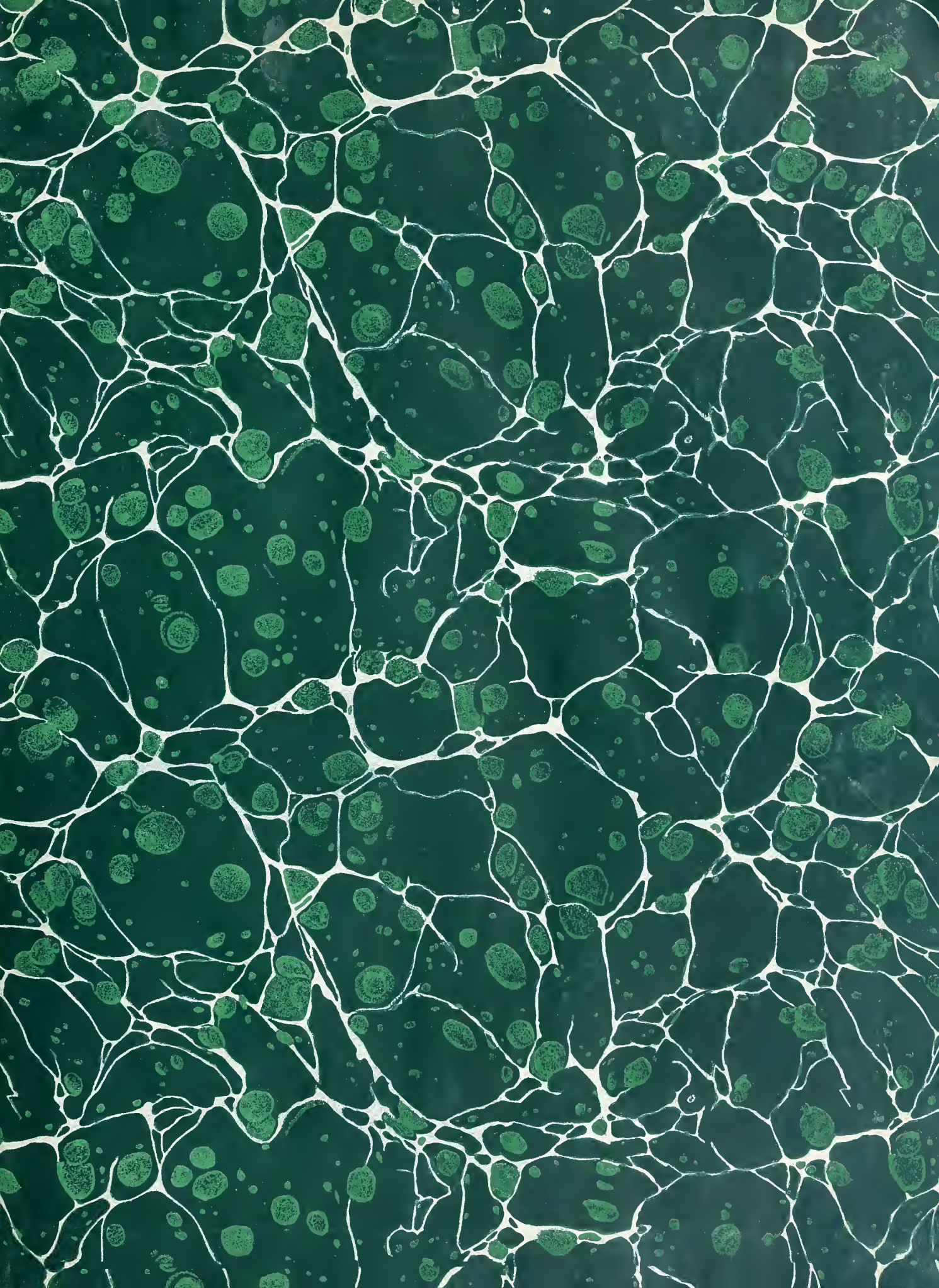

UNITED STATES DEPARTMENT OF AGRICULTURE
MISCELLANEOUS PUBLICATION No. 205

WASHINGTON, D.C. ★ JANUARY 1935

ECONOMIC AND SOCIAL PROBLEMS AND CONDITIONS OF THE SOUTHERN APPALACHIANS

By

The Bureau of Agricultural Economics
Bureau of Home Economics, and Forest Service

In cooperation with the

Office of Education, United States Department of Interior
and the Agricultural Experiment Stations of
Tennessee, Virginia, West Virginia, and Kentucky

UNITED STATES
GOVERNMENT PRINTING OFFICE
WASHINGTON : 1935

For sale by the Superintendent of Documents, Washington, D.C. - - - - - - - - - - - - - - - - Price 50 cents

ACKNOWLEDGMENTS

This study had its origin in the desire of a number of agencies interested in the welfare of the people of the Southern Appalachians for a comprehensive survey of present economic and social conditions and tendencies in that region. Such a survey, it was felt, was essential to provide the various agencies with a basis for planning their programs.

The situation and the need was clearly recognized by numerous agencies, including, among others, the Conference of Southern Mountain Workers, the Home Missions Council, the Council of Women for Home Missions, the Federal Council of the Churches of Christ in America, the Community Church Workers, and the Institute of Social and Religious Research.

One approach to a solution of this common problem was a survey of the southern mountain region which the Institute of Social and Religious Research undertook, under the direction of Elizabeth R. Hooker (*21*)[1] at the request of the joint committee on comity and the five-year program, representing the Home Missions Council, the Council of Women for Home Missions, the Federal Council of the Churches of Christ in America, and the Community Church Workers.

At the solicitation of representatives of the interested agencies, the present study was undertaken. A series of conferences were participated in by a number of the State colleges and experiment stations in States embracing portions of the Southern Appalachians, several bureaus of the United States Department of Agriculture, and other agencies, for the purpose of initiating a comprehensive economic and social study of the region. The first of this series of conferences was held at the Russell Sage Foundation in New York on November 25, 1929. Through these conferences a decision was reached to plan a survey of the Southern Appalachians and a general committee was formed for that purpose.

GENERAL COMMITTEE

Thomas R. Cooper, chairman, Kentucky Agricultural Experiment Station, Lexington, Ky.
Helen H. Dingman, secretary, Conference of Southern Mountain Workers, Berea College, Berea, Ky.
Mrs. John C. Campbell, John C. Campbell Folk School, Brasstown, N.C.
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Tennessee Agricultural Experiment Station, C. A. Mooers, Director.
Virginia Agricultural Experiment Station, A. W. Drinkard, Jr., Director.
West Virginia Agricultural Experiment Station, F. D. Fromme, Director.
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    Division of Farm Management and Costs, C. L. Holmes, in charge.
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    Service Division, Lewis R. Alderman, chief.

The Institute of Social and Religious Research, through Elizabeth R. Hooker, director, southern mountain study, and the American Library Association, through Tommie Dora Barker, regional field agent for the South, also contributed technical assistance in the preparation of the manuscript.

