with the supply, is creating a tendency toward bankruptcy. Some form of timber mining seems to be required in the interest of the private owner; it is, of course, directly against the interest of the Nation.

In striking contrast to this principle of timber mining is that of timber culture. This is the essence of forestry. It is not going to be possible, of course, in the long run to continue, as we have been doing, to cut more wood each year than grows each year. The Nation must either limit its annual timber cut to its annual timber growth or gradually deplete and dissipate its forest growth. All this is obvious, and has been many times pointed out. For every national interest, whether in peace or in war, the forest area within the Nation should be placed on a basis of continued or "sustained" yield. This requires some form of public ownership or control, and, fortunately, a start has been made in the national forests.

A good illustration of the results of timber culture is presented in a cutting on the Black Hills National Forest in South Dakota, as

shown in figure 3. The forest here is treated as a growing crop. Part of the trees have been cut out for lumber and fuel wood. The tree tops and brush have been piled for burning as a protection against forest fires. The remaining trees, after they have grown to maturity, will be cut as a second crop.

A good illustration, on the other hand, of the results of "timber mining" is presented in a cutting in Bear Gulch, in California, as shown in figure 4. The forest here has been treated essentially as a wood deposit. All trees of immediate value have been cut out, nothing has been left standing except dead "snags," and no provision whatever has been made for future growth. Indeed, provision has been made *against* such growth. Discarded logs, brush, and other débris have been left to form a fire trap, so that it is only a question of time when the gulch will be thoroughly burned out and rendered barren.

And very much as the separate gulches and valleys have been "cut out," so have the various regions of the country at large been reduced in their forest stock and consequently in lumber production. This has been shown graphically by the series of curves in figure 2, on page 49. These curves show the lumber cut, by groups of States, in per cent of the total cut of the whole country; they run from the year 1850 to 1914. Except for a few virgin patches here and there, the whole of the original eastern forest has been cut over—in addition, that is, to what has had to be cleared for agriculture.

Col. Henry Solon Graves, Chief of the United States Forest Service, in a recent address, presents in vivid manner the outlook before the country respecting the forest resources. He says:[1]

> The problem of supplies does not merely concern the amount and character of timber now standing. It concerns as well the production of new crops of timber by growth. I would have little concern about the amount of timber used if we were growing new stands in place of the old. We have enough nonagricultural land to produce for all time lumber in abundance, for ourselves and for export. But this would require keeping our forests in a productive state after lumbering. We are not doing that. Our forests are steadily deteriorating under cutting and fire. No effort is made for replacement after cutting. Fire protection is confined to old timber. Young growth and cut-over lands are not being protected. Accidental stands following cutting and fire are generally poor in quality and species, and of low prospective yield. We are still drawing for the most part on original sources of supply. Failing to replace these, we are steadily losing ground. We are actually using up our forests, just as we would use up a deposit of coal, when we might have been renewing them.
>
> The question of forest renewal and growth is one that can no longer be ignored. It is not only of interest to the public, but it is of vital concern to the owners of timberlands. It may be said that reserves of timber ought to be held by the public, rather than by private owners. A good many assert that the growing of timber is wholly a public function; that as most timberland owners

[1] Address before the American Lumber Congress, Chicago, Apr. 16, 1919.

have bought their property to exploit their timber, not to grow trees, forestry and forest growth are not matters of private concern. But the fact remains that the bulk of the timber of the country is privately owned, three-fourths of it. It is an important fact, also, that the bulk of the land that must grow the timber of the future is privately owned.

Col. Graves goes on to comment upon the folly of turning over to private individuals and corporations the bulk of the Nation's forests:

The transfer of the great bodies of timber from public to private hands was a grave mistake of public policy. It is not possible to conceive of a method better calculated to bring about a rapid dissipation of our forests than was actually used by the Government in disposing of its timber lands, nor could a surer method have been devised to bring about a condition of industrial uncertainty. The lands were parceled out as fast as possible in small lots and under conditions that inevitably encouraged speculation. It was only a question of time that every owner should undertake to dispose of his land or timber to realize on his speculation. We now see that a different method of administering the public forests should have been adopted.

(b) Permanent forest employment.

The securing of a continuous timber supply, the regulation of stream flow, and the other essential objects usually associated with forestry, form only a portion of the problem of utilizing the forest resource. The substitution of timber culture for timber mining should have also a fundamental effect upon the social and labor conditions in the forest industry. As already stated, lumbering as now carried on is a tramp industry and is therefore a breeder of tramps. The lumber-jack as characterized by the late Carlton Parker is "womanless, voteless, and jobless."

According to estimates made by the California Commission of Immigration and Housing there were in 1915 living in labor camps in that State 75,000 persons, exclusive of farm laborers. On this basis the Bureau of Labor Statistics[1] estimates that there were at least 100,000 workers in the various kinds of labor camps—logging, mining, and other camps—in the three Pacific States alone. There is no more familiar sight in this region than the "blanket stiff" wandering the coast from camp to camp seeking a better job.

It would be a barbarous thought that homeless men "like" to be homeless. The fact that they *are* homeless, whether they like it or not, is in itself an anomalous condition. With the normal home-loving human such a condition *should* make for discontent whether or not it does so. Brave efforts have been made by a number of lumber companies to make the men more comfortable, and in some degree these efforts have met with success. A few "model camps" have been established. The triweekly shower baths, the individual cot-beds, and the common reading room have brought their expected balm. But camp, however model, is no substitute for home. As one

[1] Labor laws and their Administration in the Pacific States, by Hugh S. Hanna, Bulletin 211, U. S. Bureau of Labor Statistics, p. 15.

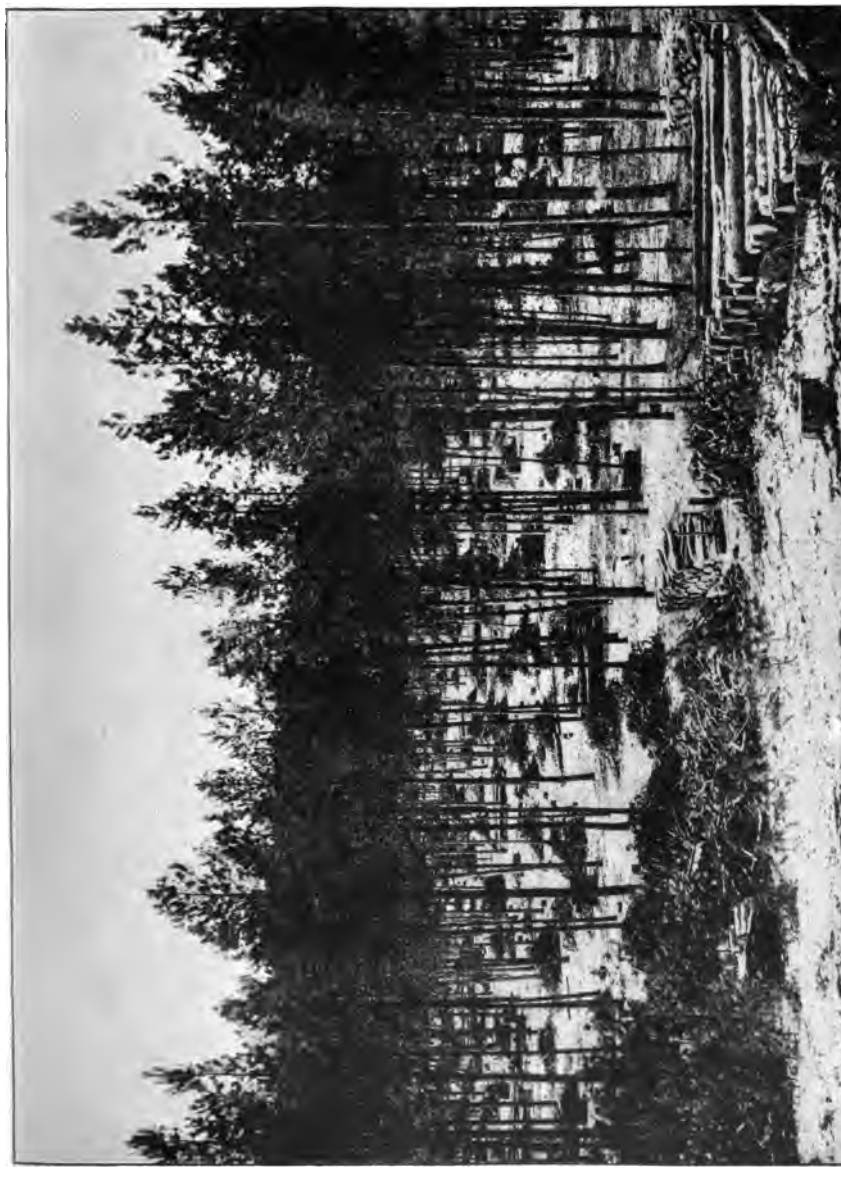


Fig. 3.—RESULTS OF TIMBER CULTURE—BLACK HILLS NATIONAL FOREST, SOUTH DAKOTA.

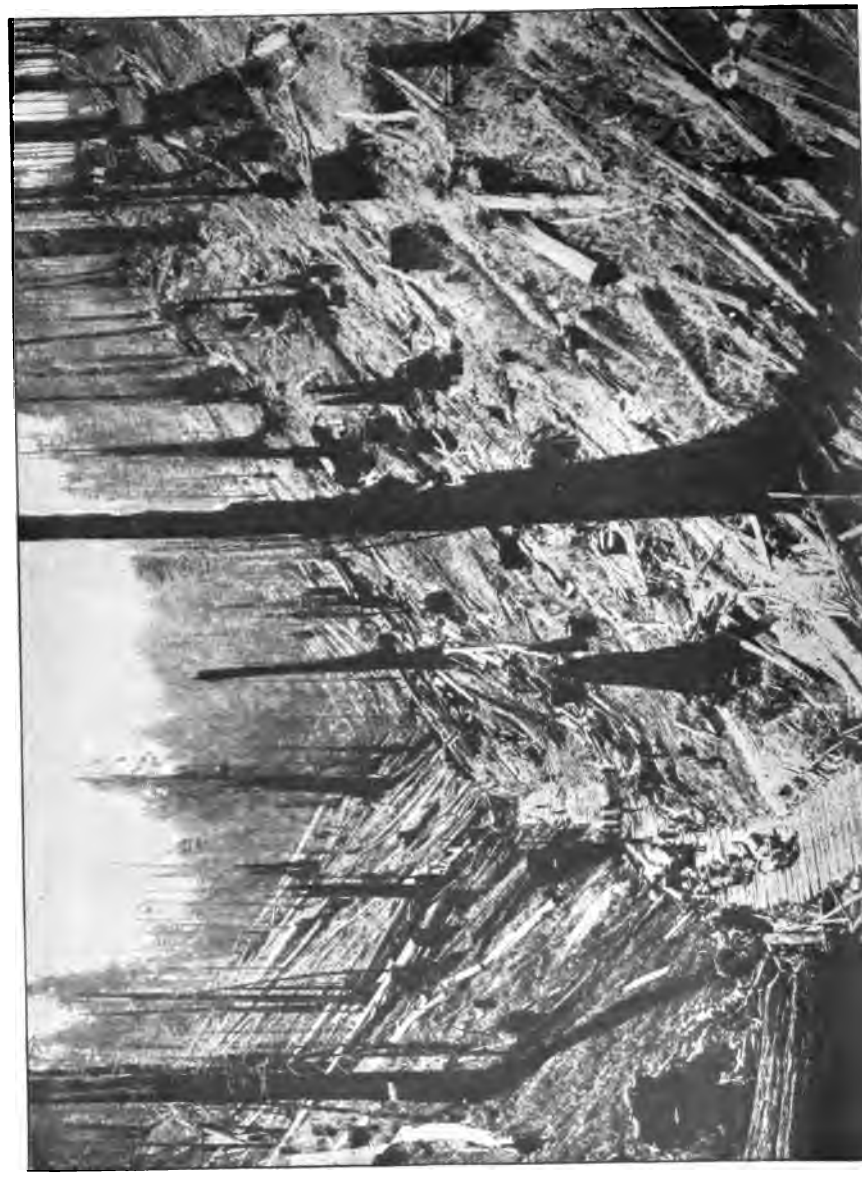


Fig. 4.—RESULTS OF "TIMBER MINING," BEAR GULCH, CALIFORNIA.

Scotchman has put it—"You canna cure an economic error with a bath."

Regarding the labor problem as applied to the forest industry, Col. Graves says:[1]

> Of far-reaching importance both to the industry and to the public is the problem of labor. It is the problem that is most insistently pressing, and perhaps in some aspects the most perplexing of any before the industry. Some features are peculiar to the lumber industry, and the ultimate solution will doubtless require a program especially adapted to the conditions of the forests and the sawmills. Temporary adjustments will doubtless be found, but a final solution will come, I believe, only with the placing of the lumber industry on a basis of stability and permanence.

But even under forestry permanent forest employment will not come about of its own accord. It is something that must be deliberately worked for. A crucial point in this connection is the size of the tract or territory upon which a continuous or sustained yield of timber is at all times to be maintained. From the standpoint of timber supply alone it may be of little or no importance whether a continuous yield is maintained within the radius of a township, a county, a State, or even a major region of the whole country. Within reasonable limits the freight charges on lumber should not be excessive, and the main thing from the standpoint of the *consumer* is to keep all areas protected and growing to full capacity and not to overcut; with the consumer it makes no difference about the radius within which the annual cut is maintained. With the *forest worker*, however, it makes all the difference in the world. If he can always reach the same spot at the end of the day's work, he can establish a home there and a family life; but if as now his headquarters are continually changing, then he must live in a camp and be driven to establish a hobo life.

The area within whose radius an annual cut is maintained is called by the forester a "working circle" or "working unit." In forest management in which the working unit is based on the needs of the workers (consistently of course with the needs of efficient operation) there would be two kinds of forest communities—the sawmill community and the logging community. The latter would be supported by the logging operation and the former by the sawmill operation. A sawmill suitably located could be continuously supplied with timber from the growth on land tributary to it; hence the sawmill community could remain permanently at one location. The headquarters of the logging operation, however, could not always be planned so as to remain on one site, and so the logging community in many cases would have to be relocated from time to time.

[1] Ibid.

It would be of course desirable that the logging community be relocated as seldom as possible. The longer the daily working radius from a given point the longer can the headquarters remain at that point, and the fewer times will the community have to be moved. Hence special effort should be made to increase the daily working distance through improved transportation. This is simply the commuter's problem as applied to the forest industry.

But the need for relocating the headquarters on account of the physical requirements of the logging operation is no reason at all why forest employment in logging communities can not under forestry be made permanent and regular. It is not the mere physical moving from one headquarters to another that makes the present lumber industry a migratory one. It is migratory because its operations are unplanned and unreliable. And so long as the industry remains one of mining timber instead of growing timber, and until the industry is placed upon a sustained yield basis, its operations must always be unreliable. But just as soon as the forest operation in a locality is planned for by a reliable agency, as the State or Federal Government, and the cut during a future series of years is definitely known and future operations definitely located, then forest employment in that particular operation can be just as permanent as employment in any other industry. A man can then know that so long as he is competent he can continue at his trade—in the sawmill or in the chopping crew—and the occasional changing of headquarters will at worst be nothing more serious than an inconvenience. The problem is only in part a physical one—and that the smallest part. The main point is to have the proper guaranty that certain operations are actually going to be conducted. This can be done by the municipality, the State, or the Nation. The essence of the matter, then, is not permanence of location but continuity of operation.

(c) Stability of the forest community.

The basis of the stability of the forest community must lie in continuous timber yield and permanent forest employment. These conditions should make of the forest worker a family man instead of a hobo. Those who are determined to be hobos would be eliminated, but those who want settled employment could have it. Under such a system many of the labor difficulties in the lumber industry would be ended.

But stability of forest operation in a given locality would not of itself result in a community or an environment in which it would be desirable to live and to bring up children. Even under the most favorable conditions a desirable community is something which does not automatically arise. A "shack town," to be sure, may automatically appear. But a mere assemblage of houses, even good

houses and with good sanitation, does not constitute a true community. If the home is something more than a house, then the "larger home" is something more than a collection of houses. Aside, then, from proper housing and sanitary conditions, the forest community, like the farming community, as something worthy of serious attention, should be developed so as to meet certain specific standards.

The first standard is self-government. In this connection a serious situation has developed in the present system of migrating lumber camps. Men registered in a given voting precinct are often obliged to move so far away in order to hold their jobs that they lose their chance to vote. Where a man has lived long enough in one place to establish a residence, the plan of voting by mail might prevent him from being disfranchised. Certain Western States have already adopted this plan. But the general shifting nature of the timber-mining industry tends to prevent men from establishing a legal residence in the first place and from continuing to hold it even if once established.

It is sometimes claimed, however, that many of the men in the lumber camps have no interest in their Government anyhow—that they "would not vote if they could." It is true that the camps contain men who do not care to vote; they contain also many men who do care to vote and who complain of being disfranchised. Each set of men represents a condition that needs to be remedied. With a permanent forest community, even though occasionally relocated, provision should, of course, be made for the voting franchise.

What has already been said (p. 66) about facilities for education and social welfare in the case of the farming community applies with equal force to the permanent forest community. Cooperation should be developed for these purposes. A vital requisite of the farming community, as already explained, is cooperation in marketing and in securing economic needs. An equivalent cooperation applies in the case of the forest community.

The farmer in selling his farm produce is selling in part the product of his labor, and so cooperative marketing of farm produce amounts very largely to cooperative marketing of labor power. The forest worker, as well as the farmer or agricultural worker, must market his labor power. And if cooperative facilities for such marketing ought to be developed for the agricultural worker, then they ought also to be developed for the forest worker. Each individual forest worker can not raise an annual yield of timber on a "timber farm" as the farmer raises an annual crop of produce on his dairy or wheat farm. The forest industry must be done on a large scale. The unit is the "working circle," not a timber farm; and so the work must be done collectively, not individually. The annual cut

from the whole tract is the product in part of the combined labor power of all the forest workers during the year. Hence one way for the forest workers to market their labor power would be for them, acting together as a collective unit, to sell in the open market the total annual output of timber from the working circle. But whether forest workers market their labor power in this way or in the usual way—through an employer—their final object is the same as that of the agricultural workers, namely, profitable employment. This requires a fair wage for a fair day's work, done under safe and proper working conditions; and effective cooperative facilities for achieving these ends must be provided both to the forest worker and to the farmer if they are to obtain full value for services rendered.

These seem to be the main requisites for an acting forest community as against a mere assemblage of timber shacks. The essence of community life is organization. On the basis of a timber culture system it should be no very great task to organize a forest community to meet the above standards; and once so organized it will not fall apart when it moves from one place to another—it will hold its integrity through any number of physical relocations. On the other hand, an unorganized shack town, though stationary, is always subject to disintegration—it always remains a camp. When timber mining is replaced by forestry the camp can be replaced by the community.

SECTION 10.

PAYMENT FOR THE USE OF NATURAL RESOURCES.

It has been already indicated that the principle of profitable employment—including fair wages for normal labor effort—is fundamental in any effort made by the Department of Labor for utilizing land for the returning soldier or other worker. In order that the payment charged for the use of land or natural resources may conform to this principle, it is necessary to have clearly in mind the relation of such payment to wages—or income equivalent to wages—made upon the land. This question is first taken up as it applies to agricultural soil, and then as it applies to other natural resources.

(a) Agricultural soil.