On request of the general committee, L. C. Gray, in charge, Division of Land Economics, became director of the study. C. F. Clayton, senior agricultural economist, also in the Division of Land Economics, became associate director of the study.

A number of technical committees were formed to plan, in cooperation with the directors, various phases of the study. The chairmen of the committees were made responsible for the segment of the study covered by their respective committees. These committees were as follows:

TECHNICAL COMMITTEES

Land utilization: chairman, C. F. Clayton, Division of Land Economics, Bureau of Agricultural Economics.
Farm organization and management: chairman, H. W. Hawthorne, Division of Farm Management and Costs, Bureau of Agricultural Economics.
Markets, transportation, manufactures, and occupations: chairman, H. Bruce Price, Department of Marketing and Rural Finance, University of Kentucky.
Public finance and farm taxes: chairman, Bushrod W. Allin, Division of Agricultural Finance, Bureau of Agricultural Economics.
Schools and education: chairman, W. H. Gaumnitz, Service Division, Office of Education.
Population distribution and changes: chairman, T. B. Manny, Division of Farm Population and Rural Life, Bureau of Agricultural Economics.
Variations in farm family living: chairman, Faith M. Williams, Economics Division, Bureau of Home Economics.
Social conditions and social organizations: chairman, W. E. Garnett, Department of Rural Sociology, Virginia Agricultural Experiment Station.
The church situation: chairman, Elizabeth R. Hooker, Institute of Social and Religious Research.

The following persons, representing the cooperating agencies, served on one or more of the technical committees and participated in the formulation of plans for the study: L. R. Alderman, C. E. Allred, Roy A. Ballinger, A. J. Dadisman, Statie E. Erickson, J. C. McAmis, W. D. Nicholls, Merton Oyler, G. B. Shively, H. N. Young.

The services of a number of persons in the Bureau of Agricultural Economics merit special mention.

L. J. Peet, Division of Land Economics, carried the chief responsibility for checking, organizing, and systematically arranging the materials prepared and submitted by the various contributors to the publication.

Special acknowledgment is also due R. G. Hainsworth, in charge, Graphics Section, who planned and supervised the preparation of the graphic material.

The topographic map of the Southern Appalachians was prepared especially for this publication by F. J. Marschner, Division of Land Economics.

J. Clyde Marquis, in charge, Division of Economic Information contributed valuable criticisms and suggestions with respect to the preparation and arrangements of materials.

[1] Italic numbers in parentheses refer to Literature Cited, p. 183.

UNITED STATES DEPARTMENT OF AGRICULTURE
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INTRODUCTION

By L. C. Gray, *in charge* and C. F. Clayton, *senior agricultural economist, Division of Land Economics, Bureau of Agricultural Economics*

Physiographically, the Southern Appalachians embrace parts of nine States: Maryland, Virginia, West Virginia, Kentucky, North Carolina, South Carolina, Tennessee, Georgia, and Alabama. (See pocket map.) The area of the region as a whole is 109,500 square miles, or 70,080,000 acres.

The terms "Southern Appalachians" and "the region" are used in the section on physical features and conditions (p. 7) to designate the entire physiographic region of 109,500 square miles, embraced by the Appalachian portions of the nine States. Elsewhere in this publication, except when otherwise stated, the terms will apply to a more restricted geographic unit, namely, the Appalachian portion of six States: Virginia, West Virginia, Kentucky, North Carolina, Tennessee, and Georgia (fig. 4). The Southern Appalachians, in this application of the term, embrace 205 counties within the six States named and have a total area of 55,375,580 acres.

The region is larger by far than any of the six States of which it is a part, and an area equivalent to that of all the New England States combined could be embraced within its boundaries, with nearly 13,000,000 acres to spare. Here is a land area which, if only because of its sheer physical magnitude alone, must challenge our attention.

Many colorful episodes in American history, and manners and customs deeply rooted in American life, derive from this region of mountains, hills, and valleys. The name, Appalachians, itself, excites curiosity, and we are told (p. 7) that it means "those by the sea", and was the name of a southern Indian tribe.

There is a tendency to think of this extensive region as essentially homogeneous and to picture it in terms of some of the romantic works of fiction or impressionistic descriptions which have emphasized the striking features of mountain life and customs.

But specialists who have contributed various sections of this study unite in pointing out that the region is characterized by considerable diversity of conditions and problems. This diversity is a factor of great importance in planning economic and social adjustments for the region.

LIMITATIONS OF STUDY

It would be attributing too much to the present study to represent that it provides more than a preliminary basis for economic and social planning in the various subregions. The study does provide information as to the historical development of the major economic and social conditions and problems which now characterize the region, and the graphical materials, together with the discussions in the text, reveal the important problems of adjustment which at present confront the people of the region.

If the reader expects to find in this publication definite programs of adjustment, with a corresponding formulation of the procedure appropriate to give effect to these programs, he will be disappointed. The limitation does not arise from a failure to recognize that the essential objectives of economic and social planning can be realized only by supplementing a presentation of problems and conditions with programs and procedure designed to effect improvements. In planning the study, however, it was recognized that the end product of the investigation could not go beyond the limits set by the methods and character of the material employed. For the most part the presentation and analysis of conditions and problems were restricted by the extent and character of published data. A limited amount of field work was undertaken in connection with the sections on schools and churches, but in other sections of the publication all of the data, and in the two sections mentioned a large part of the data, were assembled without special field investigations.

As a constructive contribution to the development of planning programs for the region, this study derives its chief merit from the fact that it brings together, organizes, and presents graphically a large volume of information from a variety of sources, showing the economic and social contrasts in various parts of the region and the important trends that should be recognized in the development of a regional program.

Although the method and procedure contribute to an understanding of the problems and conditions that characterize the region, actual planning demands consideration of numerous other factors which do not come within the range of the data of this study. To be sure, much can be done to improve conditions of life in the mountains without undertaking fundamental changes. Much progress has been made through the influence of education in disseminating more intelligent methods of utilizing the resources available to the more backward portions of the region; and much credit is due to the numerous agencies, public and philanthropic, that have striven to ameliorate the conditions of life among the poorer classes of the mountain population.

NEED FOR PROGRAM OF LAND UTILIZATION

The basic problems of the region, however, grow out of maladjustments in land use and in the relation of population to land. Tangible adjustments in the utilization of the land cannot be effected unless there is a planning agency vested with powers and resources sufficient to cope with actual problems. Land is preeminently a type of property which is little subject to direct regulation by the Federal Government, and yet the utilization of land is of great national concern.

This fact is especially manifest in the interrelations between agriculture as an industry and other industries, as well as in the internal economy of agriculture itself. It has been found necessary, as an emergency program, for the Federal Government to introduce measures designed to limit the production of certain basic crops by reducing the acreage in those crops and by regulating the type of agricultural use to which the lands might be devoted.

But as a long-time measure it is recognized that the farm as a whole should be considered as a type of land use that is alternative to other major uses. This provides an economic basis and justification for a national program of land utilization which will have as its major objective the regulation of agricultural production by effecting shifts in the major uses of land, as well as effecting desirable adjustments in standards of living, structure and cost of local government, and conservation of soil, timber, and wild-life resources. In many types of farming areas there are numerous farms in which much of the land under cultivation is unsuited to the particular use and, in many instances, the land is wholly unadapted to agriculture. Any program of agricultural adjustment designed to deal with situations of this type on a national scale must clearly operate through a national administrative organization, adequately financed, and vested with the authority necessary to enter into appropriate cooperative arrangements with State agencies to develop practicable measures for eliminating these farms, relocating the families occupying them, and providing for the proper utilization of the land.

It is clear that a program of this character and scope involves broad questions of public policy, and of administrative organization and procedure, and introduces considerations of Federal-State relationships, both of a jurisdictional and administrative character. The mere suggestion of the character of the problems involved in the development of a comprehensive plan of land utilization and the associated economic and social adjustments demonstrates that much is required for that purpose beyond a presentation of conditions and a statement of the general character of the adjustments needed.

A large part of the investigational work on problems of land utilization has hitherto failed to recognize clearly that the mere presentation of conditions and problems does not provide an adequate basis for their solution. Much of this investigational work has been predicated on a widely accepted assumption, implicit in much of our economic theory, that men will be willing and able to behave economically provided they are presented with facts which demonstrate what is economical. It is not at all astonishing that adjustments projected in this abstract way have for the most part failed to materialize. In our present-day thinking we have apparently passed beyond the stage of attempting to give effect to agricultural policies by catering merely to the self-interest of the individual farmer in the expectation that his responses will achieve the social results desired. There is little question that such a shift in emphasis is inevitable, if a rational utilization of our agricultural resources and the achievement of an adequate organization of rural life is ever to be achieved.

It follows from the point of view just expressed that the end product of the present study lies beyond such results as might be anticipated merely by placing the informational and analytical data of the study in the hands of informed persons, with the expectation that through them it would ultimately be made available to the people of the region and that actions taken by such persons and by various local administrative agencies would cause appropriate adjustments to be worked out. It is hoped, to be sure, that the material will be found helpful in these ways. Effective solutions of the major land problems of the region, however, can be anticipated only if it be assumed that land utilization is to form the basis of a national agricultural policy and that a national organization will be established with authority competent to give effect to that policy. For such an organization the data of this study should provide a basis for shaping definite programs appropriate to problems and conditions in various subregions and should suggest the procedure necessary to give effect to these programs.[2]

RELATION OF PHYSICAL CONDITIONS TO ECONOMIC AND SOCIAL PROBLEMS

In conformity with this fundamental purpose and justification of the present study an attempt has been made to describe and map land characteristics and other physical resources of the region in as much detail as possible. This procedure had two objects: (1) To show where the resources are as well as what they are, and (2) to make possible a definite association of economic and social problems and conditions with their geographical localization and the physical conditions that underlie them.

Because of the diversity in the physical characteristics of the region and of the important relation of variations in these characteristics to land use and to associated economic and social conditions and tendencies, it will be found extremely helpful to keep the pocket map showing the topography and chief cultural features of the region at hand while reading the various sections of the study. It will also prove helpful to study figure 4 carefully in order to obtain a clear conception of the major physical subdivisions of the region, which form the basis of much of the discussion in the text.

It will be noted that the western division, comprising the Allegheny and Cumberland Plateaus, an area of 17,656,000 acres (table 1), is characterized by a generally rugged or mountainous topography. Population of this division in 1930 was 1,665,907 (table 21). Of this number 504,089 were gainfully employed in that year (table 19). The numbers engaged in agriculture and in the extraction of minerals were 148,813 and 147,154, respectively. Manufacturing and mechanical industries employing 54,987 persons were dependent largely upon the extractive industries, either as a source of power or of raw materials. The existence of other forms of economic activity within the western division, such as transportation and communication, trade, and various types of services, were also almost exclusively dependent upon the extractive industries. Here, then, is an enormous area in which a large proportion of the population is dependent, directly or indirectly, upon types of economic activity that are highly unstable in character and that tend to be associated with acute problems, both social and economic.

The agriculture of the western division is also for the most part incapable of supporting a farm population, even with such supplementary income from industrial employment as can be earned by work off the farm. The presence of the extractive industries contributes, of course, to the living of farm families not only by providing a source of outside employment but also by furnishing a market for farm-grown produce, including farm-wood-lot products. Moreover, the broader tax base provided by mining properties and investments and by industries dependent upon or associated with the extractive industries permits rural families, in the division, to enjoy facilities that could not otherwise be provided except by enormous subsidies. However inadequately equipped with transport facilities, wholesale and retail services, schools, and community organizations the region may be, it is nevertheless true that the primary basis of these facilities and services is to be found in the extractive industries.

In the light of the foregoing facts, planning for the future in the western division must mean principally planning for adjustments in the utilization of resources in the light of the probable future of the extractive industries within that portion of the region. For large parts of the western division, it must be evident that agriculture alone or in combination with employment in other industries does not provide a basis for an adequate family living.

In attempting to face the fact that agriculture, by reason of topographic characteristics of the land, soil deficiencies, or other factors, is unprofitable in many parts of the division, it is well to recognize that partial employment which has made it temporarily possible for rural families to continue to occupy the land is an ephemeral basis for land-use planning, so long as the sources of this employment are uncertain, impermanent, or exploitative in character. If agricultural communities are to be maintained primarily as an appendage to mining operations in areas in which the land is not adapted to agricultural use, sound planning demands that the enterprise as a whole be projected so as to avoid developing the evils of stranded populations which in the past have been associated with the exploitation of mines and forests.

The eastern division (Blue Ridge), particularly the southern part, is generally even more rugged than the western division, but the economic and social life of the Blue Ridge is less dependent on mining and industrial activity.

Although the center of interest in the present study is in the mountainous portions of the region, because they are most definitely pathological generally speaking, it was not found expedient to eliminate the interlying valleys from consideration. For one thing, it was not expedient in constructing maps of the region to omit the valley areas. Furthermore, there is a marked economic and social interdependence in the life of the valleys and the life of the mountains. Statistically it is not always practicable to separate the data of mountain areas from valley areas, although in general the contrasts for the larger valleys are indicated. Finally, the inclusion of data with reference to the valleys serves to provide helpful contrasts that tend to emphasize more definitely the conditions and problems peculiar to the mountains.

Data used in table 11 and figures 52 and 53 show that the self-sufficing type of farming predominates in a large part of the mountain divisions, indicating

[2] For part of the region such an organization has been set up—the Tennessee Valley Authority. This occurred after much of the work on the present study was completed. The maps and charts included in the study were made available to the Authority shortly after its organization.

that much of the land is unadapted to agricultural use. The value of farm production is low throughout the mountain divisions (figs. 65–67). Within these divisions, it is true, there is considerable variation in the value of family living, but these variations are associated, for the most part, with variations in opportunities for employment off the farm (fig. 181).