The level of wages—or income equivalent to wages—made upon the land, when this level is determined through unrestricted competition, seems to be based upon one of two things: Either the net income to be made by working the best farm land to be had for nothing; or else the income to be had by working in general industry. In the earlier stages of the country's development the availability of free land was probably the dominant factor in the ultimate fixing of wage rates. But at the present time, free land of any real value has almost wholly

disappeared, and the dominant factor in fixing wage rates would seem to be the wage scales in industries competing with farm labor. These wage scales appear to have their share in withdrawing labor from agricultural to urban pursuits. On account, however, of the desire on the part of a goodly portion of the population to have "a home on a farm," considerable sacrifice continues to be made for the opportunity of getting located on the land; and to a large extent in this country, and particularly perhaps in the remaining pioneer localities, the tendency of the farmer's "wage" to drop to the standard set by free land seems still to be in evidence.

If in this, or in an earlier, time the wage level is (or was) determined, either locally or generally, by the net income from free land, then there are certain definite, and fundamentally important, relations between such wage level and the payment obtainable for the use of nonfree land. These relations can best be shown, before considering actual evidence on the matter, by assuming a theoretic case:

Suppose in a region being opened for development the farming land is in three grades of fertility—grade A having the highest fertility, grade B next, and grade C the lowest. Land of all three grades is in public hands and open to actual use without charge. There is sufficient area of grade A land so that grades B and C are not used. The net income to be made by a farmer and his family on land of grade A is $500 a year. This income is what is left out of gross returns after paying interest and upkeep charges on capital invested in buildings, stock, and equipment and any charges for reclamation. It is the money which can be made through normal labor effort on the part of the average farmer and his family on a farm of most efficient acreage. This sum of $500, therefore, is equivalent to the wages earned by the family unit. A wage of this kind is called by agricultural experts the "family labor income."

A period of years elapses and the grade A land is all taken up. Grade A is no longer the best land to be had for nothing; the best land still open to free use is now that of grade B. The family labor income to be made on land of this grade at this time is $400. The use of grade A land is now at a premium. The income to be made on this land, formerly $500, is now $650. This rise is due to an increased population and market, to better roads, and to general improvements and development. The income possible on grade A land ($650) exceeds by $250 that possible on land of grade B, and the family that obtains a farm for nothing on land of grade B is in the same position financially as the family that pays $250 annually for a farm on land of grade A. In each case the family labor income finally obtained is $400. A farm on grade A land, therefore, demands a "rental" of $250.

Another period of years elapses, and the grade B land is all taken up. The only land now to be had for nothing is that of grade C. The family labor income possible of being made at this time on such land is $200. Land of grade B, as well as grade A, is now at a premium. The income for grade B, formerly $400, because of the region's further development, has risen to $500. The income possible on grade A has risen from $650 to $800. The income possible on grade A exceeds by $600 ($800—$200) that possible on grade C; the income on grade B exceeds by $300 ($500—$200) that on grade C. A farm on the A land, therefore, demands a rental of $600, and one on the B land demands a rental of $300. In all three cases—on grades A, B, and C—the family labor income finally obtained (exclusive of rental) is $200.

The conditions above presented may be recapitulated by the use of the following table:

TABLE 5.—*Increase in rental and decrease in wages accompanying the appropriation of free farm land.*

	Original condition.			After first period.			After second period.		
	Land grades.			Land grades.			Land grades.		
	A	B	C	A	B	C	A	B	C
Net income (or gross returns from farm exclusive of interest, upkeep and reclamation charges)	$500	Not used.	Not used.	$650	$400	Not used.	$800	$500	$200
Family labor income (or equivalent of wages made by whole family).	500	Not used.	Not used.	400	400	Not used.	200	200	200
Rental	0	Not used.	Not used.	250	0	Not used.	600	300	0

The figures given in the previous pages and restated in Table 5 illustrate the tendency of wages to fall and of rentals to rise as unappropriated farm land becomes reduced in area. The two lower grades of land—B and C—are shown in Table 5 to be out of use in the original condition of the region assumed; grade B becomes appropriated after the first period and grade C after the second. During this process the family labor income, or family wage obtained, falls from $500 to $400, and then to $200. At the same time the rental of grade A land rises from nothing to $250 and then to $600. The rental of grade B land rises from nothing after the first period to $300 after the second. When the user of land is also the owner of it, his income is in two parts—he receives wages as user and rental as owner. It makes no difference, of course, to the farmer on grade A land whether he receives for his work a wage of $800 or whether he receives a wage of $200 plus a rental of $600. But where the user and the owner are not the same person it makes a very

obvious difference. Tenancy represents a complete separation of user and owner; the mortgaged farm represents a partial separation; the unmortgaged farm worked by the owner represents a complete merging of the two capacities.

The income in money necessary on a farm for maintaining a given standard of living is less than that required elsewhere. The money cost of living is reduced by the vegetable garden and by the opportunity to get milk, poultry, and other produce without paying transportation, marketing, and extraneous charges. Morever the man who has an efficiently working farm and a home upon the land is likely to get more security and comfort out of life than the man who works in a mine or in a factory or elsewhere in general industry. Whatever may be the fair wage, as measured in money, for the workers in general industry, the equivalent wage for a man secure in his own employment on a farm would be something less than this.

The point has been made, and illustrated by assumption in Table 5, that the wage of the land user may have a tendency to decline as more and more free land becomes appropriated. If this is so, then—unless the influence of wage levels in general industry, or something else, acts to prevent it—the time must come when the land user's wage will not only sink below a normal level but will approach the starvation limit. Farmers who own their land will not in general be reduced in their income, since their loss in wages tends to be compensated by their gain in rental. But the newcomer on agricultural land—such as the home-coming soldier and worker—is in danger of being reduced to the point of financial failure.

Whatever it may be that sets, in any region, the level of wages for the user of land, some significant figures regarding this level are presented in a report[1] (1916) of the United States Department of Agriculture. This report is based on an investigation of 801 farms located throughout the northern cut-over region of Michigan, Wisconsin, and Minnesota. The following averages hold for these farms:

TABLE 6.—*Area, capital invested, and income per farm.*

[Average of 801 farms.]

Size of farm	acres	108.0
Tillable area	do	55.2
Nontillable area	do	52.8
Capital invested		$6,856
Family income		559
Interest on capital invested (at 5 per cent)		342
Family labor income		217
Labor income (or farmer's wages)		49
Family labor (for rest of family)		168

[1] Bulletin 425, U. S. Department of Agriculture, Office of Farm Management, "Farming on the Cut-over Lands of Michigan, Wisconsin, and Minnesota," by J. C. McDowell and W. B. Walker.

Family income ($559) is the sum of interest and family labor income, $342+$217. On the assumption that the average farm is owned by the farmer and that the family is wholly out of debt, this $559 represents the cash which the family has for its own use. In case they are not out of debt, then all or some portion of the $342 is excluded from their own use.

A portion of the interest on capital invested represents rental; the remainder represents interest on the investment in improvements and equipment.

Family labor income is $217. Of this amount $168, or 77 per cent, is assigned as the normal wage to the farmer's family, leaving $49, or 23 per cent, as the "wage" of the farmer himself. The farmer's wage or "labor income" varies widely among the different farms: On three-fourths (77 per cent) of them it is less than $300, while on about half (49 per cent) it is less than nothing. The range of labor incomes on the different farms is shown in the following table:

TABLE 7[a].—*Farms classified on basis of labor income.*

[Average of 801 farms.]

Farm class.	Average labor income.	Number of farms.	Percentage of farms.
All classes	$49	801	100
Labor income less than 0	−280	395	49
Labor income 0 to $300	134	222	28
Labor income $301 to $500	398	88	11
Labor income $501 to $1,000	700	72	9
Labor income $1,001 or more	1,450	24	3

[a] Ibid., p. 14.

Table 7 shows that on 395 farms (49 per cent of those studied) the average "labor income," is *minus* $280. In most cases, then, farmers falling within this class are presumably either in debt or living on their principal.

It might be maintained that a farmer in this class is not necessarily in debt for the reason that his gross income from the farm might be enough to pay him, *in his capacity of landowner*, a sum sufficient to live upon, and that his wage of "minus $280" would in reality amount merely to the loss of $280 in interest. In such a case he might be able to keep out of debt and continue to make a living, but this he would do as the owner, not the user, of the land. If the owner and the user were separate persons, the user would be left without money compensation. He might, to be sure, have milk, eggs, and other food directly from the farm, but these would not constitute a complete living. He would require some minimum cash income, and in order to get it he would either have to go into debt or abandon the farm and seek a living elsewhere.

It might also be maintained that a farmer whose labor income is minus $280 is not necessarily in debt because, instead of getting income now, he is laying up money through the appreciating value of his farm. But in order to make such value available it would be necessary either to sell off, from time to time, portions of the farm, or else raise the money through successive mortgages. In either case the farmer would be living on his principal or what amounted thereto.

Again it might be argued that the labor income here referred to could be augmented by means of wages earned by the farmer in neighboring logging camps, or on the roads, or elsewhere away from his farm, and that such opportunities might enable him to keep out of debt. Permanent employment on the farm home, as shown later on, could and should be made in many cases to dovetail with employment, of the proper sort, in other local industries—especially in the forest industry. It might well be that a combination of farm and forest work would constitute a self-supporting enterprise and yield the equivalent of a high wage. But this does not mean that the wage received in one line of work should amount to a minus quantity to be made up in the other line. Farming so conducted that its deficits must be filled from earnings made in another occupation is, of course, a bankrupt enterprise.

A situation in which a farmer is making a labor income of minus $280, whatever its cause may be, is not a condition to be continued indefinitely. The average farmer in this condition is, within a very few years, obliged to abandon his holding. In many cases such farmers hold proportionately a very small equity in their lands and in such cases the improvements which the farmer makes in and upon the land are often wholly lost to him. The farm is then resold to a new occupant at an increased value due largely to such improvements. The next occupant will then have, as a basis to start on, a farm at least partly made, and his chances of failure will be much less than his predecessor's. But even he in turn is likely to fail and have the results of his efforts, together with his predecessor's, passed along to a third occupant. This condition is not limited to the northern Lake States nor to the cut-over regions of the country; it applies also in many of the western irrigation areas where, to quote Dr. Mead,[1] "prosperity has been paid for by the ruin of other families equally deserving who worked harder and suffered more."

These results are due partly to the lack of facilities for reclamation, credit, and cooperation already referred to in section 8. They are also due to the payment charged for the use of the land itself. This payment, when not in the form of tenant's rent, is in the form chiefly of interest charged in connection with mortgages or contracts

[1] Hearings before the Committee on Labor, U. S. House of Representatives, on the Crosser colonization bill, pt. 2, Dec. 15, 20, 1916, p. 91.

of sale. It also includes taxes. Whatever the form, the payment amounts to what in Table 5 is called "rental"—the difference between net income and family labor income, or "wages." Whenever the rental payment is unduly high, the corresponding wage must be unduly low.

As already stated, the man who works upon a farm, like the worker elsewhere, is entitled to have, for a year of normal labor, a compensation which will not fall below some proper minimum level of wages. If a piece of land when under cultivation is not capable of yielding (in addition to interest, upkeep, and reclamation charges) a net income equal to such minimum compensation, then it should not be used for farming at all, but should be devoted to the growth of timber or to some other use. If, on the other hand, land under cultivation is capable of yielding, in addition to the fixed charges mentioned, a net income in excess of the proper minimum-wage level, then the farmer as a worker can afford to pay rental equal to the excess.

Assume two dairy farms: One farm, when submitted to normal labor, yields a net income of $600, and the other an income of $400. Suppose the proper level of wages, when reduced to a farm basis, to be $400. Two farmers apply for and obtain the use of the respective farms. Suppose the farmers to be equally efficient. Each one puts in the same amount of labor effort and each gets the equivalent of a fair wage for a normal year's work; but one gets a surplus of $200 ($600–$400), while the other gets no surplus at all ($400–$400). This difference is the result not of any inequality in the men but of an inequality of the fertility of the land, or of distance to market, or of size of the market. Whatever makes the difference, it is not the two farmers; it is either nature herself or the community at large constituting the market. If, therefore, a charge is made of $200 in the first case and nothing at all in the second case, then the two farms are made equally attractive, each farmer is enabled to make fair wages from normal labor and a definite inequality of opportunity is removed.

If the farmer in either of these cases had greater skill or ability than the normal worker he could probably earn more than the minimum wage. The charge should be made on the basis of what the *normal* farmer could earn under similar conditions, and not on what the *particular* farmer can earn. All farmers if placed upon an equality of opportunity as to the productivity of the land are left free to improve it and to earn as much above the minimum wage as their abilities are above the normal.

The point is often made that the increase in rental of a given farm site (exclusive of improvements) is the result not so much of the individual labor of the farmer as it is of the common labor of

the community, and hence the rental should be received by the community, and the wage (or its equivalent) by the individual land user. Part of the increase in rental, however, results from the labors of the user himself, and to this part he would seem to be entitled. If so, some equitable fraction of the rental, in addition to the equivalent of his flat wage, should be retained by the user. In this way the settler would share directly (as well as indirectly) in any increase in rental accompanying the community's growth; and he would have a tangible stimulus for improving his holding, which he would not have if compensation for his labor tended to remain at some wage level.

In order, therefore, to secure, for returned soldiers or other workers, profitable employment on agricultural land, any payment made for its individual use must be so gauged as to leave to the settler, out of estimated gross returns, an amount over and above fixed charges and expenses which will be not less (and perhaps something more) than the equivalent of a fair wage. Payment can not be based on this desired standard where the land title is held in private hands, for then the basis will be, not a "fair wage," but the income possible from remaining free land or perhaps from employment in actual competing industries. Payment based on a proper wage standard can only be assured where the land title is held in public hands; the State (or other government) can then arbitrarily fix the payment low enough to allow for the fair wage required.

(b) **Other natural resources.**

As with agricultural land, so with the other natural resources, the gross returns in money obtainable from the use thereof may be divided into three classes:

(1) Interest and upkeep on works of improvement, including amortization charges on reclamation and other construction;
(2) Wages, or equivalent of wages, obtained by the worker;
(3) Rental, or equivalent of rental (including taxes), paid for the right to use the resource.

With agricultural land the rental is received on a yearly basis, commonly in the form of tenant's rent or as interest on mortgages. With the other resources it may or may not be received upon an annual basis. Payment for a water right (excluding reclamation charges) may be made each year. The water is, perhaps, used for irrigating land or for developing hydroelectric power. In either case a payment is made for a certain flow of water during one year, such flow being measured in cubic feet per second, or "second-feet." On the other hand, payment for mineral deposits—as coal, iron, or copper ore—is made on a tonnage basis for the actual coal or iron or material

taken. Thus a certain lump sum is paid for a given number of tons, the payment per ton being called a "royalty."

Payment made for standing timber is called "stumpage price"—the price of timber as it stands on the stump. It is measured usually by the number of board feet in the lumber which the trees will saw out. A board foot is 144 cubic inches, usually conceived as a board 1 inch thick having a surface 12 by 12 inches. Timber on the stump or in the log is bought and sold for so much "per thousand," i. e., per thousand board feet.

The board-foot content of a log is generally arrived at by means of some log rule—a table giving for logs of different lengths and diameters the number of board feet which they are supposed to contain. Thus a log 18 inches in diameter (inside the bark at the small end) and 16 feet long contains, according to the formula of the Doyle log rule, 196 board feet. According to the Scribner rule the same log contains 213 board feet. There are about 50 different log rules in use within the United States, chief of which are the two above named. These rules are by no means consistent with one another. Some of them are based on formulæ, some on diagrams drawn of the various-sized logs, and some on the measurement of the lumber actually sawed out.

The stumpage price of timber is supposed to be the price of logs delivered at the sawmill, reduced by the cost of logging. Logging includes the operations of chopping the trees and transporting the logs to the sawmill. The cost of logging consists in part of fixed charges and in part of wages, i. e., items (1) and (2) given above. When timber is located so that the cost of logging just equals the price of logs at the mill, then the stumpage equals zero. When the timber is located at a greater distance from the mill, the logging cost is likely to be greater than the price of logs delivered. In such a case the stumpage would be a minus quantity and the timber would be out of reach for a profitable operation.

The timber "stumpage price" is equivalent to the mineral "royalty," and both of these are equivalent to the farm rental. The latter, to be sure, is paid on a yearly basis, while the first two are paid on a lump-sum basis. But with all three—stumpage, royalty, and farm rental—each is reckoned by subtracting wages and fixed charges from the gross return obtained from selling the product—whether logs, coal, or farm produce—in the nearest available market.

Taxes placed on timber land amount for the most part to a taxation of the stumpage. Under the system generally used in this country standing timber is taxed each year. This amounts to taxing over and over again a product of the soil, and has a tendency to discourage owners from allowing their timber to remain standing and accumulate more growth. To remove this defect foresters are

advocating a system whereby no tax, or only a nominal one, is placed on the tract each year, the bulk of the tax to be taken at the time the timber is cut. A tax thus imposed chiefly on the yield might tend to stimulate timber culture as against timber mining. As yet very little progress has been made in substituting this system for the ancient "general property tax." This is due primarily to the great difficulty of changing State constitutions which at present contain legal barriers to the proposed reform.

As with the farm rental, or payment for the use of agricultural land, so with the royalty, the stumpage charge, or the payment of any kind for the use of the natural resource in its raw state; in each case, if the worker involved is to secure profitable employment, the rental charge or its equivalent must allow for a wage which does not fall below a fair minimum level.

SECTION 11.

SOME CURRENT FALLACIES.

Before leaving the discussion of the principles of land utilization, it is desirable to clear up if possible certain current fallacies and misunderstandings as to the use of land for agricultural purposes. These relate to the matters of (*a*) cheap land, and (*b*) "cheap money," cheap powder, and public improvements generally.

(a) With regard to cheap land.

The idea is still prevalent that the land problem can be solved by the short-cut process of getting cheap land or free land. Land to be had at a low price means land to be had at a low rental, for the price, or assumed value of the land, is simply its rental capitalized. A rental of $5 per acre per annum capitalized at 5 per cent makes a price of $100 per acre; and if the price be reduced from $100 to $50, the rental is reduced from $5 to $2.50. *Other things being equal*, a low rental (or none at all) is obviously the desirable thing for the worker as the user of the land, and this principle was the moving force behind the homestead law signed by President Lincoln in the period of the Civil War. By the terms of this law any citizen of the United States could obtain free of charge 160 acres of public land after residing thereon for five years and making certain improvements. Except for local taxes the original homesteader paid no rental on the raw land.

But the homestead law made for inequality of opportunity for the worker on the land. All kinds and conditions of land were thrown open to entry under the same terms. Perhaps this was inevitable under the circumstances of the time. So long, however, as good land and bad land are obtainable for the same price, or no price at all, on a "first come, first serve" basis, the element of luck and chance is

bound to be brought in. A level in price for lands of different character makes for inequality of opportunity; only a difference in payment for the use of lands of different character can make for a level of opportunity.

The kind of a farm which should be obtainable for nothing is that yielding an income just sufficient to pay a fair and normal wage plus fixed charges and other expenses. Land having a yield less than this standard should, as already explained, be devoted to some nonagricultural purpose, while land better than the standard is worth a rental proportionate to its extra yield.