SUGGESTED PROGRAMS OF ADJUSTMENT

The general situation described in the text points to the development of programs of adjustment along two major lines based on three principal sources of income—forestry, mining, and farming. The two major lines of adjustment involve (1) a combination of part-time farming with employment in forests and forest industries and (2) a combination of work in mines with employment in forests or in adjacent local manufacturing plants or part-time farming.

The adaptability of the land to the production of hardwood timber suggests forestry as a major use for much of the land. The distribution of rural population should be such as to permit the association of part-time farming with work in the forests. Although exact figures are not available, it is estimated "that our forests when fully productive may give direct employment to at least one person for every 250 acres" (*47, p. 104*). For those portions of the region, therefore, in which other forms of employment off the farm are not available and in which much of the land is submarginal for agricultural use, the permanent basis of long-time adjustment must be found in the development of farm-forest communities.

Economic aspects of this type of rural organization have not been studied in any careful way in this country, largely for the very good reason that experience in such organized activities in the United States is almost totally lacking. It is clear, however, that the maximum benefits that may be derived from this form of community economic organization cannot be realized immediately. In fact, as pointed out later, the introduction of improved methods of forest management would have the effect of reducing the cut on most stands in the Southern Appalachians and hence reducing the immediate income derived from timber products and the volume of employment provided by the immediate utilization of these products. This reduction in volume of employment, however, would be at least partially offset by increases in employment in connection with planting and thinning operations, the construction of forests roads and trails, and the introduction of various types of fire-control measures. The problem of farm-forest communities may properly be solved only by applying the principle of sustained yield management of our forests and by restricting farm-forest homesteads to the number that can be supported by the farms and forests.

The primary basis of this type of adjustment is the introduction of forestry as a major type of land use for a large portion of the rough, mountainous sections of the region. The immediate reduction of income implicit in this adjustment, as well as the necessity of increased expenditures for the purpose of rehabilitating and protecting the forests, raises a question as to whether the adjustment can be effected mainly through the medium of private ownership and management of forest land. It is true that the principle of sustained yield management of privately owned forest land has been recommended for inclusion in the lumber code adopted pursuant to the provisions of the National Industrial Recovery Act. It must be recognized that provisions such as there proposed would have an important bearing upon the utilization of privately owned mature stands of timber, but there are always large areas of understocked and second-growth stands which will generally not prove profitable to private investors. Since much of the timber in the Southern Appalachians is represented by second-growth, immature stands (p. 32), it is probable that a planned use of land, involving the development of farm-forest communities, will necessitate public ownership of a large proportion of the forest lands.

The Southern Appalachians now include seven national-forest areas which, on October 31, 1933, embraced 2,462,015 acres. The completion of the present plans for the development of national forests within the region will raise the total acreage of federally owned forest lands to 5,900,000, or nearly one-fifth of the commercial forest area.

In theory the forests of the Southern Appalachians, in connection with the farms and the mineral resources, should have provided an unfailing flow of income for the resident population. In practice such has not been the case. In that respect the history of the Northeast and the Lake States has been repeated. For more than a century the story has been one of unregulated exploitation. Uncontrolled fires, destructive lumbering, and unwise clearing for farms have left only depleted remnants of the original forest.

The available saw timber has shrunk to a small fraction of the original stand.

The cut so far exceeds the growth, particularly on farm lands, that the end of the timber of merchantable size appears to be near at hand. There is no assurance that sufficient reserves of new saw timber will reach merchantable size in time to meet the need.

Estimates based on census records indicate that in the past decade the number of wood-using establishments decreased one-half, the number of wage-earners one-fourth, and their wages one-third. The decrease of wages and salaries combined is indicated in the regional income from timber used by industries at the rate of $2,000,000 a year for the decade.

Aside from the present abnormal paralysis in industry, the region is going through a period of declining returns from timber products, the end of which cannot be predicted. The low point of the normal curve has almost certainly not been reached. Under favorable circumstances several decades may elapse before income from the timber again equals that of 1929.

None of the remedial measures mentioned, nor all of them combined, will check the decline of regional income from timber. All of them are based on plans which would tend to decrease the rate of overcutting and consequently reduce the volume of forest products until a balance between growth and cut has been attained. They give hope of increased production in the future but not in the present.

Emergency expenditures in the forests are now providing employment. That money is expended to improve the timber, but it is not income from the timber.

Timber growth is the principal element which will determine how soon these lands can return to the status of a highly productive forest property. The end of the period of reduced revenues need not be expected until growth has had time to repair the damage done in a hundred years of abuse.[3]

The farm-forest community program, if carried out on a gradual basis and in conformity with a comprehensive plan, offers a means of bringing about desirable shifts of population in the region, consistent with the proper utilization of the land, without violating the predilections of families for simple and relatively non-commercial types of rural life. It would permit those whose aptitudes fit them for the more commercial and competitive pursuits to find opportunities elsewhere and, at the same time, permit those who prefer the simple life of a rural community to indulge that preference without detriment to themselves and without imposing a burden upon others.

[3] The foregoing quotation was prepared by R. V. Reynolds, for the Forest and Woodland section under Types of Land Utilization but it was thought to be better adapted for this part of the publication.

It is recognized that poor land and sparse population furnish an inadequate basis for maintaining needed educational, social, and religious institutions, agencies, and services. Evidence of these conditions and their consequences are abundantly presented in the sections of this publication dealing with various aspects of problems and conditions in the Southern Appalachians. Lack of economic opportunities is associated with lack of roads. Lack of roads results in economic and cultural isolation of families and communities. Poverty and isolation tend to lower the physical, mental, and moral development and to undermine the economic efficiency of the population. Inadequate medical attention (figs. 191 and 192), poor diet (p. 153), ignorance of hygiene (figs. 189 and 190), inadequacies of housing (figs. 166–175), and similar factors contribute to a high death rate and tend to undermine the economic efficiency of the population (p. 155).

A stranded community inflicts these economic and social evils upon its own population and at the same time it imposes unnecessary sacrifices upon the larger community of which every social unit, no matter how small, is still a part. For the isolated community must have a school; each family within it demands access to a road; and every type of public obligation for the maintenance of health, enforcement of law and order, and protection in distress, which the political unit is obligated to provide for the individual, must extend to the most isolated settler or family. The per capita costs of these services are always high when they must be maintained for relatively few persons.