In spite, however, of the defects pointed out, the homestead law has provided opportunities for many American workers, and for soldiers returning from the Civil War. In 1872, 10 years after the passage of the homestead act, a law was passed by Congress providing for the "soldier's additional homestead." Under this law any Civil War veteran who had already obtained a homestead of less than 160 acres could get, without the need of residence or improvement, the additional land needed to make 160 acres. Every such veteran could get a paper certificate whereby the acreage to which he was entitled could be secured. This certificate became known as "scrip," which was a document enabling the holder to select and obtain from the Government the immediate and unconditional title to a given acreage anywhere upon the public domain. Since this form of scrip amounted to a free and transferable ticket to a piece of public land at no definite location it became subject to grave abuse by land and town-site speculators.

But soldier's scrip has provided only one of the opportunities for speculation. The homesteader upon making "final proof" receives from the Government a patent conveying a fee simple title to his land, and there is absolutely nothing in the homestead law—either in letter or spirit—which prevents the holder of such patent from parting with it the moment after he receives it. Neither is there anything to prevent the title holder from letting out his land to a tenant. The same is substantially true of the other public land laws—desert land, timber and stone, and the other acts and grants disposing of the Nation's domain. Practically in all cases unrestricted titles have been conveyed—either for nothing or at nominal sums—to private individuals or corporations.

Much has been written and said about fraud in connection with the disposal of the public domain. The physical nature of the improvements made on homestead entries, the "dummy" system for getting large holdings of timber and other lands, the "plastering" of mineral claims to gain control of water-power sites or strategic water holes on the public range—these and other spectacular methods of immediately subverting the theoretic purposes of the various

land acts have been the subject of a vast amount of moral denunciation. Far greater stress has been laid in all this on methods used than on results achieved.

Whatever the methods used, however, the laws themselves have made no provision whatever against the concentration of land into few hands, or against tenancy or the other ills of the landless. These results may have been hastened by fraud, but if there had been no single case of fraud, the final effect must have been the same. The Government in conveying an unrestricted title to land and natural resources opens the way for drawing a sharp line between the worker and user of land on one side and the owner and controller of land on the other. A specific right is thus conveyed to barter in land and the sources of life. Unless the title and tenure of land is specifically limited to the right to use it there is nothing to prevent such title from becoming negotiable and made an object of commerce. Land may be "cheap" or had for the asking, but if the tenure conveyed is unrestricted, then no single thing exists in law for preventing ultimately the exploitation of the user by the barterer. Cheap land to the original homesteader will be dear land to his successors.

(b) With regard to cheap money, cheap powder, and public improvements.

One of the aids held as being vitally important in every region now undergoing settlement is what is called "cheap money." This consists of two main features—low-interest rates and long-time payments. The most efficient method of making long-time payments, both on interest and principal, is the one above explained—the amortization method. Cheap money should apply not only to payments for reclamation work and land improvement, but to payments also for live stock and other equipment. The essentials of an efficient credit system have been suggested in section 8 (d), pages 73–74.

"The State" is the money lender equipped to supply credit at lowest cost. "The State" is now acting as money lender, in aid of agricultural development in several parts of the world—notably in Australia, in New Zealand, and in European countries. A start in this direction has been made in this country by the rural credits law. This, however, provides only for raising money on an enterprise already established, and not for financing a new enterprise. There seems to be a very widespread desire—on the part of landowners, land users, and land reformers—to have public credit, whether exercised through the Federal Government or the individual States, so used as to help the settler in clearing, reclaiming, and improving land, and thus "opening up" the undeveloped country.

Of what interest is such a policy to the land *owner?*

It has already been pointed out that the wage—or income equivalent to wage—made upon the land, seems to be determined, under

unrestricted competition, either by the wage level in general industry or by the income from free land. Assume, then, a locality in which, on the average farm, 30 per cent of the annual return (outside of upkeep and running expenses) goes for the farmer's "wage," 60 per cent for fixed charges on improvements and reclamation, and the remaining 10 per cent for rental. Suppose the policy of "cheap money" is then introduced in the region by means of the State (or Federal Government) acting as money lender. This reduces the cost of reclamation and improvement work. In the case of a new farm developed under this new régime, out of every $100 of annual return, $30, as before, goes for wages. This sum is a constant amount fixed through competition by industrial wage standards, or else by the income from free land. But the charge for improvements and reclamation, through the policy of cheap money, has been reduced, say from $60 to $45. Then the remainder of the annual return ($25) is rental.

Thus the $15 saved through the cheap money policy has been subtracted from one annual charge and added to another. This other being rental, goes partly to the State in the form of taxes, and partly to the landowner in some form of private rental. As already pointed out, the landowner may receive his rental as tenant's rent, or as interest on a mortgage, or he may receive it through a contract of sale. Where, of course, the landowner is also the farmer he gets the $30 "wage" as land *user* and the $25 "rental" (less taxes) as land *owner*.

In the illustration here given, the State through its policy of cheap money adds $15 per $100 of gross return to the rental of the average farm. If now, *all* of this $15 is collected as taxes, the State (or local community) gets the value which the State creates; if *none* of the $15 is thus collected, the landowner gets the value which the State creates; if *part* of the $15 is thus collected, the State gets a portion of the value which it creates and the landowner gets the rest. Unless, therefore, the State, in adopting a policy of cheap money collects a part at least of the extra value thus created, the landowner seems to be the only one benefited.

The result of the process just described would be called, in customary parlance, an "increase of land values." If the rental is made to increase (as in the illustration) from $10 to $25, then (on a capitalization at 5 per cent) the land value involved is made to increase from $200 to $500.

The increase of land values (and of rentals) is something that has always been desired, naturally enough, by the landowner. And so long as the State refrains from taking as taxes *all* of the increase in rentals, the landowner will continue to have this desire. Much has been said about the landowner growing rich on the "unearned increment." This, of course, is only to be expected, and the ex-

amples of it are legion. In thousands of cases, on the other hand, the landowner by no means gets rich. On the contrary he may be left out altogether, even when the increment is big. This increment is usually made through buying low and selling high. An "increase in land values" is to the land speculator what a "rising market" is to the stock speculator. But selling land usually involves spending money as well as making it. Indeed, more money may be spent than is "made." Land selling in most cases is carried on through a labyrinth of agents and subagents. In such cases, the policy of cheap money is of benefit not so much to the landowner as it is to what may be called the "land-owing interests." These interests, consisting of owners and sellers, may be so numerous that the money got by any *one* of them is but a meager amount. Incidentally, however, this does not affect the land user. It makes no difference to him, in obtaining his legal right to use land, whether the sum which he pays goes to one man or many—whether it helps to make one man rich or to keep several men poor.

For the same reason that cheap money appeals to the land-owning interests, the movement for "cheap powder" appeals to them also. In certain regions, as in the State of Washington, there has been a strong movement to have powder, for stump blasting purposes, manufactured by the State and sold to settlers at cost. Stump-pulling operations to be conducted on a large scale by the State, directly or through contractors, are also advocated in several sections. Projects for irrigation, swamp drainage and river improvement are being conducted through public agency in several parts of the country. Any activity of this kind, if effectively carried out, tends to reduce the original cost of reclamation and hence the annual reclamation charge. The effect is precisely that of cheap money. The reclamation cost is reduced, the rental increased, and the land owning interests thereby benefited. Such activities also tend to increase the gross return from farm land, which is another way of increasing rentals and land values. As the Director of the United States Reclamation Service says: "So long as the value that attaches to land goes into private pockets there appears to be no escape from the fact that the benefits of all public improvements, including irrigation works, inure to the benefit of landowners almost exclusively."[1]

Mr. William Kent, of the United States Tariff Commission, in a recent address before the American Economic Association on "Land Tenure and Public Policy," shows very clearly why the landowner is interested in improvements made at public expense. He says:[2]

[1] Fourteenth Annual Report of the Reclamation Service, 1914–15, Arthur P. Davis, director, p. 6.

[2] Speech at the thirty-first annual meeting of the American Economic Association, Richmond, Va., Dec. 28, 1918.

When we consider agricultural lands we find the same curse. We find that every improvement in transportation, whether by rail, canal, or road, at once results in higher land prices, in higher land rents, and therefore in higher cost of production, if people are permitted to charge up their rents or interest on land value as part of their producing cost. The man who would pay for his land out of its product finds that it must be done either out of more years of crops and of life, or out of higher prices from the man who eats. The McCormicks produce the harvester. Up goes the price of wheat land. Does Ford invent a tractor? Farm lands being made more productive, immediately advance in price, and neither consumer nor farm tenant get the advantage, because at one end the farm owner can raise his proportionate rent, and at the other there is no reduction of prices for foodstuffs. Farm land, just like city lots, is oftentimes held out until the need and the breeding capacity of others calls for its use. Then there stands at the gate the fee simple owner to charge in rent or in purchase price the value created by the work of others.

Of what interest are these policies of cheap money and public improvements to the land *user*?

As already shown, the land user who happens to own the land which he works is benefited by these policies. He is able to pocket the extra rental caused by the decrease in reclamation costs. But this he does as the owner, not the user, of the land. The same holds true for the man who has already contracted to pay a stated sum for the land he uses. He is able, of course, to benefit by any rise in the rental (or land value) taking place after his own payment for the land has been fixed. In other words, the reforms named help the settler who is already on the land, but they help him only to the extent that he is the owner, not the user, of the land.

But how about the newcomer—the prospective settler not already on the land? Anything which reduces the cost of reclamation tends to enlarge the land area available for settlement. And this is so whether the wage is held at a normal or starvation level. If by means of the community (or public) control of land wages can be maintained at a fair level, then anything (like cheap money, cheap powder or public improvements) which makes more land available for settlement, increases the opportunity to make a fair wage, or a living, on the land. If, on the other hand, wages are maintained at or near the starvation level, then any reform which makes more land available for settlement, increases the "opportunity" to make a starvation wage, or mere existence, on the land. The prospective settler, therefore, as a future land user has much to gain by the above mentioned reforms, *provided* wages are maintained at a fair level; otherwise he has nothing to gain from them.

Of what interest, then, are these reforms to the land *reformer?*

Land reformers claim to be working in the interest of the land user and not the land owner and practically all of them are sincere in this desire. And yet many of them are working for things which tend to aid the owner but not the user of the land. They are working for

such things as cheap money and cheap powder without regard apparently to what is being done about wages. To the extent that they disregard the latter problem (i. e., the need of maintaining a fair wage level) their efforts at reform result in furthering the "opportunity" above referred to—that of eking out an existence on the land. And every added farm thus developed on an *existence* basis means one less farm to be developed on a *living* basis. Such "reforms," therefore, extend a bad land system and narrow the opportunity for installing a good system. They do harm, not good.

The principle, then, of "State aid" to "self-help" in land development can secure profitable employment on agricultural land only when it is linked with another principle—that of maintaining a fair wage level on such land. But this, as already explained, can not be done except where land titles are in public hands. As long as the fee simple remains in private hands all efforts of the land reformer are in vain—they are equivalent to an attempt to lift a fallen man while standing with both feet upon his back.

Mr. Kent, in concluding the address above referred to before the American Economic Association, speaks of the effect on the use of the various resources of the private control of land disposal through fee-simple titles:[1]

> In summing up, I arraign this traditional fee-simple title for many economic and social crimes and misdemeanors, and I can not distinguish between the economic and the social.
>
> It has contributed a great impulse to the overgrowth of our cities and towns, and to the depletion of our agricultural areas; it has lessened our food supplies and increased their costs; it has created idle classes, farm tenancy, and bad agriculture.
>
> It has destroyed our forests, wasted our coal supplies, cascaded our petroleum.
>
> It has encouraged private monopoly and resultant extortion, and has encouraged malevolent activities by our own common carriers.
>
> More than any other privilege it has permitted men to reap where they have not sown. It has, like a sponge, sopped up general benefits and deprived society in general of what was due from inventions and improvements.

[1] Ibid., p. 11.

CHAPTER III.

METHODS OF FARM LAND UTILIZATION.

In Chapter I a general view has been presented of the land utilization of the United States—both agricultural and forest land. In Chapter II the main principles have been discussed that are required in utilizing land for making new opportunities for profitable employment. Mineral land and the water resources have not been considered except incidentally; attention has been limited almost wholly to farming and to forest lands. Possible methods of applying the principles will now be taken up. Methods for the utilization of farm lands will be presented in this chapter and of forest lands in the next.

The methods used in the Australian countries combine in the main the principles of farm land utilization which have been discussed herein. The Australian land system is based upon the colony unit and has been built upon the successful experience of France, Denmark, and other European countries in the community form of agricultural development. In the various land settlement plans of the British Empire, as presented by the reconstruction committees of the British Government, the Australian system is, in greater or less degree, used as a working model. This system has been developed under physical conditions closely resembling those in America, especially in the Western States; and the State of California, under the able leadership of Dr. Elwood Mead, has started a settlement patterned on the colonies in Australia.

In Canada, as a result of the British movement toward land utilization for returning soldiers, the Dominion and some of the provincial governments have adopted policies of land settlement. The Soldier Settlement Board, with headquarters in Ottawa, has charge of this work for the Dominion. This board was created by act of Parliament in August, 1917, and its field of action is chiefly in the three Prairie Provinces—Manitoba, Saskatchewan, and Alberta—where the Crown lands are under the Dominion Government. Ontario was the first Province to take up soldier colonization in tangible form. A colony started in 1917 at Kapuskasing, in the Clay Belt in northern Ontario, contains now some 60 settled families of returned soldiers.

Fundamental to the success of any farm colony is its access to market. This is necessary both for settler and consumer. Profitable

employment for the one and reduced cost of living for the other require definite connection between colony and city. The "pipe line" connecting land and market must be kept open; and from it all unnecessary industrial obstructions must be eliminated if the alternative employment offered on the land is to serve any real benefit. In advance, therefore, of describing the methods developed for establishing the community unit itself, some possible methods will first be considered for establishing efficient distributing facilities between colony and city market.

SECTION 12.

FARM COLONY AND CITY MARKET.

Between producer on the farm and consumer in the city there are a number of industrial processes. These include transportation, storage, and retailing. Many farm products, before they are ready for market, must undergo also various processes of manufacture. The creamery, cheese factory, flouring mill, and abattoir stand between the farm and the corner shop. The tannery, woolen mill, and cotton mill stand between the range and the plantation on one side and the clothing store on the other.

With a number of the basic food products, however, no manufacture is required. These include such great staples as milk, eggs, poultry, fruit, and vegetables. With these no factory stands in the way of their direct delivery from farm to table. The facilities for transporting these staples also are somewhat different from those requiring manufacture. They can be carried in small containers. Within limited distances, therefore, they can be transported by truck instead of by rail or water. This reduces the number of handlings and makes the connection between farm and table much more direct and efficient. This should, and does, result in lowering the price to consumer and raising the pay of producer.

This direct transfer could not extensively be utilized so long as the truck was drawn by horses. But the invention of the motor vehicle has greatly extended the radius within which the method can be applied. With good concrete roads a motor truck service can make accessible to an urban center all land within a radius of 75 miles. Around most urban centers the acreage of farm land—improved or improvable—within this radius would be sufficient to supply the population with dairy products and the other staples named. A very large portion of the urban population of the United States is included in centers of this description; and sufficient population can be reached within the motor truck radius to provide a market in these staples for more than three-fourths of the farm land in the country. The motor truck service should, of course, be coordinated with the railway and waterway services.

(a) The motor transport postal service.

A rural truck service has been started by the Post Office Department in connection with the parcel post system. Some 36 routes have been established. Together these form continuous lines from Washington, D. C., eastward through Baltimore, Philadelphia, and New York to Portland, Me., and westward through Gettysburg, Pa., to Pittsburgh, Cincinnati, Indianapolis, and Chicago. Lines run southward from Indianapolis and Cincinnati through Kentucky and Tennessee into Alabama, Georgia, and South Carolina; also between Gettysburg, Pa., and Richmond, Va.

The utilization of this rural motor service for marketing purposes has already begun. Farm products of various kinds are being carried in the postal trucks from the country districts in Maryland, Pennsylvania, and Virginia into the city of Washington. Schoolhouses are used for collecting and distributing. In the town of Mount Joy, Pa., near Gettysburg, a combination schoolhouse and postal station serves as a market to which the farmers of the neighborhood bring their eggs, poultry, and other produce for direct shipment in the postal trucks to the Park View schoolhouse in Washington, which is also a postal station. From this point the produce is distributed at cost to the local city consumers on a "cash and carry" system. Produce is also brought to Park View from several towns in Maryland and Virginia over one or another of the five postal motor routes leading out of the city.

The building at Park View performs four related public services: It is a schoolhouse, a post office, a market, and a community center. It is a large, well-equipped structure recently built to serve these several purposes. It contains a large assembly hall which is used in the evenings as a public forum by the local people. There are several school rooms of varying sizes. The pupils are of primary and grammar school grades. A corner room on the ground floor is used as the post office, and a large room adjoining serves as the market.

The building is in charge of a "community secretary," who is employed by the authorities of the local school district. Under him is the school principal. He is also the post master. Park View is, then, more a community house than a schoolhouse. It provides the services which, in the typical country town, require four separate institutions—the school, post office, store, and town hall. Through the community secretary these functions are correlated.

The community center, as illustrated in Park View, should form the nucleus of each community unit. Through this center the people of each locality can readily cooperate with the people of other localities that are similarly organized. In this way the farming community

can deal directly with the urban community, the postal motor route forming the connecting line. The motor route, therefore, or the possibility of establishing one, is a prime essential in locating any land-settlement project. The farm colony should be on the post road.

(b) Road building and farm building.

The establishment of postal motor routes and farm colonies thereon would require ultimately a great deal of new construction. A large number of motor roads are already made, and the several States are adding to the mileage each year. Under the road law of July 11, 1916, the Federal Government is cooperating with the States in building rural post roads, not to exceed one-half the cost being appropriated by Congress. The initiative in this work is taken by the separate States. A proposed national road system has also been worked out in the Post Office Department, and work thereon would not have to await State action. This project calls for the construction and maintenance of about 15,000 miles of roads.

Farm building (or establishing ready-made farms in the colony unit) requires work of various kinds. This includes housing operations, land leveling, fertilization, installation of water systems, etc. In certain sections of the country it would include also stump clearing, swamp drainage, and other work of reclamation.

The effect of road building and farm building in any locality would, of course, be an increase in land values. And these values, as already explained, will all go to the owners of the land unless taken therefrom, in whole or in part, through taxation. By this method the individual State could collect the full value which it had created; and this plan has been suggested as the simplest and fairest way of paying for improvements. The Federal Government, in cooperating with any State, could stipulate this method as a condition of spending its funds for work carried on in such State.

(c) Possibilities of a public "construction service."

Road building and farm building are provided for in the proposed development law introduced in the last Congress to carry out the land development policy of the Secretary of Labor. The measure provides that this and all other construction work shall be conducted by a "United States Construction Service." In this service men desiring work would be able to immediately enroll. Its object is to be a reservoir in times of labor surplus, and a diluter in times of labor shortage. In periods of unemployment the service would be used in "buffer employment" for carrying on the various kinds of public works. In periods of labor shortage dilution of labor could take place through this service so as to distribute the available skilled men in such manner as to be most effective.

A Government construction service is no new idea. The public development of public works has long been successfully carried out both in this country and abroad. The principle has been applied in the Australian countries and beginnings have been made by our own Government in the work of the Isthmian Canal Commission and the Alaskan Engineering Commission.

The work of road building and farm building is one of industrial preparation. It must be, therefore, to a certain extent migratory. But this is no reason why definite standards of working and living conditions can not be maintained. Like the logging camp and the mining camp, the "construction camp" should be abolished. It has already been explained (sec. 9c) that the forest community can be made, through proper management and foresight, to supplant the logging camp even where the logging operations, as in most cases, must be migratory. The working community can be relocated from time to time. And this method can be applied not only with forest operations but with road and farm construction when the work has to be shifted from one job to another. Thus the workers could continue to live with their families and to have the full advantages of schooling and the other facilities of a community life.

This work of industrial preparation might well serve as an apprenticeship in the industries themselves being launched. Men working at reclamation and farm building are in a logical and practical position to become the prospective settlers on the land being improved. Such men having for a time worked in a construction service in preparing lands for farming could as permanent farmers be "graduated," to quote the Secretary of Labor, "upon the very land which they prepare."

It is quite possible that most of the work of a construction service could be done through units consisting of cooperative crews. The cooperative crew is a substitute for the private contractor. In Russia, where it is known as the "artel," it is an ancient and successful institution; and in New Zealand it has been working well for many years. Under this method a number of workers form themselves into a crew and collectively bargain with the Government to do a specified piece of work. This plan is being used by the Alaskan Engineering Commission in building the Government railroad in Alaska, and is said to be far more satisfactory, both to the workers and the Government, than the old-time method of letting jobs to contractors. Work thus is being done on what amounts to an actual cost basis.

Through the agency of a construction service, as provided for in proposed legislation, an immediate program for employment could tie up intimately with a permanent one. A "job" on the roads could be made to lead directly to a living on the land. Farm building fol-

lowing road building, "buffer" work could broaden into permanent work and a truly effective development policy be thereby initiated.

(d) The "garden city."

The postal motor route has been pointed out as an important means of bringing together the farm colony and city market. Especially is this so since the farm colony must, as a usual thing, be located in rural or undeveloped territory. Another method, however, of bringing together the farm and the market is to make more complete use of suburban territory.

By the proper planning of our smaller and growing cities a better contact can be made between urban and agricultural areas. The suburban zone usually separating these areas, with its waste spaces and its ragged borders, constitutes what might be called the city's back yard. It is as inefficient as it is unsightly. The suggestion is made, therefore, by town planners that the suburban zone as now constituted should be supplanted wherever possible by a carefully planned agricultural community, or a series thereof. This is accomplished by means of the so-called garden city form of development.

The garden city is best illustrated perhaps in the town of Letchworth, in England, a combined factory and farm town which has been built 33 miles out of London. Letchworth is the first of the garden cities. The enterprise is described by Mr. Thomas Adams, town planning adviser to the Canadian Commission on Conservation, in his excellent report on "Rural Planning and Development," 1917. Letchworth was started in 1903. An area of nearly 4,600 acres has been purchased by the Garden City Co. at a cost of about $225 per acre. About one-third of the area has been devoted to the city proper and some 30 industries have been established therein. The rest of the area, surrounding the industrial portion, constitutes an "agricultural belt." The population had grown to about 13,000, but will be increased to some 35,000 when the town is completed.

The Letchworth garden city idea has grown into a movement which has been spreading in England, in France, and elsewhere in Europe; and it promises to be an important factor in after-the-war reconstruction. "The aim of the garden city movement," says Mr. Adams,[1] "may be described as the marriage of town and country." It has not only attracted attention in Europe but in this country as well. The United States Senate early in 1917 passed a resolution authorizing the Committee on Agriculture and Forestry to make an investigation and report on the subject. The garden city scheme is something which in its nature is likely to proceed somewhat slowly,

[1] "Rural Planning and Development," Commission of Conservation, Canada, 1917, p. 168.

but as a means of colonizing land near the city market it seems to have many promising possibilities.

Speaking of this type of development as an opportunity for returning soldiers and workers Mr. Adams says:[1]

> The success which has been achieved at Letchworth, in England, in the building up of a city and agricultural colony combined, affords us the example we require to solve a large portion of the problem of the returned soldiers. Such a scheme involves artificial organization to get it started, but one of the objects of that artificial organization would be to develop a town in which there would be the fullest public freedom for natural growth and individual initiative.

SECTION 13.

THE AUSTRALIAN SYSTEM OF LAND SETTLEMENT.[2]

The Australian system of land settlement is in vogue not only in the continent of Australia, but in the island of Tasmania and the group of islands comprising New Zealand. This combined territory, together with that of other South Pacific islands, is often referred to as "Australasia." The "Commonwealth of Australia" forms one major political unit of the British Empire and includes, in addition to the "Northern Territory," the States of New South Wales, Victoria, Queensland, South Australia, Western Australia, and Tasmania. The several States have separate governments and are tied together by the Federal, or Commonwealth, Government, which has complete control over the Northern Territory. The capital of the Commonwealth is Melbourne. The Crown lands in Northern Territory are subject to the disposition of the Federal Government; Crown lands elsewhere are subject to the disposition of the particular State in which they lie. The "Dominion of New Zealand" forms another independent political unit of the British Empire.

(a) Main features.

The Commonwealth, each of the Australian States, and the Dominion of New Zealand all have their peculiar methods of land settlement. These methods in their present form represent a development which has been going on during the last quarter century. Though varying somewhat in detail, there are certain essential features which are common to practically all of the jurisdictions, and these may be given as representative of the system as a whole.

The main features of the Australian system of land settlement are the following:

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[1] Ibid., pp. 214–215.

[2] Only the salient points of the Australian land system are here presented. The subject of legislation is not taken up. For a concise statement of the recent soldier settlement laws of the Australian States, and of other countries, reference is made to a publication of the Department of the Interior.—"Summary of Soldier Settlements in English-Speaking Countries," by Elwood Mead, Consulting Engineer, U. S. Reclamation Service, 1918.

1. The establishment, through legislation, of a central authority (usually designated a "settlement board") which is empowered and directed to carry out the land policy provided in the law.

2. The location by the settlement board of land areas large enough to form community units. All "Crown lands" needed are obtained through reservation; all private lands needed are obtained through State purchase or "resumption." In the latter case some form of condemnation is usually made available.

3. The selection of settlers by the settlement board. These are chosen on the basis of their fitness for agricultural work; the ownership of a certain minimum capital is usually required, and the settler generally must be ready within a few months to enter upon the land.

4. The preparation, in advance of settlement, of plans—based on adequate land classification and surveys—for irrigation, drainage, or other reclamation needed in the case of each area; and the grouping of lands for purposes of a town site, of farm laborers' allotments, and of regular farm allotments. One farm only is allotted to one family, and the acreage is determined on the basis of family needs.

5. The organized construction of reclamation works and the organized improvement of land—through leveling, cultivating, and the erection of buildings—whereby each farm is equipped for use in advance of settlement. In New Zealand this construction work is done to a large extent by means of coöperative working crews, instead of by private contractors.

6. The alienation to the settler by the State of a land tenure designated to prevent speculation and to keep the control of each farm in the hands of its user and occupant. For this purpose different States have different methods. As already mentioned, New South Wales provides a perpetual leasehold, while Victoria grants a restricted freehold. In any case the object is to provide a right to the use of land rather than a right to barter land.

7. The payment for the use of land and improvements, as far as possible, upon a cost basis, and in such wise as to impose the minimum hardship. For these purposes the method is to provide for—

(*a*) Small initial payments;

(*b*) Amortization of the costs of improvements (and of the land when bought) at low interest rates, and during a period usually of 30 years or longer;

(*c*) A reasonable rental (when land is leased) based upon the productive value of the land;

(*d*) The opportunity to any settler who desires to withdraw, to receive fair compensation for improvements made at his own labor and expense.

8. Community organization for cooperative action in marketing produce, purchasing supplies, obtaining credit, and in providing

for other economic as well as social needs. For these purposes the land reserved for a town site may be used for the location of warehouses, stores, banks, schools, churches, and other public buildings.

9. The establishment of a demonstration farm at some central point in each colony, to be run by the State under a director who acts also as an agricultural adviser for the farmers in the community. Pure bred cattle and other live stock may be raised on such farms and sold at cost to settlers.

10. Loans to settlers on long time and at low interest rates, to enable them to secure seed, grain, fertilizer, and minor farming equipment, and to meet initial running expenses. Security for such loans may be had through liens on the land or on stock, or by means of cooperative credit associations.

(b) First application in America—California, 1917.

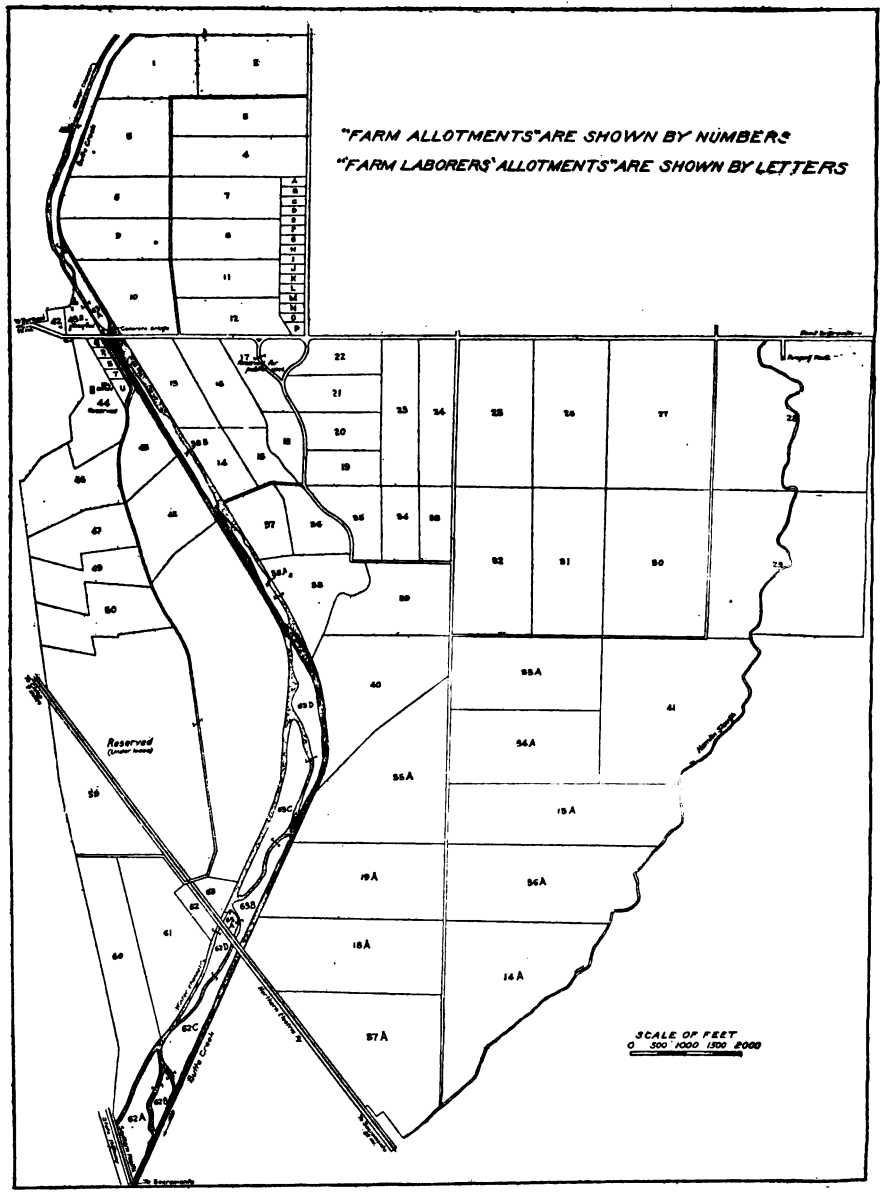
The first law to be enacted and actually put in force, looking to the establishment of the Australian settlement system in this country, is the California land settlement act of 1917. Under this law a "Land Settlement Board" is created having general powers to carry out the provisions of the act. This board consists of five members holding office for four years, and appointed by the governor. The board is authorized to purchase within the State, in one or more tracts, an area not exceeding 10,000 acres. A sum of $260,000 is appropriated for the purpose of the act. The settlement board, through the public press, is to call for offers of land and to inspect the same when offered. On this point the act states that "every report of such inspection shall as far as practicable specify the—

(*a*) Situation and brief description thereof;
(*b*) Extent and situation of land comprising so much of any tract as it is proposed to acquire;
(*c*) Names and addresses of the owners thereof;
(*d*) Character of water rights;
(*e*) Nature of improvements;
(*f*) Crops being grown on land;
(*g*) Appraisement of value of land, water rights, and improvements."

On the basis of these reports the tract or tracts to be acquired shall be chosen by the board.

Not only any citizen of California, but any citizen of the United States, may apply for a farm allotment under the terms of the act, provided only that the applicant is ready to enter upon the land within six months, and that he or she is not the holder of agricultural land "or of possessory rights thereto," to the value of $15,000. "The board shall have the right in its uncontrolled discretion to reject any or all applications it may see fit."

Upon the acquisition of a tract by the board, the latter is to subdivide the tract into three classes of allotments: An area is reserved



Map 8.—DURHAM LAND SETTLEMENT PROJECT, CALIFORNIA.—An irrigated tract of 3,876 acres in Butte County in the Sacramento Valley purchased by the State in 1918 under the land settlement law of 1917. A community unit which will comprise 63 farm allotments and 21 farm laborers' allotments is being established here.

first as a townsite or community center which is cut up into small lots and disposed of by sale or lease. A limited number of "farm

laborers' allotments" are then to be laid out, each allotment not to exceed $400 in its unimproved value. The remaining land as far as possible is to be divided into regular "farm allotments," each allotment not to exceed $15,000 in its unimproved value.

Improvements in the tract may be made by the board—these to include the preparation as needed of the land for irrigation and cultivation; the seeding, planting, fencing, and erection of farm buildings thereon; and the building of cottages on the farm laborers' allotments.

The land tenure provided is a freehold partially restricted by means of a "contract of purchase." This contract provides for continued residence, cultivation, repairs, and even fire insurance, and forbids during a minimum period of 10 years the transfer or subletting of any allotment.

The prices of the various farm allotments must be such as to return at least the cost of the land and surveys, plus interest at 5 per cent, and must in addition be graded "so as to render such allotments as nearly as possible equally attractive." The initial payment is 5 per cent of the total charge and the remaining 95 per cent may be amortized over a period of 40 years.

Loans may be made by the board to settlers by chattel mortgages on stock and farm implements, such loans to extend over a period not exceeding five years.

Since the passage in April, 1917, of this land settlement act, the State land settlement board has been appointed and organized, headed by Dr. Elwood Mead, and the first purchase has been made. The tract first acquired covers 3,876 acres in Butte County in the Sacramento Valley, lying one-half mile east of Durham and 7 miles southeast of Chico. This tract is shown on map 8, page 110. An adjoining area of 2,400 acres was also acquired as part of this project, making 6,276 acres in all. An area of 3,520 acres has been subdivided into 63 farm allotments and 21 farm laborers' allotments, and a small area (22 acres) has been set aside for the purposes of a community center.

Most of the land can be irrigated by means of a canal built several years ago which diverts the waters of Butte Creek. Underground water from depths of 40 to 100 feet is also available for household and stock purposes. The soil varies from a sandy loam to adobe. Part of the tract has already been ditched and leveled; 900 acres were seeded last year to alfalfa and 600 acres to wheat and barley. Plans have been prepared of houses and farm buildings which the board is going to erect in accordance with the selection made by the settlers themselves.

Steps have been taken by the board previous to any settlement for securing cooperative action on the part of the prospective settlers.

The "Durham Cooperative Stock-Breeders' Association" was all ready for organization, and membership therein has been one of the conditions required by the board for purchasing lands and joining the community. The settlement board in a circular announcing the opportunities offered in the Durham settlement project states the "things the board desires to see achieved." They are as follows:

1. The settlement to become widely and favorably known as the home of one breed of dairy cattle, one breed of beef cattle, one breed of hogs, and one or two breeds of sheep.
2. The cooperation of the settlers in buying and selling.
3. The establishment at Durham or on the settlement land of a training school in agriculture.
4. The erection in the near future of a social hall owned and paid for by settlers.
5. Two areas have been included in the subdivision for poultry farms. It is hoped some experienced poultry breeders will apply for these.

On June 15, 1918, the land settlement board began examining the applications for allotments in the Durham project. These had been coming in for several weeks. For the 63 regular farm allotments there were 150 applications and for the 21 farm laborers' allotments there were 132 applications. The proportion of applicants that had to be excluded is suggestive of the high demand in this country for land settlement opportunities of the kind offered on this project.

SECTION 14.

THE FIRST SOLDIER COLONY—KAPUSKASING, ONTARIO.

The first and only instance in North America of government colonization for returned soldiers is the colony at Kapuskasing in the Canadian Province of Ontario. This settlement was started in 1917 as the first experiment in an enterprise of the Ontario Government known as the "soldier settlement scheme."

(a) The "soldier settlement scheme."

The soldier-settlement scheme provides for giving to each returned Canadian soldier a farm lot of 100 acres in the "bush country" of northern Ontario, 10 acres on each lot to be cleared and made ready for the plow at the expense of the Government. In addition to this gift, material or labor to the value of $150 is donated to each soldier settler toward getting started on his land. A loan of $500 is also made to him, this to go toward the building of his house or for securing general equipment. This loan must be paid back, on the amortization plan, within 20 years, with interest at 6 per cent. The settler can also obtain the use of a horse by paying for his keep, and have the use of needed tools without charge. Within five years the settler

must clear an additional 10 acres of land on his farm, 2 acres to be cleared each year. Whenever the additional 10 acres have been cleared and all indebtedness to the Government has been repaid the settler obtains a patent to the land.

A great deal of work is thus provided for by the Government in clearing the 10 acres on each allotment, so that the settlers coming to the colony can obtain work of this kind either upon their own land or upon that of others. The settler also has the opportunity to cut and sell any pulp wood which may be standing on his lot. Pulp wood at the railroad track was selling in northern Ontario in December, 1918, for $7 a cord. The original plan contemplated that the men, before going to the colony, go first to the provincial experimental farm at Monteith for preliminary training in land clearing and in general farm work. This arrangement has now been discontinued. Arrangements, too, were made for the location of a pulp mill in connection with the colony to be established, this mill and the logging operations with it to serve as a source for winter employment.

(b) Colony located in Clay Belt.

The colony which has been established to carry out this scheme has been located in what is known as the "Clay Belt" which extends for several hundred miles along both sides of the Transcontinental line of the Canadian Government Railways. This belt covers portions of the Provinces of Ontario and of Quebec. It is a level region, covered throughout by a small growth of spruce, fir, poplar, and other forest trees averaging from 30 to 50 feet in height. Large portions of this forest have been burned, these portions going by the French name "brulé." The soil for the most part consists of a clay loam interrupted by a series of muskegs or moss-barrens. The region is drained by a number of rivers, these containing falls possible of generating a large amount of water power. In general the soil near the rivers is of a better quality, and the timber is larger, than on the areas between the rivers where the spruce and fir trees, though of considerable age, are usually of small diameter (4 to 7 inches). Patches of these species large enough for pulp wood (8 to 10 inches in diameter), occur scattered here and there.

The climate in winter is cold, dry, and very exhilarating. The summers are short and hot, though frosts are likely to occur in every month. Forest fires also are likely to occur anywhere and any time during the summer as a result of brush burning or of sparks from locomotives. The main farm crops of the future will probably consist of oats, hay, and some of the more hardy root vegetables, and agriculture in this region will consist in the main of raising live stock for beef or dairy purposes.