PRESSURE OF POPULATION THE BASIC PROBLEM

Although population is sparse in some parts of the region if judged merely by statistical expression of population density, and although this sparseness makes for inadequate community facilities or high costs for providing them, the principal problems of the region as a whole grow out of an excess of population in relation to the economic opportunities to be found there under prevailing conditions. This population excess is the outgrowth of a high rate of population increase. From 1920 to 1930 population increased 16 percent in the Southern Appalachians, whereas, the increase in the six Appalachian States in counties outside of the Appalachian region was only 8 percent. For the period 1900–1930 the increase was 55 percent for the Southern Appalachians and 33 percent for other counties.

The chief explanation of the relatively high increase in the Southern Appalachians is to be found in the higher birthrates prevailing in the rural as contrasted with urban population groups and in the mountain groups as contrasted with the valley groups or in cities. For example, within the region the number of children born per 1,000 women of childbearing age was much less in cities of 10,000 population and over than in other portions. For the region as a whole, the rate was 339 for cities of 10,000 population and over and 618 for the population outside of cities of that size. Taking the most mountainous portions, we find that the rate for population groups outside of cities of 10,000 population was 610 for the Blue Ridge, 613 for the Allegheny Plateau, 670 for the Northwestern Cumberland Plateau, and 746 for the Northeastern Cumberland Plateau. These rates may be compared with the rates for the corresponding population groups: in the Southern Appalachian Valleys, 532, in the Central Appalachian Valleys, 510, and in the Appalachian Valleys of Southwest Virginia, 504.

To some extent the resulting pressure of population in the mountainous divisions has been lessened by extensive emigration. Figures drawn from the census show that persons born in the six Appalachian States but living in other States in 1930 greatly exceeded the number born in other States and living in the six Appalachian States in that year. These figures reflect a general movement of population out of the six Appalachian States northward and westward. Ohio, Texas, Oklahoma, Illinois, Michigan, and California are among the States that have attracted large numbers of people whose place of birth was in the six Appalachian States. A considerable number of the residents of Florida in 1930 also reported their place of birth as Georgia. But the relief through emigration has been only partial. In many parts of the mountains, population is now excessive in relation to natural resources and to the present type of economic organization.

In some parts of the region it will be possible to mitigate population pressure through the introduction of new industries or other adjustments in economic organization. To a considerable extent, however, any fundamental alleviation of the conditions of life can be achieved only by removing some of the population from localities in which economic opportunities are too limited to provide a good family living to localities in which these families can supplement earnings from the farm with employment in forests or industry, or to areas where a more adequate livelihood can be obtained from farming. It need not be assumed that this adjustment will involve caring for the present population on a permanent basis in farm-forest communities or in local part-time farming. There are large numbers of the population, particularly among the younger generation, who will welcome opportunities for employment elsewhere.

The establishment of farm-forest communities should be planned with a view to providing adequate educational opportunities and accessibility to larger centers of population through the medium of good roads and increased availability of other means of communication.

Poverty and isolation appear to be the chief barriers to more extensive spontaneous migration of the population. It appears reasonable to assume, therefore, that with improved standards of living, increased accessibility, more external contacts, and better educational preparation for various types of economic pursuits, increasing numbers of the population will seek their livelihood outside of the region. Those who remain will consist chiefly of old people or people who, by reason of inclination or aptitude, find the relatively simple life of the farm-forest community congenial.

At the same time, the concentration of the population in farm-forest communities will tend to correct many of the collateral problems which arise from the existence of isolated communities. The necessity of maintaining roads, schools, and a variety of public services for widely scattered families and isolated communities would be removed, thus eliminating a burdensome and unnecessary public expense.

Definite adoption of the policy and practice of sustained yield management of our forests would provide at the same time a permanent basis for the maintenance of a wholesome community life and the efficient utilization and conservation of an important natural resource.

PROBLEM OF SEASONAL EMPLOYMENT

Conditions created by the expansion of extractive industries in the Southern Appalachians, particularly of coal mining, raise the second major problem of adjustment. Clearly the problems associated with mining operations must be faced and a long-time plan should be developed which will have in it the elements of permanence of employment and security of livelihood for the laboring population. The general effect of industrialization in the region has been to decrease the number of farms and the acreage of land in farms. This tendency has progressed much further in the older industrialized subregions, such as the Upper Ohio Hills, than has been the case in some other subregions, such as the Northeastern Cumberland Plateau.

At present experiments are directed to the establishment of families dependent on employment in seasonal industries on subsistence homesteads to enable them to supplement industrial employment with farm work and to produce a considerable proportion of their food supply.[4] Under the conditions prevailing in the coal-producing sections in the Southern Appalachians it is doubtful that any permanent improvement in the situation can be achieved until increased stability of employment can be introduced into the industry as a whole. It is conceivable, of course, that with reorganization in the coal industry to provide adequate employment and a living wage rural homes adjacent to the mines might be substituted for the usual squalid mining town. If these rural homes were sufficiently clustered along good roads to avoid excessive costs for roads, schools, and other public services, the arrangement probably would prove beneficial to the families concerned, to the public, and to the mining companies.

In many instances the land adjacent to the mines is unadapted to agricultural use, so that the general tendency has been for the mines to draw families from farms at some distance from the mines and place these families in mining villages or towns where employment complementary or supplementary to work in the mines is not available (p. 39). For a solution of the problems in the mining sections, one must look, therefore, to measures that are much broader in scope than those designed to deal with an essentially local situation. Old-age insurance, public-works planning, industrial decentralization may be mentioned as illustrative of measures that ultimately must be undertaken if anything approximating a solution of the economic and social evils connected with mining of coal are to be corrected.

Coal is the primary source of power. The chief raw material manufactured in the region is timber. These are the two great natural resources upon which the economic and social organization of the mountain divisions of the Southern Appalachians must primarily depend. If, therefore, increased decentralization of industry becomes economically feasible, a logical economic development in the mining areas of the Southern Appalachians would be to combine the use of the coal resources with the production of manufactured forest products.

Factory employment has long been utilized by elements of the population living in the more isolated sections as a means of supplementing farm income. The automobile and cotton-textile industries have drawn large numbers of the population into the factories. In many instances, however, particularly in the automobile industry, such employment has been essentially of a temporary character, drawing one or more members of the family away from home to engage in factory work in periods of brisk production. The family frequently remains on the farm, and the factory employees return to the farm in periods of slack production.

NEED FOR RATIONAL PLANNING

In short, rational planning is a critical need in the Southern Appalachians. Land is not being used now in accordance with its physical and economic adaptability. In some sections, the land is adapted to further agricultural expansion; other sections are suited to forest use, but by reason of improper management and other circumstances, the potential benefits of such use of the land are not being realized.

In areas clearly submarginal for agriculture, it appears obvious that fundamental adjustments must be worked out along one or more of the following lines:

(1) Conversion of the land to public ownership and its utilization for public forests, parks, or game preserves.

(2) In combination with these types of ownership and use of land, establishment of small rural communities on lands adjacent to or within the forest areas which are adapted to agricultural use, with a view to employing the family workers in the forests and in local forest industries.

(3) Development of local manufacturing industries based primarily on the utilization of locally produced coal as a source of power (or of hydroelectric power in appropriate instances) and the utilization of timber as a source of raw material.