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The location chosen for the first soldier colony was on the Transcontinental line where it crosses the Kapuskasing River. At this point an experimental farm run by the Dominion Government had been located and here also was situated a Government internment camp containing several hundred German and Austrian prisoners. This location was chosen partly for the reason that a certain amount of land clearing could be accomplished through the labor of the interned prisoners. A pulp mill is to be located on the river by the Kapuskasing Pulp & Paper Co.

The Government of Ontario has complete control of the Crown lands, which occur practically without interruption throughout the Clay Belt. The townships in this northern part of Ontario are 9 by 9 miles square, while those farther south are 6 by 6, as in the United States. Five of these large-sized townships have been reserved for soldier settlement purposes.

The first group of returned soldiers applying for admission to the colony went through preliminary training at Monteith in the spring of 1917. This group, containing about 30 men, arrived in Kapuskasing in June, 1917. Since then other groups have come from time to time, these consisting of men who were disabled in one way or another. A good many of the settlers are of the English cockney type.

A so-called "colony farm" of 600 acres has been established on the east side of the Kapuskasing River and this has been almost wholly cleared and stumped by the interned prisoners and by the settlers coming to the colony. Several buildings make up the nucleus of the colony. These consist of an administration building, a dormitory, schoolhouse, store, planing mill, sawmill, and blacksmith shop. A spur track has been built in to the planing mill. About 20 dwelling houses have also been constructed for the use of the soldiers and their families while their lots are being cleared.

Each lot contains 100 acres, 100 rods wide by 160 long, these being laid out in regulation order along so-called "concession" lines. Sixty-two men with their families were, in December, 1918, actually living on the land. Other men not yet located on their lots were employed at work in the colony, either at clearing land, building houses, cutting timber, or at other occupations.

The lots are spread along the Transcontinental Railway on each side of the station at Kapuskasing. They extend from Kitigan, 6 miles east of the station, to a point about 2 miles west of the station. A number of settlers also have taken up lots at a place called Harty, about 11 miles west of Kapuskasing, in the burned-over or "brulé country." Thus the lots extend, with some interruption, about 17 miles along the railroad track, this distribution being the result of allowing the men to choose their own locations. The roads are being made by the Ontario Government through what is known as the

Northern Ontario Development Branch. Construction of the houses is a part of the soldier settlement scheme, each house being designed according to the desires of each man.

SECTION 15.

LESSONS FROM CANADIAN EXPERIENCE.

No constructive system of land settlement has been worked out in Canada as there has been in Australia. Almost all the land in Canada has been at one time or another in the ownership of the British Crown just as 75 per cent of the territory of the United States has been vested in the Federal Government. And just as the disposal of the United States public domain has constituted the main land policy of this country, so the disposal of the Crown lands has been the policy of Canada. The "homesteading" method has prevailed in both countries, and a large part of the good agricultural land of the western Canadian prairies has been alienated to individual settlers in lots of 160 acres. These lots, as in the States, have been disposed of through free grants subject only to certain conditions of initial improvement and residence. In neither country has there been a consistent, constructive land policy.

The Government of the Dominion of Canada at Ottawa has control of the Crown lands in the "Prairie Provinces" (Manitoba, Saskatchewan, and Alberta) and in parts of British Columbia. It also has complete supervision of the Yukon and Northwest Territories. Elsewhere in Canada the Crown lands are under the control of the respective Provinces in which they are situated. These consist of the "Maritime Provinces" (Nova Scotia, New Brunswick, and Prince Edward Island) and of Quebec, Ontario, and British Columbia. Newfoundland, like New Zealand, is an independent political unit of the British Empire.

The reconstruction plans of Great Britain are likely to result in some remodeling of previous land policies in the various colonies, and, as already stated, they are patterned in part after the Australian system. Land legislation in the several Canadian Provinces may be said to be in the making, and no review of this legislation is herein presented. But certain methods in handling the land problem have been worked out in Canada which give promise of being crystalized sooner or later into a new land policy. These relate to the use of land as an opportunity for workers, and they form constructive suggestions for a new land utilization in the United States.

(a) Land classification.

Canada has made an excellent start in land classification, especially in the Province of New Brunswick. This Province is systematically classifying all of its Crown lands. This work began in 1916 and one-fifth of the total area has now been covered. It is estimated that the

work will last for another 10 years. The method is to lay out so-called "strip surveys" across the land so that 4 per cent of the total area is covered. All of the trees on each strip are calipered to obtain their diameters and a percentage of tree heights are taken. Soil samples are also taken and topographic features surveyed. From these data a complete forest and timber map can be made of each township as well as a complete map of its soil conditions. Four classes of soil are used: clay, loam, sand, and rock.

In determining what is, and what is not, profitable agricultural land, soil fertility is of course only one factor. The market is the other big factor. A truly complete system of land classification should consider all the points taken up in section 7 (The "Highest Use" of Land), and should apply the specific test given by the Secretary of Labor—the "yearly compensation to be obtained by the settler for his own use as a result of his labor."

(b) Town planning.

Canada has also made a good start in the matter of town planning. Mr. Thomas Adams, town-planning adviser to the Commission of Conservation at Ottawa, has done pioneer work in this regard. His work has already been referred to in connection with the "garden city" movement. He has worked out methods for laying out and developing the large city, the small town, and the agricultural community. Plans for the agricultural development of any locality should of course be based upon a thorough land classification comprising soil, forest, and topographic surveys. In this way the farming and the forest lands can be definitely segregated and efficiently subdivided, and the roads laid out so as to best meet the needs of the community as a whole.

Each community unit, Mr. Adams points out, should be planned so that all roads lead by the most direct routes to the community center. The method which has been, and still is, followed of laying out roads in level regions being developed, both in Canada and in the United States, is to place them on the section lines (or other lines separating legal subdivisions). Thus all roads in such regions, as a rule, run north and south or east and west. By running the roads obliquely across the township to its center, access to the latter is made more direct, the average haul is shortened, and the total road mileage is reduced.

Several different methods of carrying out this principle of ready access have been devised by Mr. Adams. He illustrates these plans in his report by means of diagrams. These are shown in figures 5 and 6, pages 118, 119. Each illustrates a "plan for agricultural settlement." Figure 5 shows four different methods of planning town-

ships, and figure 6 indicates four other different methods. The plans shown on the latter diagram assume that "the square form of land division for the separate farms must be adherred to."

A material reduction in the road mileage, as compared with present practice, is here illustrated. The regular 6 by 6 township covers an area of 36 square miles, and the total length of roads on the section lines within the township (excluding boundary roads) is 60 miles. By running the roads obliquely, as in figure 5, the mileage is reduced from 60 to 46, "of which 11 miles are secondary and not essential." In figure 6 the total road mileage shown is 40, of which 36½ miles comprise principal roads and 3½ secondary. Thus from one-fourth to one-third of the mileage is saved.

The main point about the old and the new methods of laying out roads is thus summed up by Mr. Adams:[1]

> The objection to the present method is that it stereotypes the division of land according to a hard and fast system of survey without proper regard to topography, facilities for social enjoyment, convenience, and transportation. The proposal is not to substitute a new for an old method of stereotyping development, but to substitute an elastic and scientific method for one which is based on no definite principles.

Lands chiefly valuable for forest growth are shown as segregated in the illustrations of townships presented by Mr. Adams. These lands might be handled as community forests and managed upon a sustained-yield basis. The farm units in these illustrations are laid out, apparently, on the assumption that the soil throughout the township is about equally fertile, and that the most efficient acreage (for family use) in the case of farms near the community center is distinctly smaller than that for farms on the outskirts.

A central town site covering one section (640 acres) is set aside in the illustrations given for buildings and grounds necessary for general community use. These would include warehouses, stores, schools, churches, etc., and perhaps a demonstration farm in charge of an agricultural adviser. Ready access to the community center is required, both for economic and social reasons, and so the community tract should be made as symmetrical and compact as possible.

The disadvantage of an unsymmetrical settlement is illustrated in the Kapuskasing colony. One of the complaints here made, especially by the women, was the difficulty of getting together at the community center, and the consequent restriction of social intercourse. People living in the Kitigan settlement have to go 6 miles to the store, the post office, and schoolhouse at Kapuskasing. Efficient town planning would have enabled all settlers to have had their homes within a radius of 3 miles of the center.

[1] Seventh Annual Report, Commission of Conservation, Canada, 1916, p. 123.

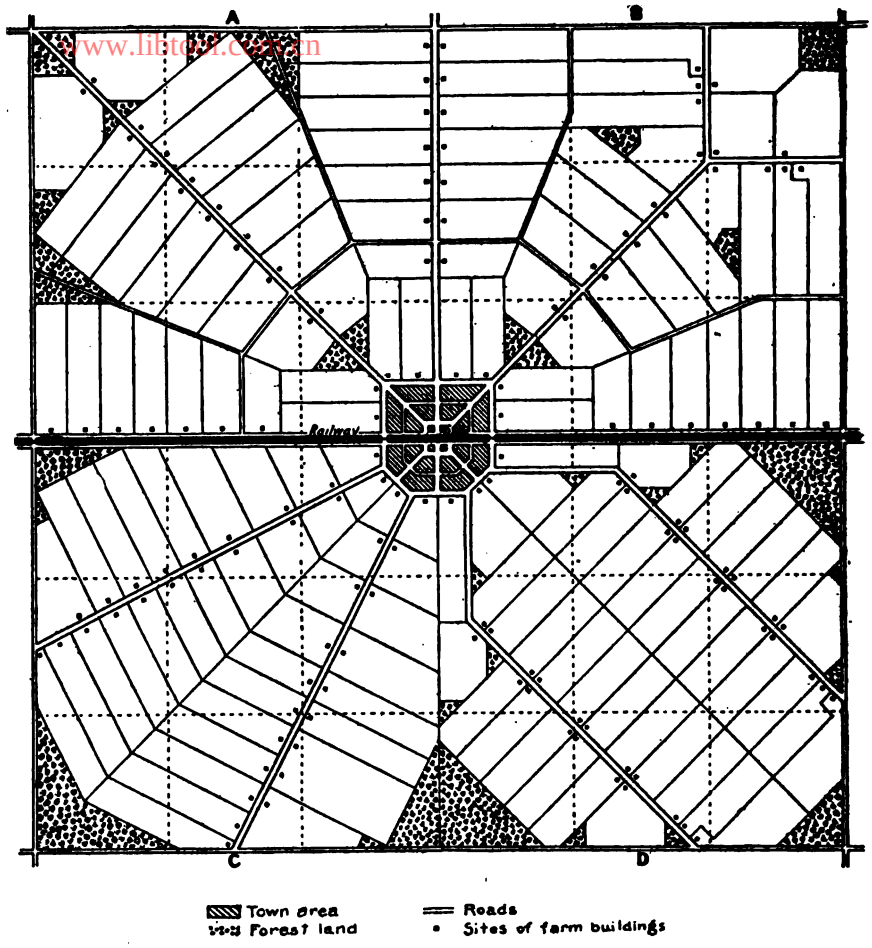


Fig. 5.—A CANADIAN PLAN FOR LAYING OUT A TOWNSHIP.—This and the succeeding diagram show eight different methods of planning quarter sections of townships. Imaginary areas are taken and roads are planned to secure (1) close settlement of the farm buildings, (2) convenience and directness of access to the town area and station, (3) reduction in length of road, (4) use of swampy and rocky land for timber reserves. The buildings are also grouped so as to obtain the best social facilities and economic use of wells of water supply. In the town area it is assumed there would be good facilities for obtaining education, medical advice, and recreation—and an organized cooperative agency under Government auspices to supply farm implements, seeds, etc., to the farmers and to collect and distribute farm produce. On this diagram the total length of road provided to give access to all the farms is 46 miles, of which 11 miles are secondary and not essential. Under an ordinary rectangular division plan the total length of road is 60 miles. Boundary roads are not included in either case. In addition to the saving in road construction and maintenance which would be effected by proper planning, there would be the great saving in time and team labor for the farmer, owing to the greater nearness of the farms to the center. Fewer and more direct roads mean better roads, because it is possible to concentrate a given expenditure on a smaller area.—(From Seventh Annual Report, 1916, Commission of Conservation, Canada, p. 120.)

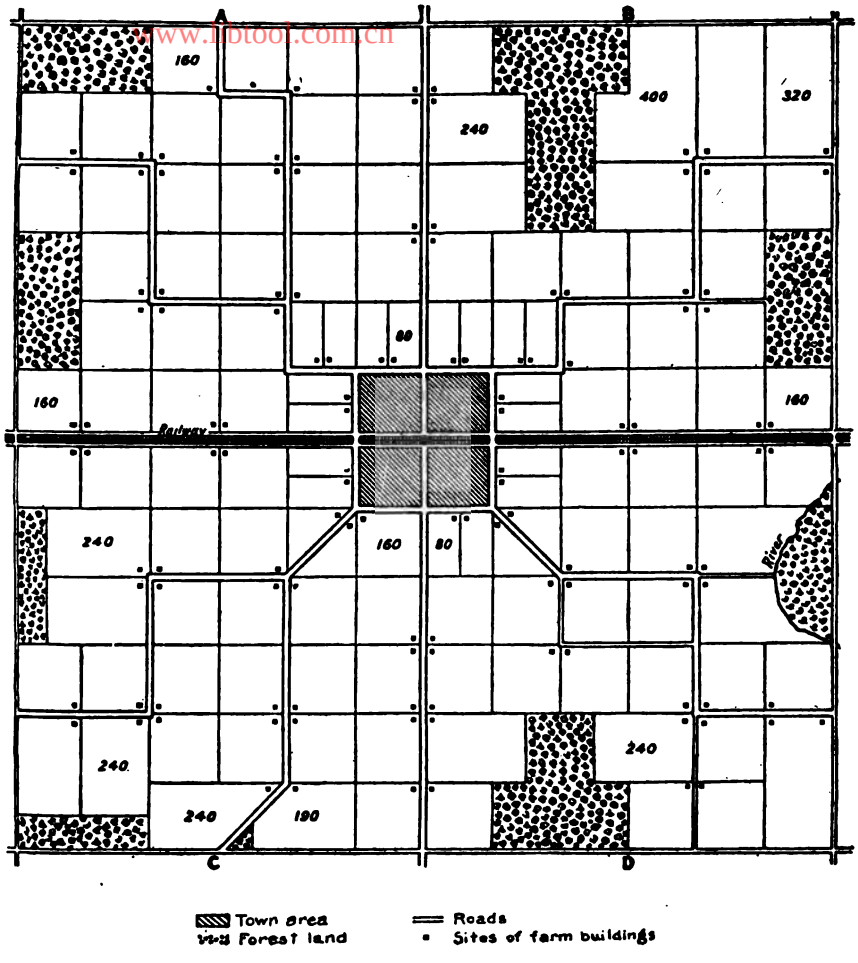


Fig. 6.—ANOTHER CANADIAN PLAN FOR LAYING OUT A TOWNSHIP.—In this plan it is assumed that the square form of land division for the separate farms must be adhered to as a condition precedent to the planning of the area. Varieties of size of holding from 80 acres (near the town) to 400 acres (remote from the town) are provided for, but all holdings could be made 160 acres if desired. A different plan is shown for each of the quarter sections, adaptable to the imaginary topography of the land, the only feature common to all the quarter sections being the main roads intersecting the township in two directions—one parallel with the railway and the other at right angles thereto. All the farms are grouped so as to give them convenient access to the town, where the same facilities are presumed to exist as are described in respect of Fig. 5. The total length of road usually provided in a fully developed township, not including boundary roads, is 60 miles. In this plan there are 36½ miles of principal and 3½ miles of secondary road, making a total of 40 miles. Every farm has sufficient road frontage, and the same length of boundary road is allowed for in both the above cases.

The object of these diagrams is not to suggest stereotyped or rigid forms of land division but to show the desirability of abandoning such forms. Every township should be inspected and planned before settlement.—(From Seventh Annual Report, 1916, Commission of Conservation, Canada, p. 126.)

The adaptation of the methods illustrated in figures 5 and 6 for laying out a community unit would seem to require (as a convenience if not a necessity) that each unit be inclosed by definite legal boundaries. These boundaries could be made to define in each case an independent *settlement district* having a particular legal status, within which certain laws could be made to apply and a consistent settlement policy worked out. It could comprise a township or any other definite area of land.

Such a district might be organized eventually as an independent town or some other provision made to secure for it local self-government. The land thus organized, whether vested in the general or the local government, might ultimately be controlled by the latter for permanent community purposes. In case lands within the district are vested in the State or general government, arrangements should be made whereby some equitable portion of the rental for the use of such lands be collected and paid over, in lieu of taxes, to the community.

It might often be necessary, especially in thickly settled regions, to include within the boundaries of a settlement district a number of established farms and areas which could not in all ways be included as part of the district organization. Such a situation introduces complications which would have to be dealt with in accordance with the local circumstances. It would probably be found necessary to limit the inclusion of such areas to some maximum percentage of the district's total acreage—perhaps 20 per cent.

It has already been pointed out (section 11 b) that any public improvement, such as a farm settlement district established by the State at public expense, tends to increase the land values in the locality thus developed. Privately owned areas, either inside or immediately outside of the settlement district, would be increased in value, and hence in rental. The settlement project itself, therefore, would have the tendency to start a boom for the sale of these private lands. This in turn would lessen the effectiveness of the State enterprise; settlers would be induced to buy the private lands for speculative purposes rather than obtain the use of State or community lands with which they could not speculate. Values created by the State would thus go into private pockets.

A remedy for a situation like this would be to have these private lands made the subject of special taxation. By taking as an extra tax the extra rental created, speculation could be eliminated, the State enterprise protected, and a fund collected for public use which would be otherwise collected for private use. A measure of this kind would be a consistent part of any truly effective town planning and colonization policy.

(c) Expropriation of land.

Canada and this country have in the past used the same system with regard to Government lands—that of alienating an unrestricted land title. The disadvantage of this sort of alienation is now showing up. The Soldier Settlement Board of Canada planned to utilize the Crown lands of the Prairie Provinces for soldier settlement purposes, and the promise went forth to the soldiers returning that this prairie land would be available to the extent needed for their use. When the Settlement Board came to take account of stock, however, they found that the Crown lands remaining were practically negligible. On the other hand, there were found vast areas of unused land within 10 miles of railroad facilities which were held in private ownership. This land was at one time Crown land but had been alienated in unrestricted title to individuals and corporations. And so to-day, when the land is needed for soldier settlement purposes, it is found to be out of reach of the Dominion Government, although held unused by private parties for speculative purposes.

In view of this situation a conference was held in Ottawa on November 19, 1918, of the premiers of the various Provinces. At this conference the Dominion Government made the suggestion to the premiers that each Province pass legislation providing for the expropriation of unused private lands which might be suitable for soldier settlement purposes. Such legislation has been introduced into the respective Parliaments at their sessions this winter and it is expected that in this way land in the Prairie Provinces and elsewhere may be made available for settlement. The general plan, adopted from Australia, is to provide for the assessment of the unused land by the owners thereof, such assessment to be used as a basis for taxation. The Government then is to exercise the right of buying the land when required, at or near the assessed value.

The United States faces the same predicament as Canada in obtaining lands for her returned soldiers. Practically all of the public domain has been alienated in fee title. The remedy for Canada's past mistakes, namely expropriation, suggests itself as a remedy for our own. The prairie region of this country, including the Dakotas and other States, is the counterpart of the prairie region of Canada; and it is possible that if successful colonization is to be carried on in the former region, land may have to be secured by the respective States in a manner equivalent to that being developed in the adjoining Canadian Provinces.

But if in either country, when the land is once retrieved, an unrestricted title therein is alienated to the individual settler, there will be nothing to prevent such land from accumulating again in the hands of the nonuser and bringing about a repetition of the present difficult problem of securing land for use. This error of granting

the fee title to Crown lands is being made in the Kapuskasing colony, and it bids fair to be repeated elsewhere in Canada. This fallacy is still flourishing in the United States. In each country, however, there is a growing sentiment to replace this folly by the common-sense method of retaining the title in public hands.

(d) Need of a permanent pulp industry.

The need of making forestry, combined with agriculture, an integral part of any policy of land settlement is clearly seen in Canada, where farm and forest lands are so closely mingled. At least two of the big wood pulp concerns of that country are making a definite beginning with respect to carrying out forestry on their licensed timber holdings. One of these is the Laurentides Pulp & Paper Co.; the other is the Riordon Pulp & Paper Co. Both concerns are practicing forest planting. In addition to this the Riordon company is building a town on Lake Temiskaming, in the Province of Quebec, in connection with a pulp mill which will be built at the same place. This town has been planned by Mr. Thomas Adams, of the Commission of Conservation. The idea is to have a permanent mill, a permanent industry, permanent employment, and a permanent and well equipped town. A further step in this policy, and one which seems to be foreseen by the company, should be that of providing continuity and stability of employment, not only for the mill workers but for the woods workers as well. The need is suggested of domiciling in a permanent way, within the locality of woods operations, the men who work in these operations.

Logging in Canada, as in the United States, is carried on very largely during the winter season. At the end of the season, under present practice in both countries, the lumber jacks are "laid off." At the beginning of the next season they are "taken on." In the meantime they shift for themselves as best they may. Some of the men have farms and families in one place or another and spend their summers farming; some of them work on other men's farms as hired men; many of them take "any old job" that comes along. The system of employment is as happy-go-lucky as the system of logging operations of which it is a counterpart. As one remedy for this situation the suggestion has been made by one of Canada's big pulp men that the lumber jack should have during the summer—his off season—a "two-acre homestead" to live and work upon, thus insuring him a permanent home with his family.

On the other hand, the settler during the winter, which is *his* off season, should have the opportunity for woods employment near his home. Such an arrangement is anticipated in connection with the soldier colony at Kapuskasing. The Ontario Government has licensed the timber on several townships to the Kapuskasing Pulp & Paper Co. and has arranged that the company build a pulp

mill and town for its workers in the vicinity of the soldier colony. The mill is to employ some 800 persons, and 200 of the jobs are to be open to men living in the colony. In this way winter employment near their homes is to be provided for the settlers.

Another important reason for stabilizing the pulp and the timber industry, and tying it in so far as possible with that of the agricultural industry, is to provide a local market for farm produce. Families supported by the pulp industry, whether working in the mills or in the woods, will require, in addition to such produce as perhaps they can raise in their limited gardens, or upon their "two-acre homesteads," a considerable amount of the staples which can only be raised on farms of sufficient size. The population consisting of these families, therefore, would serve as the chief local market for the agricultural products of the settlers.

CHAPTER IV.

METHODS OF FOREST LAND UTILIZATION.

In the previous chapter the methods of land utilization were discussed primarily from the standpoint of agricultural development. In this chapter such methods will be discussed from the standpoint primarily of forestry, and only incidentally of agriculture. The principles underlying the use of forest lands for permanent employment, as already shown, relate to (*a*) timber culture versus timber mining, (*b*) permanent forest employment, and (*c*) stability of the forest community. Management of timber as a crop is the essence of real forestry, and provides the only sound basis for stabilized employment in the woods and sawmill.

European practice illustrates this point. Mr. Raphael Zon, of the United States Forest Service, in a recent illuminating article,[1] states that in Europe for generations sustained forest production has formed the backbone of a system of continuous communities of woods workers.

> In Switzerland a forest of 10.000 acres, with an adjoining area of 3,000 acres of agricultural land, supports a prosperous, permanent community of 1,500 people.

In France during the past 60 years, in the region of "the Landes," many thousands of acres have been reforested. The Parishes of La Teste and Caseaux in this region contained, before the reforestation, about 1,600 people; since the establishment of the forests these same Parishes came to support a population of 14,000. Taking Europe as a whole Mr. Zon estimates that 80 per cent of all woodsmen live in their homes on small holdings near the forests in which they work.

Recent estimates made by the United States Forest Service indicate some of the possibilities of forest employment in this country. In 1914 the timber logged and sawed into lumber in the United States amounted to 40 billion board feet. To log and saw this timber required about 480,000 men. If our present methods of timber mining are continued, the annual cut is bound to decrease, and with it the opportunities for employment. Assuming that the present per acre per annum yield is not diminished, the most that can be expected, after the remaining surplus stock of virgin timber has been cut off, is a yearly output of about 25 billion feet. The number of men required in logging and sawing this amount will be less than 300,000. If, on the other hand, timber culture is practiced, the Forest Service estimates that the permanent forest area of the Nation will yield a total output, for lumber production alone, of at least 60 billion feet.

[1] "Reconstruction and Natural Resources," by Raphael Zon, Journal of Political Economy, April, 1919.

This would provide permanent employment for over 700,000 men, who, with their families, would make a population upwards of three and a half millions.

In addition to these operations of logging and sawing, many men would be employed, under forestry, in fire protection, in forest planting, in the construction and upkeep of roads, buildings, and other improvements, and in a variety of other occupations incident to the proper development and upbuilding of the forest resource.

Since four-fifths of the standing timber in the country, and of the permanent forest area, are to-day in private hands, the main possibilities of permanent employment in the lumber industry depend upon bringing the timber lands now privately owned under a continuous forest production. It is doubtful, as experience over the world has shown, whether timber owners themselves will adopt timber culture on their own volition. It must come, therefore, either through some form of regulation by the Government of cuttings on the private lands, or else through Government ownership. In the meantime the public forests (National, State, and municipal), because of their permanency, offer the immediate opportunity for the development of permanent communities.

The national forests, including timber, grazing, and other lands, cover a total of 155 million acres—20 million acres in Alaska, 130 millions in the Mountain and Pacific States, and 5 millions in various parts of the eastern half of the country. With respect, therefore, to immediate and permanent forest employment, the main field of opportunity lies in the West, where the bulk of our national forest land is situated. Chief attention herein will be devoted to this western field. Before taking this up, however, some salient points regarding eastern forest development will first be briefly considered.

SECTION 16.

POSSIBLE FOREST SETTLEMENT IN THE EASTERN STATES.

Two-thirds of the estimated future forest area of the United States is in the eastern half of the country; and nine-tenths of the present population is also in this eastern half. This region has been, and still is, the main field of the lumber industry. The largest cut of timber is now being made in the Gulf States, and after these have been "cut over" the industry will shift to the Pacific and far Western States where the biggest reservoir of timber remains. The permanent wood supply of the country, however, must look ultimately to the eastern forest land as its mainstay.

A portion of the East having one of the best opportunities to develop an intensive timber culture is the region from Maine to Pennsylvania (the New England and Middle Atlantic States). This region contains about 28 per cent of the Nation's present population,

but includes only 12 per cent of the country's permanent forest area. The greater part of this region's forests are within a series of timber belts, known collectively as the "Northwoods," including northern Maine, the White Mountains of New Hampshire, the Green Mountains of Vermont, and the Adirondacks of New York.

It was in these Northwoods and adjoining areas that the American lumber industry made its real start. In 1850 the Northeastern States cut more than half of the Nation's supply of lumber; to-day they cut less than one-tenth. In many of the "Northwoods" townships the population was lower in 1900 than it was in 1800. Historically a part of the oldest section of the country, and alongside the most populous areas in the Nation, this northeastern region may nevertheless be classed with the new and undeveloped sections of the continent as a possible field of opportunity for permanent employment on the land.

Restoration of the forests has been often suggested as a means of employment for the returning men. Serious thought has been given this subject by the British Government. The Subcommittee on Forestry of their Reconstruction Committee has reported a scheme for forest planting and rehabilitation in the United Kingdom. As in old England, so in our own New England, and elsewhere in our eastern States, there is grave need of restoring a depleted forest growth to upbuild the wood-using industries required by a dense population.

The lead in developing methods for restoring, under a system of forestry, the timber resources of the Northeastern States would naturally be taken in the one national forest of the region—that in the White Mountains of New Hampshire. Some of the States also own forests, and more could be acquired. On much of the timberland in the region thriving stands, especially young white pine and hardwoods, are growing fast. On the other hand, many of the stands are irregular and the trees in poor form. The forest as a whole needs patching and weeding. Much small-sized wood could be cut while the bulk of the land is restocking, and the material used in various industries—the spruce in the paper and pulp industry and the pine and hardwoods in different kinds of woodworking factories. This of course is now being done. Under present "timber-mining" methods, however, the forest is being still further reduced; under timber-culture methods it could be utilized and at the same time be restored.

The White Mountain National Forest takes in portions of New Hampshire and Maine. Land is being acquired in this area under the terms of the Weeks law, passed by Congress in 1911, and up to June 30, 1918, the Government had purchased, or approved for purchase, 401,233 acres. This land occurs in a number of large-sized

tracts, on several of which some form of permanent forest settlement might be established.

One of the most promising locations consists of a tract known as the "Wild River Watershed," covering about 30,000 acres. This was cut over by a lumber company over 20 years ago, when most of the old-growth spruce and pine was taken; a fringe of small spruce, however, remains on the upper slopes of the ranges that bound the watershed. The bulk of the tract is now covered by a mixed stand of poplar and of white birch and other hardwoods in all stages from sapling growth to maturity. The Forest Service estimates that this stand contains at present not less than 10 cords per acre on 15,000 acres, or a total of 150,000 cords. The annual growth is estimated at one-half cord per acre on 25,000 acres, or a possible sustained yield of 12,500 cords.

A variety of products can be made from the stand on this watershed for which markets appear to be readily available. The poplar and spruce will make pulpwood, which can be shipped by rail to different pulp mills in the region or else driven down the Androscoggin River. The white birch can be made into bobbins to be used in the many textile mills in this part of New England. The yellow birch and the other hardwoods might be manufactured into turnery products of various kinds. Tan bark and fuel wood can be taken out in connection with the operations for pulp wood.

The sustained production possible on this Wild River Watershed would make continuous employment, under present forest conditions, for about 40 men in the logging operations alone. Agricultural land in the vicinity would enable these men to live, if they desired, on "two-acre homesteads"—as being suggested in Canada. These men with their families could form a permanent forest community of 200 people and upward; and if some local woodworking plant were included as part of the project a much larger community could be established.

Permanent forest communities of this kind could be organized also in connection with operations on national forest areas in the Southern Appalachian Mountains. There are 15 areas in these mountains within which land is being acquired by the Government, and up to June 30, 1918, about 1,215,000 acres had been purchased, or approved for purchase, under the Weeks law. This Southern Appalachian region is strategic in the future industrial development of the whole South; it is going to be the chief seat of the future hardwood supply for the United States, as well as the key to the control of water and power.

The many streams crossing the Southern Coastal Plain, together with the Ohio and lower Mississippi Rivers, will probably require, for their eventual effective control, a series of reservoirs in the South-

ern Appalachians. The main uses for these streams are those of navigation and water power. To conserve the water for these all-important purposes, and with a view to preventing the floods that continually ravage these valleys, the sites for 136 storage reservoirs in the Ohio River and Southern Atlantic watersheds have been located by the United States Geological Survey and the Pittsburgh Flood Commission. To prevent "silting up" these reservoirs, when constructed, it will be necessary that the watersheds draining into them be protected by forest cover. Indeed, everything possible is required to control the flood wave of any southern river system, and the dike, the revetment, and levee downstream are quite as important as the storage reservoir and forest cover upstream. The proposition for stream control by all these methods, both in the Southern Appalachians and elsewhere, has been for several years before Congress and the purchase of forest areas under the Weeks law is the first step in this big program. The extension of this program would open a wide field of opportunity for permanent employment on forest lands.

SECTION 17.

POSSIBLE FOREST SETTLEMENT ON THE NORTH PACIFIC COAST.

The forests of the West occur along the ranges of the Mountain and Pacific States. Three-fifths of the area of these forests (and probably four-fifths of their timber volume) are included in the "Pacific Northwest." The Pacific Northwest comprises the mountainous portions of the three Pacific States, and of Idaho and Montana; it may be subdivided into three main regions—(1) California, (2) the "North Coast" (western Oregon and Washington), and (3) the "Inland Empire" (eastern Oregon and Washington, Idaho, and western Montana). These regions are heavily stocked with coniferous forest—Douglas fir, western hemlock, bull pine, sugar pine, etc.—and comprise what has already been referred to as the main timber "reservoir" now remaining in the Nation.

The total volume of timber standing in this reservoir was estimated a few years ago to be 1,513 billion board feet—or more than half the timber stand of the United States.[1] Of this, some 500 billions were in national forests and other public reservations, while 1,013 billions were in private ownership. Although the volume of timber in private hands was twice that in public hands the permanent timber area on the national forests alone was 50 per cent greater than that in private ownership. The average stand per acre in the Pacific-Northwest to-day is not far from 19,000 board feet; that in the national forests will run about 9,500; and that in private ownership about 32,000.

[1] Report of U. S. Bureau of Corporations on the Lumber Industry, Pt. I, 1913.

Washington and Oregon together contained some 937 billion feet, or about one-third the entire stand in the United States. The average per acre stand for these two States (including both public and private forests) runs about 26,000 feet. The per acre stand for California averages nearly 23,500, and that for Idaho and Montana together averages over 6,500. Of the 1,013 billion feet of privately-owned timber in the Pacific-Northwest, 201 billions were held, in about equal proportions, by two companies—the Southern Pacific Railway and the Weyerhaeuser Timber Co. Eight concerns held a third of the timber and 38 held half of it.

The North Coast forms the predominant forest region of the West, much as the Northeastern States do for the East; but the two regions have some marked contrasts. The Northeast, with nearly three-tenths of the Nation's population, has the advantage of a varied lumber market, but has the handicap of a run down forest. Less than 5 per cent of this forest is in public hands. The North Pacific coast, with a little more than 2 per cent of the population, has nearly a third of the Nation's standing timber. About half the forest lands (and a quarter of the stand) are in national forests or other reservations. The installed capacity of the sawmills of the United States is about 160 per cent in excess of the yearly cut:[1] In the Northeast the capacity is more than five times the cut; on the North Coast it is nearly twice the cut. The Northeast has two acres per capita of permanent forest land while the North Coast has fifteen.

Methods applicable in developing the forest industry in the North Coast region, as a source of permanent employment and community life, are illustrated concretely in this section by an assumed project for operating, on a timber culture basis, a typical tract of mountain forest land. Development of this kind requires that the Federal Government take further initiative in conducting timber operations on the national forests.

(a) Possibilities of Government initiative in developing national forests.

There seems to be good reason why the Government might take the initiative, to an increasing degree, in devolping its own forests. Working plans for many working units within the national forests could probably be put into effect through the regular timber sale contracts under which the timber and wood on these forests are now being cut. Terms could be inserted in these contracts requiring the purchaser of timber to operate it under specified conditions. Thus he might be required to make a series of cuttings within definite periods and locations as prescribed by a working plan; to pay a certain scale of wages; to maintain given standards of labor; and to

[1] "Some Public and Economic Aspects of the Lumber Industry," by W. B. Greeley, Report No. 114, U. S. Department of Agriculture, p. 7.

provide for community development. But in any case in which it was found to be impracticable to carry out a working plan by means of a timber sale contract, the timber operations might be carried on by the Government itself.

The Federal Government during the war was beginning to take an active part in timber operations. A regiment of lumberjacks on the North Pacific coast, under Col. Disque, was getting out Sitka spruce for airplane stock. In addition, there were some 12,000 lumberjacks in the Tenth and Twentieth Forest Regiments in France. These men, and many others among the soldiers and war workers, might well be desirous of continuing at work of this kind if conducted upon a proper basis; and the equipment and operation of certain forest-working units might be carried on by a public-construction service including men from those regiments.

At present, however, under general practice on the national forests the tendency is for the lumber company, rather than the Government, to take the initiative in forest development. In the patchwork of public and private holdings which is characteristic of many areas within the national-forest boundaries, some lumber company has perhaps a group of sections, quarter sections, etc., which it desires to operate. It backs a sawmill up against this part of the forest and makes its own plans for cutting off its own patches of timberland. It then negotiates a sale for timber on the Government holdings which are mixed in with its own. The company also may buy public stumpage independently from its own land. So far, therefore, as the actual timber operation is concerned, the cutting is in most cases done where it is to the best economic advantage of the timber company, and not in accordance with any working plan that may be prepared by the Government for the development of the forest. Unless, then, the Government conducts its own operations, it must either leave the forest undeveloped, or else sell the timber to some company that can advantageously cut it.

A number of reasons may be mentioned why the Government has not undertaken the operation of its own timber. One of these is that most of the national forest timber is not as accessible as that in private ownership. Some of it, however, is quite accessible, or will become so within the next few years; but in such cases overdevelopment of the lumber industry (and hence wasteful competition) discourages Government operation. Perhaps the most potent reason is the lack of an assured steady market. However this may have been in the past there seem now to be many chances for developing local demands for wood. The lumber companies, since they operate on a huge scale and upon a timber-mining basis, tend to seek the big national and overseas markets rather than the smaller local markets. The local wood consuming industries, therefore, often suffer from the lack of a steady source of supply. Thus some of the

cooperative fruit-growing concerns of the West, although in the immediate vicinity of national forests, have difficulty in securing at reasonable prices an adequate supply of box material for packing their produce. The Forest Service is seeking to remedy this condition, and already on certain of the national forests, in Idaho and elsewhere, the cuttings are so arranged as to permanently maintain the local sawmill and other wood-using industries. This in turn is working toward the maintenance of permanent, stabilized forest communities.

The recent apprehension as to a shortage in the pulp and paper supply points out a vital national need that might be met in part by the national forests. A large quantity of pulpwood is available on these forests, and this, it would seem, should be used, as far as possible, rather than to depend upon Canadian or overseas sources for our newsprint.

The policy of further Government initiative in handling its own timber need not, of course, be applied all at once upon the total area of public timberland. A beginning here and there, as already being made on several of the forests, can pave the way for such development. The extension of this policy would seem to open a big field of opportunity, to returned soldiers and other workers, for employment which would be profitable to them and of service to the country.

(b) The Cascade-Puget Sound area.

The timberland portions of the North Coast region consist largely of the western slopes of the Cascade Mountain range in Washington and Oregon. As a typical sample of this territory and one representative of the timberland problem therein contained, a certain area of land in northwestern Washington has been selected for study. This will be designated herein as the "Cascade-Puget Sound area," and is shown on map 9 (facing p. 134).

This area consists of a belt of land extending east and west from the Cascade divide to tidewater on Puget Sound; it is in effect a "cross section" of all typical conditions—physical, economic, and legal—to be found between the mountain summit and the ocean harbor in this northwestern corner of the country. The area covers part of Skagit and Snohomish Counties, including 1,027,885 acres; its length, east and west, is approximately 70 miles and its breadth, north and south, averages 23 miles.