(4) Combination of employment in the mines with work in local factories, or part-time farming, to provide an adequate living for families not included in farm-forest communities.

(5) Encouragement of emigration.

It must be recognized that some areas that are not now profitable for agriculture are in reality well adapted to that use. It would be a mistake, in the long run, to attempt to divert land in such areas to a nonagricultural use in order to correct a temporary situation. As a matter of temporary adjustment such lands could probably best be diverted to the less intensive agricultural uses by developing toward a grassland economy.

In areas that are not now submarginal for agriculture, it is probable that the projected program of the Agricultural Adjustment Administration to develop plans of farm organization which will maintain a balance in the production of the main export crops and at the same time maintain the proper supplementary and complementary relationships between the various enterprises that make up the farm organization will prove the most effective procedure.

In some parts of the region adequate adjustments may be accomplished without the necessity of families moving to new locations. Throughout the region first consideration in any area should be given to the possibility of ameliorating conditions of life without extensive regrouping of the population. In any case the regrouping that is so essential in many parts can be accomplished only gradually. In the meantime there is room for the continued exertion of the educational efforts that will teach the people of the area the methods of making the best of the material, human, and social resources at their disposal.

[4] UNITED STATES DEPARTMENT OF THE INTERIOR, DIVISION OF SUBSISTENCE HOMESTEADS. GENERAL INFORMATION CONCERNING THE PURPOSE AND POLICIES OF THE DIVISION OF SUBSISTENCE HOMESTEADS. U.S. Dept. Int., Div. Subsistence Homesteads Circ. 1, 13 pp. 1933. [Mimeographed.]

PHYSICAL FEATURES AND CONDITIONS

By F. J. Marschner, *research assistant, Division of Land Economics, Bureau of Agricultural Economics*

The manifold influences of the natural environment on the economic and social characteristics of a region justify a careful examination of its physical features and conditions. Types of land utilization, farm organization, and other topics discussed in this publication are more or less directly related to the physical characteristics of the land. Consequently, in this section an attempt has been made to describe the salient physical features and conditions that characterize the Southern Appalachians.

PHYSIOGRAPHIC DIVISIONS OF THE SOUTHERN APPALACHIANS

The Appalachians, as a physiographic region, comprise the mountain system in the eastern United States that extends in a northeasterly direction roughly parallel to the Atlantic coast from Alabama to Maine. The name Appalachians is derived from that of a southern Indian tribe, meaning "those by the sea" (*17*). For convenience of dividing the mountain system into a northern and southern part, Mason and Dixon's line is used, although it is not a physiographic boundary.

Morphologically, the Southern Appalachians do not have a uniform pattern. Differences in their geologic history and structure, and subsequent modification of the surface through weathering and erosion, have produced distinct characteristics in arrangement and forms in various parts of the region. On the basis of these distinctions three well-defined physiographic divisions are recognized—the eastern, the central, and the western. (See pocket map[5].)

The eastern division embraces the mountain chains, ridges, and plateaus, collectively known as the Blue Ridge. The Blue Ridge, as well as the adjoining Piedmont Plateau to the east, has mostly crystalline rocks of igneous and metamorphic formations, such as granite, diorite, gneiss, schist, slate, and others. In altitude the Blue Ridge exceeds all the other mountains, not only in the Southern Appalachians but in the entire eastern United States. From an elevation of less than 1,000 feet in Alabama it rises to over 6,000 feet on many mountain peaks in western North Carolina and eastern Tennessee. Farther north elevations decrease to altitudes of 4,000 to 5,000 feet on the highest mountain tops.

The central division includes the Appalachian Valleys and Ridges lying between the Blue Ridge to the southeast and the Cumberland-Allegheny escarpment to the northwest. This division comprises a belt from 40 to 60 miles wide and 700 miles long of strongly folded and faulted rocks, consisting mainly of limestones, sandstones, and shales. Most of the fault lines and folding axes follow in their trend the main direction of the division. This and the subsequent decay and solution of the rocks have resulted in a succession of mostly long and narrow ridges and intervening valleys. The harder and more decay-resisting rocks form the ridges, whereas the softer rocks, mainly limestones and shales, which weather and wear down more rapidly than others, underlie the valleys. The general elevations in the central division as a whole are lower than those of the bordering mountains to the southeast and northwest. From an elevation of about 500 feet in Alabama there is a gradual ascent to about 2,500 feet near the Smyth-Wythe County line in Virginia, and from there on northeastward the elevation decreases, falling to less than 400 feet in the Potomac Valley.

The western division is composed of the Appalachian Plateaus. The southern part in Alabama and Georgia, separated from the middle part by the Tennessee River, is known as "Sand Mountain", the middle part in Tennessee and Kentucky as the Cumberland Plateau, and the northern part in West Virginia as the Allegheny Mountains or Allegheny Plateau. Along the southeastern border of this division and along most of its northwestern border, well defined escarpments separate the plateaus from the adjacent country. A fairly uniform geologic structure is characteristic of the entire division. Nearly flat-lying formations of sandstones and shales with interbedded coal seams predominate. Limestones form part of the lower strata. Elevations increase gradually from south to north, rising from less than 500 feet in Alabama to about 2,000 feet in Tennessee and reaching a maximum of 4,710 feet on Spruce Knob in eastern West Virginia. The general slope of Sand Mountain is southward while that of the Cumberland and Allegheny Plateaus is northwestward.

DRAINAGE

Drainage of the Southern Appalachians is into both the Atlantic Ocean and the Gulf of Mexico. The divide follows the eastern rim of the Blue Ridge escarpment from the Georgia-South Carolina boundary through North Carolina into Virginia. In the vicinity of Roanoke the divide crosses the Appalachian Valleys and Ridges and thence follows along the summit of the Allegheny front into Pennsylvania. Atlantic trunk streams that have their headwaters in the northern part of the region in the Appalachian Valleys and Ridges, like the Roanoke, James, and Potomac Rivers, have cut gaps in the Blue Ridge through which these streams reach the Atlantic slope. These gaps are important not only as drainage outlets to the fertile valleys, but also because they provide natural gateways through which communication with the eastern seaboard is facilitated.

Only about one-fourth, 24,650 square miles, of the total area, 109,500 square miles, shown on the topographic map of the Southern Appalachians (in pocket), is drained eastward into the Atlantic. Of the remaining three-fourths of the area about 18,600 square miles in Georgia and Alabama are drained southward by tributaries of the Apalachicola, Alabama, and Tombigbee Rivers into the Gulf of Mexico. By far the greater part, however, 66,250 square miles, is tributary to the Ohio River and constitutes part of the extensive Mississippi River drainage system.

While the rivers draining the northern part of the Appalachian Valleys have cut outlets eastward through the Blue Ridge, the rivers draining most of the southern part of these valleys, the Tennessee and New Rivers, have cut westward through the Appalachian Plateaus. The Tennessee River collects the waters from an area of 21,750 square miles in the Blue Ridge and the Appalachian Valleys before reaching the pass cut

[5] This map, in addition to showing the principal topographic and certain cultural features, serves as a key for identification and location of counties and places shown on the maps or mentioned in the text of this publication. It was compiled mainly from the latest material obtained in topographic surveys by the U.S. Geological Survey, soil surveys of the Bureau of Chemistry and Soils and surveys by the Forest Service, U.S. Department of Agriculture, and work of local surveyors and engineers.

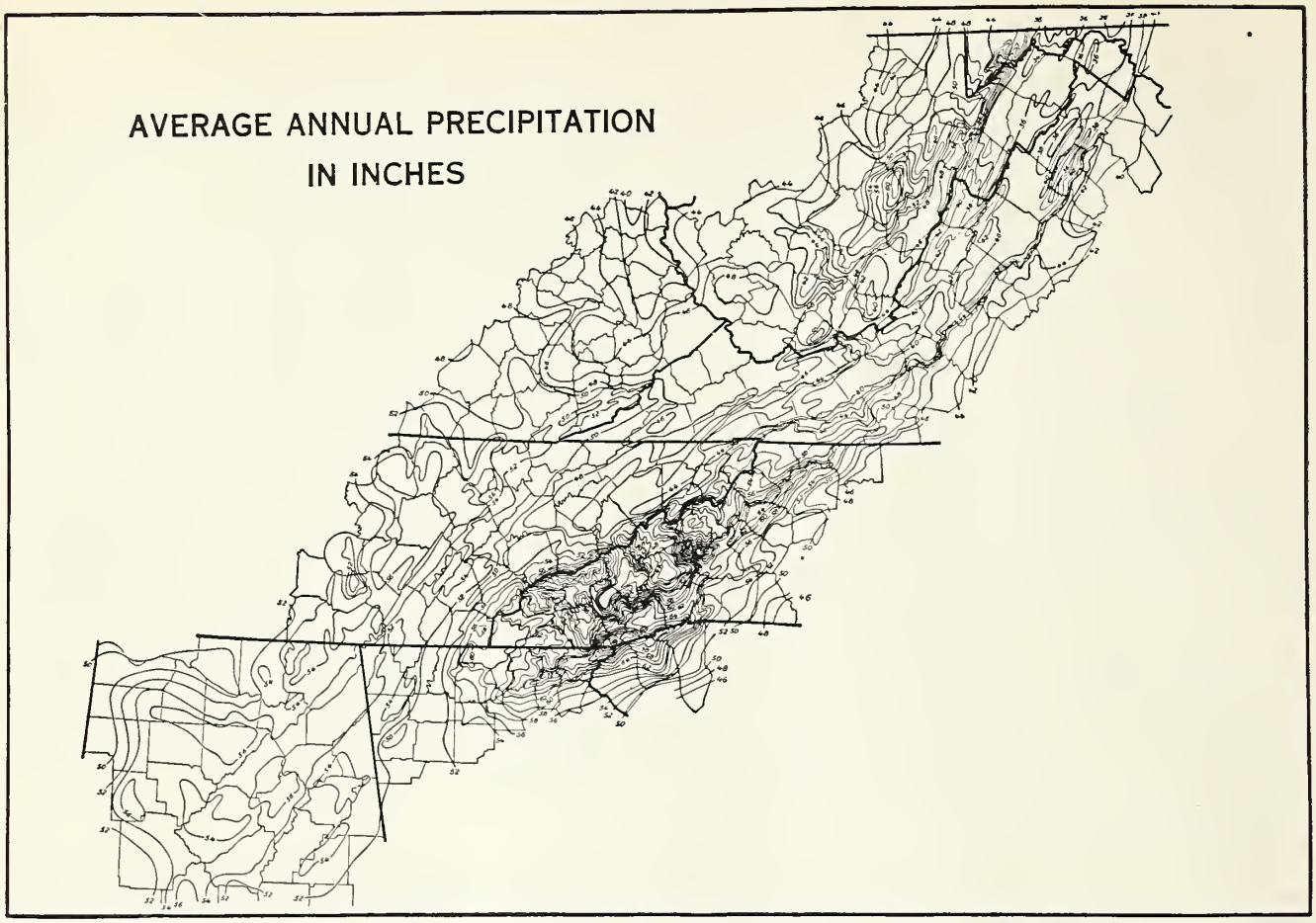

FIGURE 1.—The distribution of the average annual precipitation follows closely the direction of the mountain system. Precipitation is heaviest on the eastern slope and the higher mountains of the Blue Ridge (fig. 4), where the range is from about 46 inches to a maximum, in places, of over 80 inches, and on the western slopes of the Cumberland and Allegheny Plateaus, where the range is from about 42 to 62 inches. Precipitation in the Appalachian Valleys and Ridges ranges from 34 inches in the northern part to 54 inches in the southern part. (Based on records of 300 U.S. Weather Bureau stations for 1930 and prior years (*48*, *49*).)

through the Appalachian Plateaus near Chattanooga. From there on, the Tennessee River drains an additional 7,900 square miles before passing over Muscle Shoals into the Coastal Plain. The entire drainage basin of the Tennessee River embraces nearly one-third of the area of the Southern Appalachians.

The second largest drainage area in the Southern Appalachians belongs to New River which, at its junction with Gauley River, forms Kanawha River. New River has its headwaters on the Blue Ridge Plateau and, after crossing the Appalachian Valleys and Ridges, flows in a canyonlike channel that is more than 100 miles long and, in places, more than 1,000 feet deep which it has cut through the Allegheny Plateau. This canyon, carved deep into the various formations of the plateau, has economic significance aside from its geographic interest. With the exposure of the strata along New River and its tributaries, the underlying coal beds have been made easily accessible for exploitation in many places. As a consequence, one of the most productive coal fields in the Appalachians is located along this river.

All the other large rivers—the Cumberland, Kentucky, Big Sandy, and Monongahela—have their sources west of the Cumberland-Allegheny escarpment. The drainage area and the volume of water carried by any of them is small in comparison with the area drained and volume carried by the Tennessee or Kanawha Rivers, but they are doing effective work in dissecting the strata of the plateau and in exposing the coal resources of the region.

CLIMATIC CONDITIONS [6]

The climatic conditions prevailing in the Southern Appalachians are quite distinct from those found in the regions bordering on the east, south, and west. The elevation above the surrounding country and the mountainous character of the relief produce these differences between regions and the strong climatic contrasts found within the region. Only the two most important climatic factors, precipitation and temperature, can be considered in this brief description.