The Cascade-Puget Sound area includes all land within the drainage systems of the Stilaguamish River and all of the streams entering Puget Sound between the delta of the Skagit River on the north and the mouth of the Snohomish River on the south; it includes also the drainage system of the Sauk River, a tributary of the Skagit entering from the south. (See map 9.) The elevation of the Cascade

divide, on the east, runs from about 5,000 to 8,850 feet; that of Glacier Peak, the highest summit, is 10,436 feet. The drainage from the main divide is through the Sauk River (and its chief branch the Suiattle) westward and then northward into the Skagit. The drainage of the Sauk and of the North Fork of the Stilaguamish River are separated near the town of Darrington by a low divide across a very level plain. It is possible that the upper part of the Sauk and the North Fork, in former geologic times, constituted a single stream. But whether or not a continuous stream ever in fact flowed thus from Glacier Peak through the North Fork into the Stilaguamish River, this line is marked today by a continuous valley traversing the full length of the area.

Two fairly distinct zones are crossed by the Cascade-Puget Sound area—*a lowland zone* on the west and *a mountain zone* on the east. The larger portion (85 per cent) of the area is in the mountain zone, 15 per cent being in the lowland. About one-fourth of the lowland zone consists of flat bottom land along the lower courses of the present (or former) rivers, and this alluvial soil forms the choicest of the farming land. The remainder of the lowland zone consists of rolling topography, irregular in form but for the most part of moderate slope. The soil is largely of glacial origin, so the fertile portions tend to lie in patches, and good agricultural land is mixed irregularly with land whose highest use is for forest purposes. The mountain zone consists largely of barren, rocky crests or of high steep slopes supporting a meager and unmerchantable growth of timber. But a belt of merchantable timber lies on the slopes along each of the main streams, the growth consisting of large-size Douglas fir, hemlock, cedar, and other conifers. Lowland belts formed largely of agricultural land extend into the mountain zone along certain of the main valleys.

A large portion of the lowland zone (on the west side of the area) is under cultivation; dairy farming is a thriving industry and a number of good-sized towns have grown up. The lowland zone extends along the full length of Puget Sound and is typical of the settled agricultural territory bordering the main waterways of the North Pacific coast. Most of the mountain zone, on the other hand, consists of wild lands, the main industry here—so far as it has developed—being lumbering. Some of the mountain valleys in the Cascade-Puget Sound area have had sporadic mining booms, but the locality is now considered as containing only meager quantities of mineral wealth. The mountain zone in this area (aside from its absence of minerals) is typical of the whole flank of the Cascade Range throughout both Washington and Oregon.

Land in the *lowland zone* is useful, for the most part, for farming purposes; but most of the productive land in the mountain zone is chiefly useful for forest purposes. There are, however, extensive

portions of the lowland zone (much of the "logged-off country") which are not sufficiently fertile for profitable farming, and should be reforested. On the other hand there are a number of thousand acres in the low valleys of the mountain zone which are fertile and level enough for profitable farming, most of these occurring within the lowland belts shown on map 9. A meager agricultural settlement has grown up in these belts, especially along the valley of the North Fork of the Stilaguamish River. The settlement here is the direct result of the opening of the valley by the railroad, a branch of the Northern Pacific that extends between the present towns of Arlington and Darrington. This road was built to tap the timber of the valley, and several thousand acres of heavy growth have already been cut off bordering the main streams. The placing on a stabilized basis of the future forest development of the valleys and slopes here described would aid in the permanent employment and settlement, not only of the people engaged in the forest industry, but of those engaged in farming as well.

(c) Division of forest land into "working units."

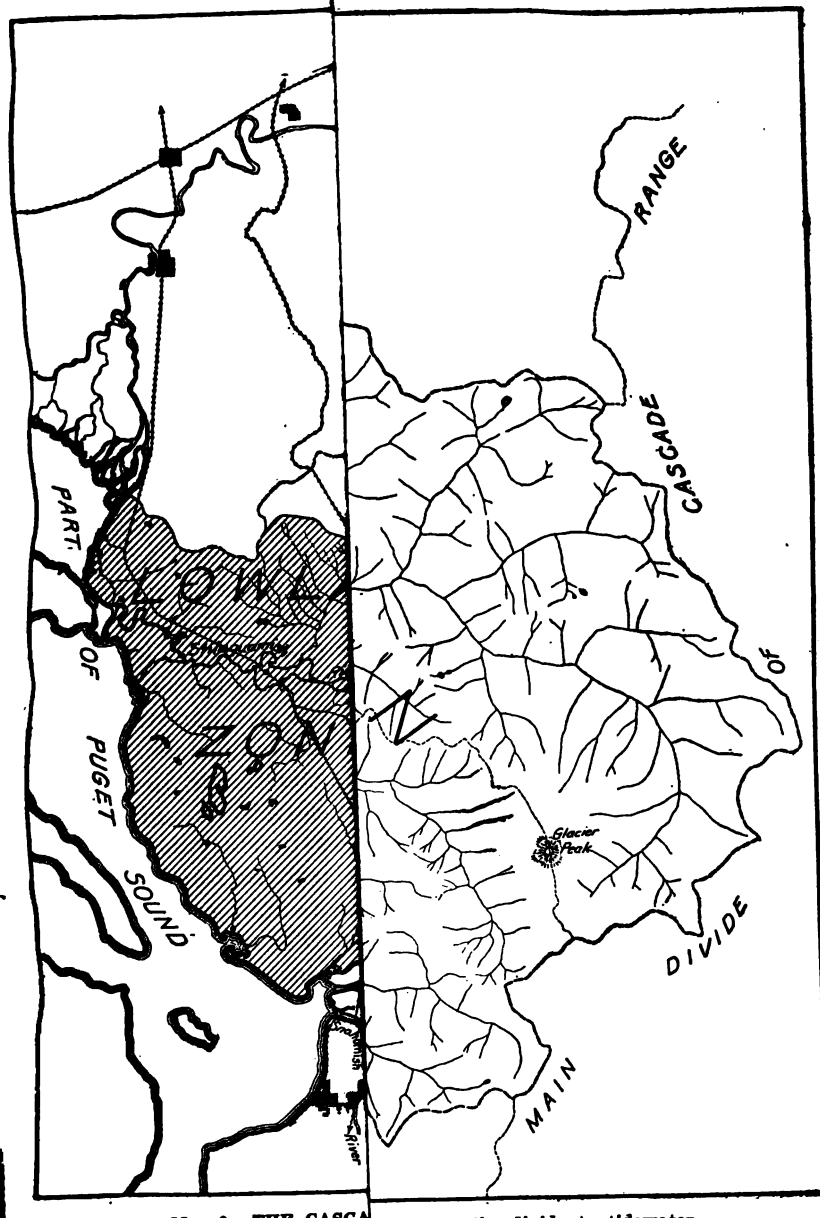
What foresters mean by the "working circle," or the "working unit," has been explained in section 9 (*b*)—it is the area within whose radius an annual cut of timber is continuously maintained. It is therefore the area within which a forest community can be continuously maintained. A primal question, then, in the management of forest land for settlement purposes, is that of laying out the working units. This problem is illustrated, in the case of the Cascade-Puget Sound area, on map 10 (facing p. 136).

The "mountain zone," or permanent forest portion of the area covers 878,000 acres. This extensive acreage occurs throughout several somewhat independent mountain valleys. It would be unwise, therefore, to treat this whole territory as a single working unit. As already explained in section 9 (*b*) the working unit should be of such size as to require the fewest possible relocations of the logging community during the rotation. In accordance with this principle, the mountain or forest zone is here divided into four working units. These, as shown on map 10, are delimited as follows:

(1) *Stilaguamish unit*, including the drainage system of Pilchuck, Deer, and Jim Creeks, and of the lower half of North Fork.

(2) *South Fork unit*, including the drainage systems of South Fork (inside the mountain zone) and of one of the headwater branches of the Sauk River in the vicinity of Monte Cristo. This includes all land and timber tributary to the Monte Cristo branch of the Northern Pacific Railroad above Granite Falls.

(3) *Darrington unit*, including the drainage systems of the upper North Fork and of the upper Sauk (except that of the headwater branch at Monte Cristo).



Map 9.—THE CASCA lope from the divide to tidewater.

(4) *Suiattle unit*, including the drainage systems of the Suiattle River and of the lower course of the Sauk River.

In all of these units there occur portions of the lowland belts, so that agriculture would form a secondary industry in each unit.

(d) **Working units and national forests.**

Map 11 (facing p. 138) shows the territory within the Cascade-Puget Sound area which is included in national forests. This territory (shaded on the map) covers nearly two-thirds of the whole area and about three-fourths of the mountain (or forest) zone. Two national forests are here represented—the Washington and the Snoqualmie.

The relation of the working units to the national forests is thus shown very distinctly. Only a small portion (22 per cent) of the Stilaguamish unit is within national forest boundaries—this portion being on the headwaters of Deer Creek in the Washington forest. The Darrington unit, on the other hand, is almost wholly (i. e., 90 per cent) within national forest boundaries, the remaining 10 per cent being included in the lowland belt along the North Fork and the Sauk River. Seventy-five per cent of the South Fork working unit is in the Snoqualmie National Forest and 83 per cent of the Suiattle unit is in the Washington Forest.

Not all of the land within national forest boundaries is owned by the United States Government. There is usually a belt of land along each of the main streams in each forest which has gone into private hands through the homestead, timber and stone, or other laws. These lands often contain some of the best timber in the forests. Scattered sections of State lands also occur through the forests. In the Rocky Mountain and Pacific States the alienated lands of these various kinds occupy about one-eighth (12.3 per cent) of the area within national forest boundaries. The percentage of this alienated national forest land is highest (21.7 per cent) in California, and is lowest (3.6 per cent) in Wyoming. In Washington it is 14.5 per cent and in Oregon 15 per cent.

Some of the main features of land ownership, as exhibited on the Cascade-Puget Sound area, are shown on map 12 (facing p. 140). The portions of the area which have been surveyed by the United States Land Office are indicated by the township and section lines. These portions cover more than half of the whole area. Most of the land on the western third of the area is privately owned. Within the national forest boundaries most of the land is unsurveyed, and, with the exception of some mining claims and "forest homestead" entries, this unsurveyed land belongs to the Government. No railroad grants occur on the area. The State of Washington owns many pieces scattered throughout the surveyed portions; these pieces consist chiefly of "school lands," sections 16 and 36. Many of the school lands

have been sold by the State and are now in private ownership. In each of the working units, therefore, the bulk of the land outside of the national forest boundaries is privately owned.

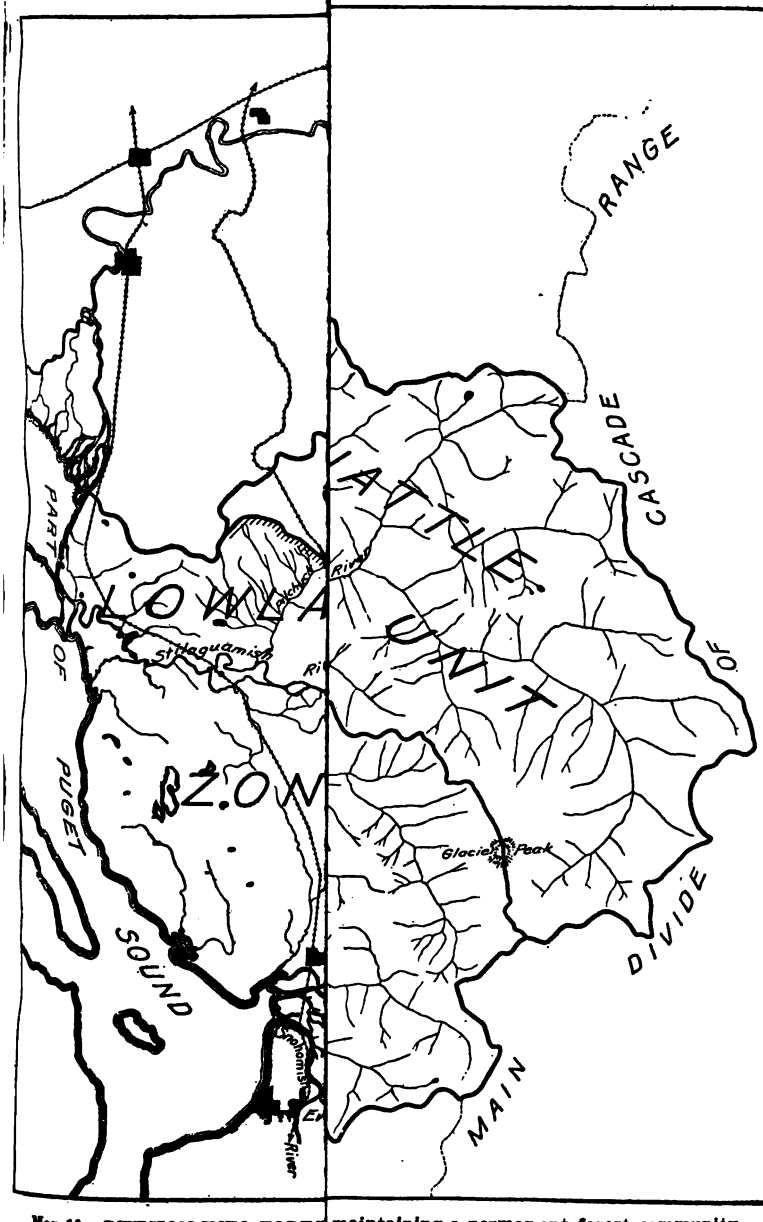
(e) The Darrington working unit.

The Darrington working unit will here be used to illustrate the problems of forest settlement on the North Pacific coast. No special survey has been made nor has any working unit been actually established. Such descriptions as are made apply to the more general features, and the figures given are only approximate. No plans are contemplated by the Government as to the actual development of this unit.

The Darrington unit is indicated separately on map 13 (facing p. 142). It has a total area of over 310,000 acres. Of this, nearly 200,000 acres consist of barren mountain summits, ice caps, and alpine timberland. The latter supports a timber growth for the most part unreachable and unmerchantable, which, however, must be protected from fire along with the productive forest of the lower altitudes. This whole area above the productive timber line may be called the "alpine or protection belt." The lowland belt, as already stated, enters the Darrington unit along the valley made by the North Fork and the Sauk River, and that part of the belt within the unit covers 20,255 acres. Between the lowland and alpine belts there occurs the productive forest area which occupies the remainder of the working unit, or 92,600 acres. Portions of this area have been burned over, a few portions have been logged off, but most of it is covered by virgin forest whose meager growth is about offset by decay.

That portion of the Darrington working unit occupied by the lowland belt (or the Darrington Valley) is practically all outside of the national-forest boundaries. It is shown on map 12 in heavy shading. This area includes the bulk of the potential agricultural lands within the unit. Many of these lands are still covered by heavy timber; others are logged off but are still in stumps; only a few hundred acres have been actually cultivated. This area, therefore, should be segregated from the forest working unit proper and established as an agricultural settlement district. The handling of this district will be considered below—in heading (h) of this section.

Alienated lands in the Darrington working unit (both within and outside of national forest boundaries) are shown on map 12 in medium shading. Most of these are privately owned and lie along the upper Sauk River and around the edges of the segregated settlement district just described. A few sections of State land occur also here and there. At the extreme north end of the unit there occurs a small piece of United States public land, which was not included in the lands reserved for national forest purposes. The total area of these alienated and unreserved lands is about 19,500 acres, or 21 per cent



Map 10.—DIVISION INTO FORES maintaining a permanent forest community.

of the 92,600 acres which form the productive forest area of the working unit.

In case the Darrington working unit were to be actually established the first task would be to get under consolidated control by the Federal Government all of the lands within such unit. It has long been suggested that the Government should purchase the private forest lands within and adjacent to the exterior boundaries of the national forests, or else that some form of cooperation should be secured between the Government and the private owners on a basis satisfactory to both. As already stated a cooperative arrangement might be made with the owners whereby they would receive each year a part of the net returns from the operation of the whole working unit, such part being in proportion to the amount of the timber owned by them as compared with the total amount of timber on the unit.

The few State lands included in the Darrington working unit could be exchanged for land of equal area and value outside the national forests. The establishment of State forest land in large solid blocks in lieu of the school lands (secs. 16 and 36) scattered through the different national forests, has already been undertaken for the whole State of Washington, as well as for other western States. The few sections of unreserved public land (at the extreme north end of the unit) could not at present be included in a national forest by presidential proclamation, but could be included by act of Congress.

The methods here outlined for consolidating the control of forest land on the Darrington unit would apply also to the other working units described. On the Darrington and Suiattle units, and possibly on the South Fork, the plan of outright purchase of intervening private lands might be feasible. On a unit like the Stilaguamish, however, where more than half of the area is in private holdings, the alternative method above mentioned, that of cooperative control, might be the more practicable.

Speaking on the subject of cooperation between the public and private timberland owners, Col. Graves says:[1]

> It is possible that where public and private lands are intermingled and economically interrelated, as in the west, a still more far-reaching principle may be desirable; one that would coordinate all forest lands within economic groups so that they can be developed in a way best to meet the needs of the country and the communities. It has already been found necessary to coordinate and handle jointly all forest lands, regardless of ownership, with respect to protection from forest fires. * * * At the present time the mixed character of ownership tends to prevent an orderly development that builds up and sustains communities.

But whatever legal methods may be worked out, the policy here suggested is the very necessary one of integrating conflicting interests in the management of national resources. Though this policy

[1] Address before the American Lumber Congress, Chicago, Apr. 16, 1919.

has long been advocated, the ideas which have been most loudly voiced, with respect to the national forests, embody the very opposite policy. Strong pressure seems ever to be working within Congress and outside to have the forests "thrown open to entry" so that they will be divided into private holdings. Clever means and plausible excuses are devised for honeycombing still further the Nation's property in these forests. This policy is not only propounded but is being insidiously applied. It is a policy not of integration but of disintegration.

(f) A survey and plan for each working unit.

After a forest working unit has been located and tentative arrangements made for bringing it under consolidated control, a detailed working plan, based upon an adequate survey, should be made for the unit's development.

The survey referred to should apply both to the forest unit *itself* with its supply of timber, and also to the possibilities of marketing the timber products therefrom. The chief classes of data to be obtained in an adequate forest survey of this kind are the following:

1. The location, acreage, topography, and general physical character of the working unit.

2. The stand of timber (M feet b. m.) and of wood (cords), and the quality and condition thereof, on the various parts of the working unit.

3. The distribution of forest age classes, with estimate of the actual annual growth in each.

4. The presumable potential growth per acre per annum of timber and wood on the various soils and slopes.

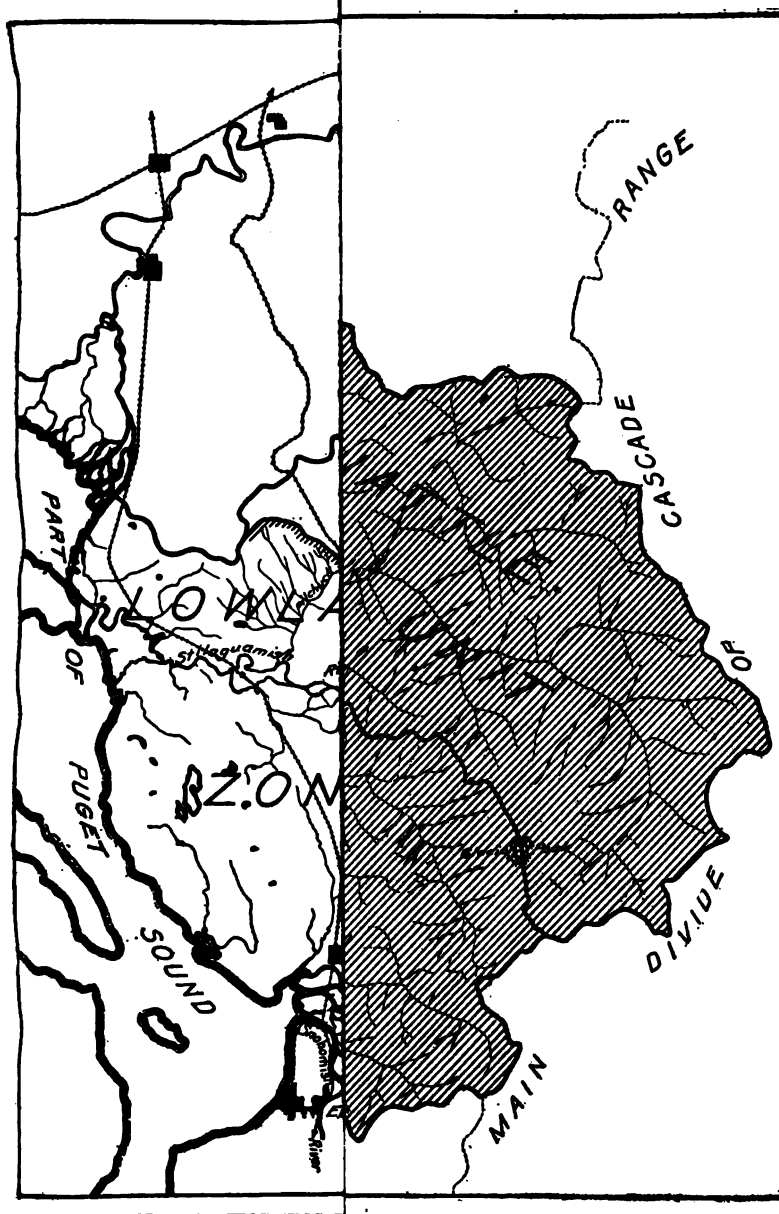
5. The degree of fertility of soils on the bottom lands which might have agricultural possibilities, and which should be tentatively segregated for the purpose of making an intensive agricultural survey.

6. The possibilities of securing a steady market for the timber and forest products of each working unit, with special reference to domestic and local consumption of such products, to the demand for pulp and paper, and to the possibilities of utilizing as a market the needs for timber of the United States Government.

7. The average wages paid in local timber operations and in other local occupations, and the average cost of living applicable to the locality.

8. The possibilities of logging and operating the working unit, with the costs involved; and the yearly return to be expected from the sale of (*a*) standing timber, (*b*) logs at the sawmill, and (*c*) lumber and other manufactured forest products ready for shipment.

9. The ownership of the various lots and holdings within the working unit, and the amount and value of the standing timber on each.



Map 11.—WORKING List all of these consisting of United urth unit.

Upon the basis of data of the classes here indicated, a working plan, including a market plan, can be made for equipping and operating each forest unit. This plan should, of course, provide for the application of the principles discussed in section 9—of continuous timber yield, of permanent employment, and stability of community life. The main points to be covered in such a plan include the following:

1. Recommendation of permanent boundaries of the forest working unit to be finally established. Suggested procedure for obtaining control of the lands within such boundaries—including the reservation or setting aside of Federal lands for the particular purpose, the exchange of State lands, and the purchase or cooperative control of private holdings. Statement of values and costs involved.

2. Recommendation as to the segregation of agricultural lands which might be formed into a "settlement district."

3. Suggested procedure in establishing a market for the annual output of timber and wood expected from the unit, including details as to sales to be made to the War and Navy Departments, the Railroad Administration, and other branches of the United States Government, to local municipalities, to local wood users for domestic purposes, to the pulp and paper industry, to local wood-using industries, and to consumers generally. Statement of costs and returns to be expected.

4. Statement of annual output of lumber and other products which can be supplied and marketed from the working unit or tract from year to year.

5. Location of, and specifications for, all plant and equipment necessary for cutting and delivering the annual output, including sawmills, logging railroads, stream improvements, landings, etc., together with the necessary rolling stock, machinery, and supplies; estimate of costs.

6. Location of, and specifications for, the sawmill and logging communities to be immediately established.

7. General program of cuttings and operations suggested for the first rotation (or forest generation), together with the several locations of the logging units.

8. Specific program of cuttings and operations suggested for the first 10 years.

9. Location of, and specifications for, the cuttings and operations to be conducted, in conformity with the programs just mentioned, during the first year.

10. Recommendation as to wage scales to be offered for the various kinds of work.

11. Statement of the number of workers and families provided for in the project.

12. Itemized statement of yearly costs and returns, and provision made for payment to the State, in lieu of local taxes, of a fair proportion of net receipts.

The survey and working plan when once formulated for the forest unit along the lines suggested should be submitted for approval to the proper authorities, and upon approval thereby steps should be taken accordingly to put the plan into effect.

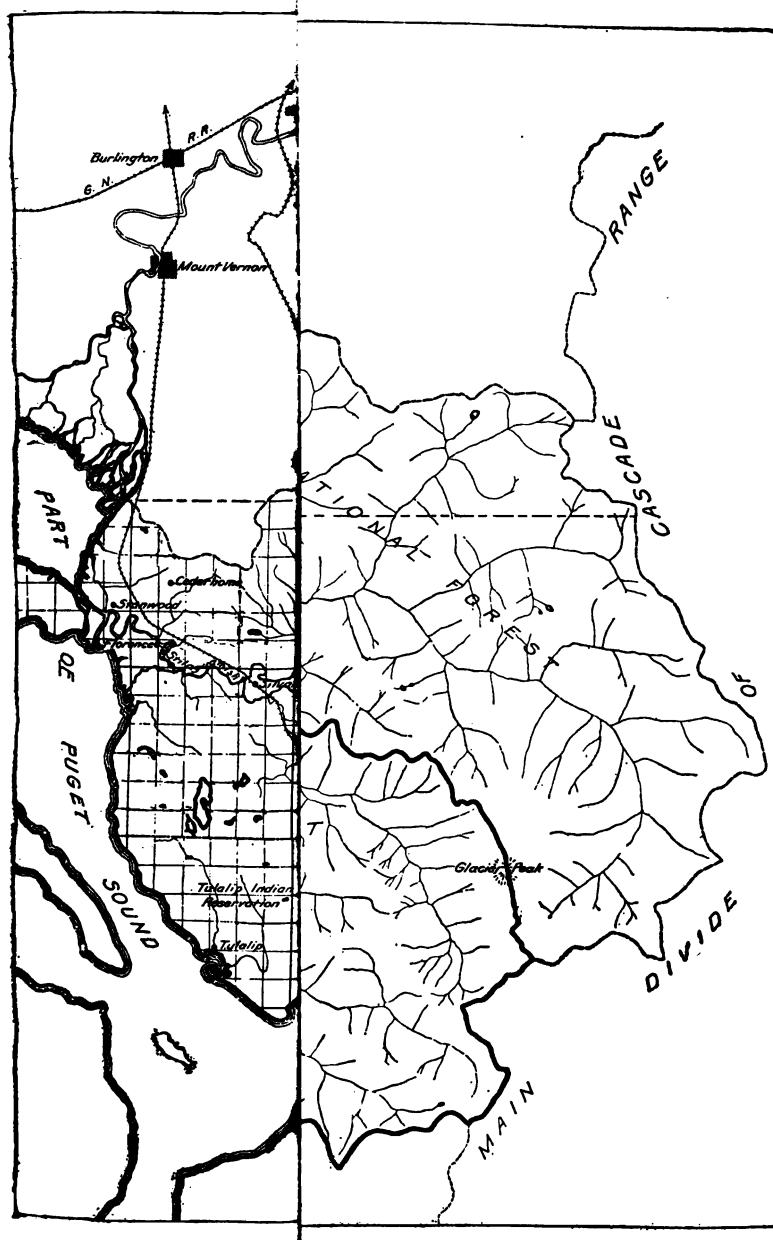
(g) Development of the working unit illustrated in the Darrington project.

It is here assumed that the Darrington working unit has been established within the boundaries which have been indicated on the several maps, and that all alienated lands have been obtained by the Government so that the latter holds full control over the whole area. That portion designated as "Darrington Valley" is considered as being segregated for purposes of agricultural settlement. It will be assumed also that an adequate market has been found for the total annual timber yield of the tract.

The development of the Darrington working unit is concerned principally with the productive forest belt described above in heading (e). The protection forests of the "alpine belt," on the upper mountain slopes, must be preserved against fire; and the farming land in the "lowland belt" (or Darrington Valley) will be handled on its own account. The *productive forest belt* is shown on map 13 (facing p. 142), being indicated by the several grades of shading. As already stated, this belt covers 92,600 acres. It can be operated by a system of logging railroads over which the logs could be hauled to a central point and sawed into lumber.

The most convenient point for this purpose would probably be the present site of the village of Darrington, on the Sauk River, at the eastern end of "Darrington Valley." Pondage facilities for the storage of logs and ample area for a lumber yard could be made available on the south side of this village. From this point the lumber could be shipped out on the Darrington branch of the Northern Pacific. Darrington, then, would be the central headquarters for the whole tract, being the site of the sawmill and the community supported thereby. By handling the working unit on a sustained yield basis the sawmill community could remain on the one site indefinitely.

The logging community would have to be relocated several times during the rotation, as the headquarters of the logging operation had to be moved from one part of the tract to another. From each headquarters there would be a limiting radius within which daily trips could be made by the workers while the intervening area was being cut over. The timber area which could thus be reached from a single headquarters is here referred to as a "cutting block."



Map 12.—SOM "alienated") and of other lands

To operate the full area of the productive forest belt on the Darrington unit it is estimated that it would have to be divided into six cutting blocks. These are shown on map 13 by the distinctive shadings. Each block is there named and the headquarters indicated. A plot one mile long, running lengthwise of the valley, is allowed at each headquarters as the location of the logging community. Each worker and his family could then have a separate house and the use of sufficient land to make a garden. The community at all times should be organized along the lines already discussed in section 9 (*c*). The same holds true, of course, for the sawmill community at Darrington.

Logging railroads from the sawmill at Darrington to the various cutting blocks could be built. The average rail haul for the whole tract would be about 10 miles, the maximum haul 30 miles. As each section of railroad is built a permanent grade should be made, and also permanent bridges; but the steel could be removed after a valley had been worked over, and used for the next logging unit. The railroad grades, when not occupied by trackage, might be used for automobile roads. The whole tract at all times should, of course, be well protected from fire, and so all possible facilities should be afforded for rapid transportation.

The first cutting block to be operated would be the Darrington, with headquarters at the village of the same name. During the period in which this block was being cut over the logging community would have the same location as the sawmill community and could for the time be merged therewith. From this location logging railroads up the various valleys would be laid out, and by means of the transportation thus provided it would be possible for the men each day to reach and work any part of the Darrington cutting block. The average working distance would be about 6 miles and the maximum distance 11 miles.

The approximate working distances (average and maximum) from the headquarters of each block, together with the acreage of each block, are as follows:

Block.	Average working distance.	Maximum working distance.	Area.
	Miles.	*Miles.*	*Acres.*
Darrington	6.0	11.0	26,285
Upper Sauk	3.5	8.5	14,435
Red Mountain	3.0	9.0	12,105
Whitechuck	3.0	7.0	10,900
North Mountain	3.25	7.0	14,705
Fortson	4.0	9.0	14,170
Total			92,600

In cutting over these blocks the logging community would h to be relocated, of course, several times. Some 10 or 15 y would be needed to work over the whole of the Darrington cut block and get out the mature timber thereon. After this period logging community would move to the Upper Sauk block and rem for several years. The next move would probably be to the I Mountain block, then to the Whitechuck block, and then to the N Mountain and Fortson blocks. The two last would doubtless worked simultaneously, about half of the total yearly cut com from one and half from the other. During this period, therefo the workers would be separated into two communities, one of th having headquarters at the village of Fortson in the Darringt Valley, and the other on the upper North Fork as shown on the ma

Altogether, therefore, five different locations of the logging com munity would be required in order to cut over the whole workin unit. It is likely that this first cutting, being limited to the remova of the mature and merchantable stuff, would take about 50 years; i so the average period spent by the logging community on each cut ting block would be 10 years. When the whole of the working uni had been cut over—at the end of the 50 years—the young growth left in the first cutting would be mature and a second series of cuttings could be started.

(h) Agricultural settlement within the forest working unit.

Agricultural settlement within national forests is at present carried on under the homestead system, and with most of the drawbacks of that system. The "Forest Homestead Act" of June 11, 1906, provides that areas of land found by examination to be presumably best suited for agricultural purposes shall be "listed for entry"—that is, offered for disposal under the regular homesteading terms applying on lands outside the national forests. Under this law many farms have been taken up along the valleys and the "shoe string meadows" within the forests.

Considerable dissatisfaction has resulted from this system. The farms taken are isolated from one another and the settler must usually clear his land of stumps and build his farm under the typical single-handed methods of the pioneer of 50 years ago. Although in many cases, where conditions have happened to be favorable, satisfactory homes have been located on the "June 11 claims," they are too often the cause of friction between prospective settlers and administrative officers. With the agricultural lands inside the national forests, as with those outside, the homesteading system with its perverted individualism should be replaced by colonization.

Methods for doing this are illustrated in the Darrington Valley, the segregation of which as an agricultural settlement district has already

been referred to (p. 136). Agricultural districts equivalent to this might be segregated in the lowland belts within each of the other working units shown on the Cascade-Puget Sound area. Indeed agricultural settlement and forest settlement would normally proceed side by side, under a rational system of land settlement, in any western mountain region like the one here represented.

The proposed Darrington agricultural settlement district is shown separately on map 14 (facing p. 144), covering an area of 20,255 acres along the North Fork and the Sauk Rivers. It is traversed, as already stated, by the Darrington Branch of the Northern Pacific Railroad. The timber on more than two-thirds of this area has been cut off and the logs hauled out on the railroad to sawmills on Puget Sound or in the immediate valley. The rest of the area still supports a heavy stand of Douglas fir, western hemlock, cedar, and other woods. About 340 acres of the logged-off land have already been turned into cultivated land, much of which has been settled for many years. This land is now divided between 55 families, the average "farm" thus having six acres. The agricultural population is approximately 135, or between two and three to the average family. One lone bachelor in a log cabin often constitutes a "family." Many of the settlers are married, however, and most of them work for a portion of the year on some logging operations in the neighborhood.

The distribution of the timbered, the logged-off, and the actual cultivated land is shown on map 14. Several logging companies are at work cutting off the timber. The general locations of these operations are indicated by the logging spurs leading off the Northern Pacific track. Sawmills are located at Darrington and Fortson; at each of these places there is also a shingle mill, and one is located at Hazel. Most of the timber is mature or overmature and at the present rate of cutting will last 15 or 20 years. About 4 per cent of the district's area consists of cultivated land, and of land within village limits; about 33 per cent is timbered land, and 63 per cent logged off.

The land within the Darrington district is divided among quite a number of owners. All but 1,500 acres of the land is privately owned, 960 acres belonging to the State and 540 acres to the Federal Government. The owners have been classified into three groups. The first group consists of the Federal Government (with 540 acres), the State (with 960 acres) and one big timber company (with about 3,500 acres). Hence this group of holders owns 5,000 acres or about one-fourth of the total area of the district. Another quarter of the area is owned by six holders, including timber and land companies. The remaining land (nearly half the total area) is owned by 75 holders, mostly individuals having lots from 40 to 160 acres. The lo-

cation of the land held by owners within each group is shown on map 15.

The procedure in the survey and development of the Darrington settlement district would be similar to that already described in section 15 in connection with agricultural settlement in Canada. Different physical problems would of course be met—especially with respect to the stumps which would have to be blown out or otherwise extracted from the land.

One of the first big tasks, in the case of the Darrington district, would be to determine the land which, in view of its inherent fertility, its location, and the cost involved in clearing it of stumps, would make profitable agricultural land in accordance with the principles discussed in Chapter II. The remaining area would make good land for growing timber. Most of the potential farming areas would be on the bottomland immediately along the main river courses, as well as on some of the "first bench" land. Probably most of the "second bench" land—and that around the edges of the district—would be potentially more valuable for forestry.

At least half of the district's area would probably be found to be chiefly useful for forest purposes; part of this would be land now timbered and part land at present logged-off. All of it of course should, sooner or later, be reforested. Thus a strip around the edges of the district might eventually be transferred to the status of the adjoining national forest land and added to the forest working unit above described. Supposing half of the Darrington district to be so transferred, the productive timber acreage of the Darrington forest unit would be increased from 92,600 to about 103,000; and the final area of the Darrington agricultural district would be reduced from 20,255 acres to a narrow strip covering about 10,000 acres.

Projects of these two kinds in the Darrington locality—one for forest settlement and the other for agricultural settlement—could be repeated in any number of western mountain valleys. Each of such projects should, as far as possible, be carefully worked out in close cooperation with the other. Many of the workers in a permanent sawmill at Darrington might be able to live on small farms or "two-acre homesteads" in Darrington Valley and make part of their livelihood thereon. On the other hand, a certain amount of winter employment might be provided for the settlers by means of the mill ing operations at Darrington and the logging operations on th working unit. In this way forestry and agriculture in a given local ity would be made to supplement each other, and a series of join projects could be developed which would offer opportunities for com bined employment in these great land industries.

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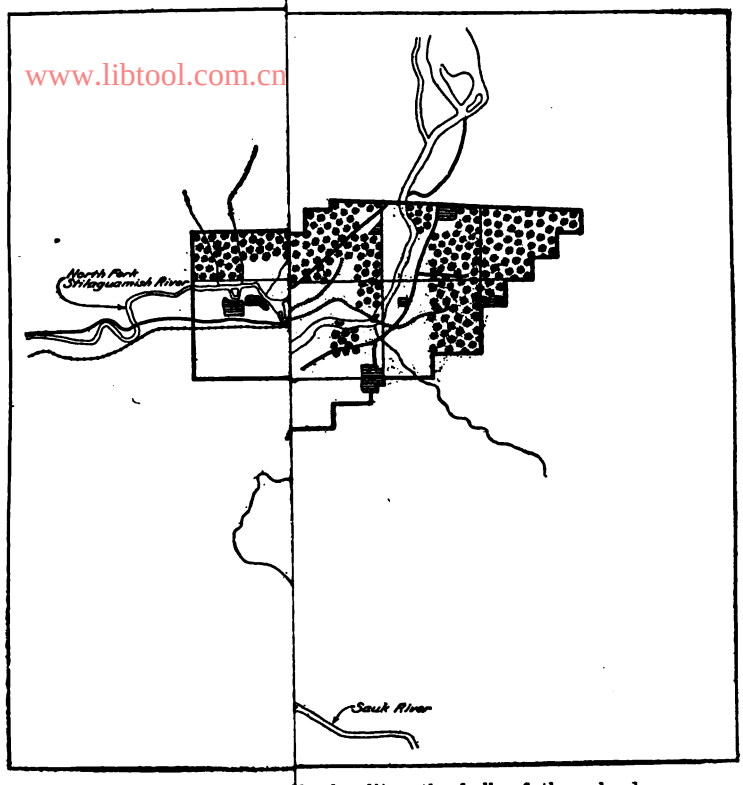

Map 14.—A POSSIBLE the locality; the bulk of these lands