Precipitation over the entire Southern Appalachians is heavy, but shows noticeable variations (fig. 1). The heaviest precipitation in the region, in fact in the whole eastern United States, falls along the eastern escarpment of the Blue Ridge and the higher mountains in North Carolina, where, in places, the annual average exceeds 80 inches. Here the moisture-freighted winds from the Atlantic discharge in their ascent a great part of their burden. The situation on the western slopes of the Appalachian Plateaus is somewhat similar, but the moisture-carrying winds from the Gulf of Mexico have to travel farther, the ascent is more gradual, and, as a consequence, discharges are moderated. Only one station on the

[6] Acknowledgment is due J. B. Kincer, U.S. Weather Bureau, for suggestions and criticisms of the maps on climatic conditions.

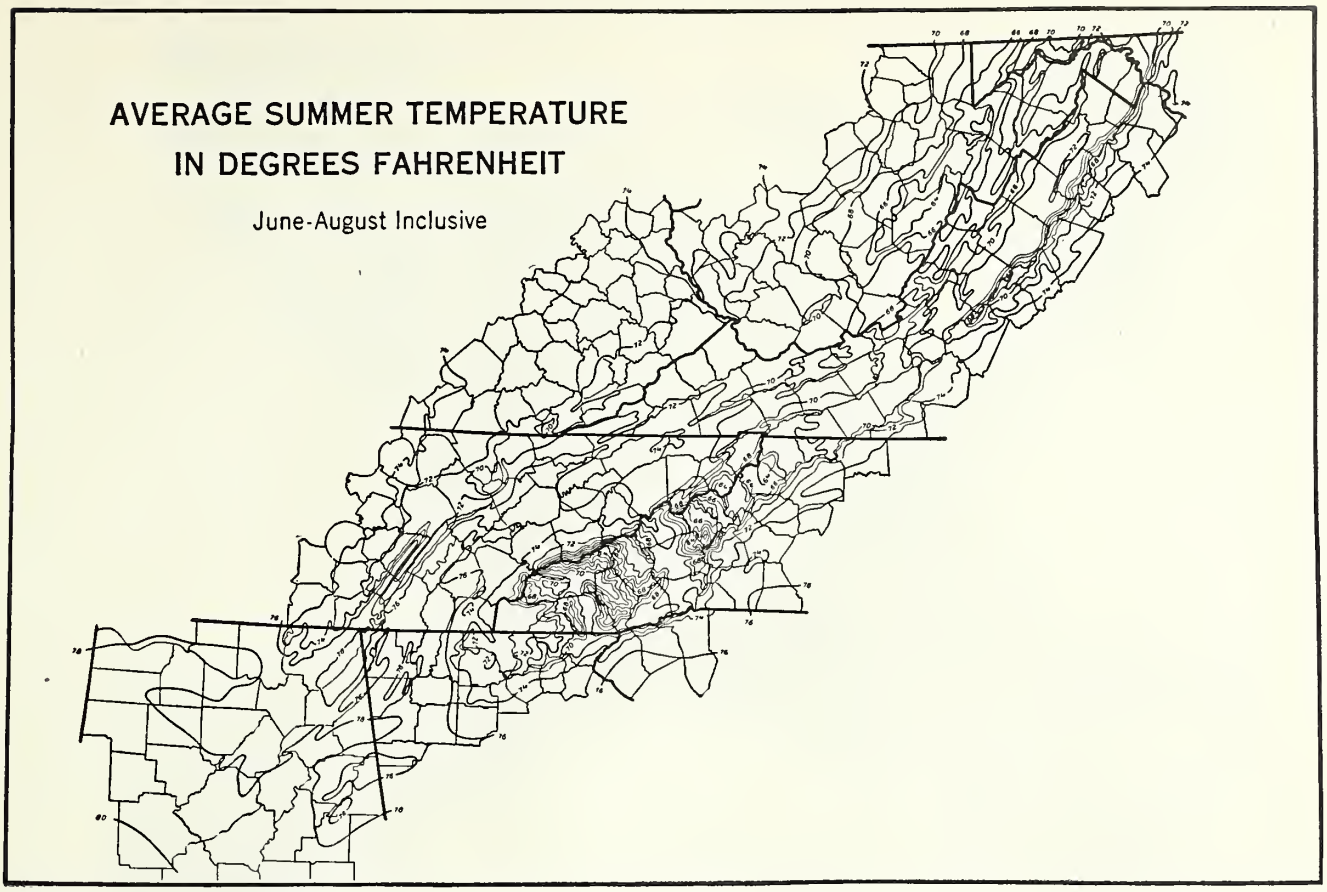

FIGURE 2.—The average summer temperature of the region as a whole is considerably lower than the prevailing summer temperature east or west of it. In some of the higher parts of the Allegheny Plateau, and on the mountain tops in the southern half of the Blue Ridge, the average summer temperature falls below 64° F. In the lower part of the Appalachian Valleys the average ranges from about 70° to 76°. (Based on records of 200 U.S. Weather Bureau stations for 1930 and prior years (48, 49).)

western slopes of the Southern Appalachians has had an annual average precipitation of more than 60 inches, and conditions at this station are applicable to a relatively small area in the Allegheny Plateau. But all of Sand Mountain and the greater part of the Cumberland Plateau receive an annual average of over 50 inches.

At a number of stations in the northern part of the Appalachian Valleys and Ridges the average annual precipitation is 35 inches or less, the lowest in the Southern Appalachians. Here the sheltering effect of the Blue Ridge on one side and the Cumberland-Allegheny escarpment on the other reduce materially the annual precipitation. The sheltering effect is noticeable, moreover, throughout the Appalachian Valleys, except in that part in Alabama and Georgia which extends farther south than the flanking ridges.

The seasonal distribution of the precipitation is fairly even, although the autumns, as a rule, are dryer than the springs. About 50 percent of the precipitation falls during the growing season, but protracted dry periods and torrential downpours are, however, not uncommon. The snow cover over most of the region is not deep nor does it last very long. The Allegheny Plateau and parts of the Blue Ridge must be noted as exceptions. On the Allegheny Plateau the annual snowfall averages 50 to 60 inches unmelted, and the snow cover lasts an average of 30 days or more (*24*). There is also a heavy snowfall usually lasting several weeks on the higher mountains and on the Blue Ridge Plateau.

In the region as a whole, the average amount of precipitation is abundant for the production of all crops; it is also ample enough to sustain a dense forest growth, the natural vegetation of the region.

In the mountains and hilly parts of the Southern Appalachians the surface run-off of water is very rapid, and erosion is active on exposed slopes. Many sites are available at which the swiftly running waters of the rivers can be held and used for power development. In fact, if water-power potentialities are considered in conjunction with the deposits of coal, oil, and gas, this region is one of the most stupendous reservoirs of primary power in the United States.

In the Southern Appalachians temperature exerts a greater influence than precipitation over plant and animal life and over a great many of man's activities. In agriculture, summer temperature and the length of the frost-free season largely determine the kinds of crops that can be grown with the available moisture supply and the type of farming practiced.

The considerable variations in the amount of heat and the length of time it is available for plant growth (figs. 2 and 3), arise mainly as a consequence of differences in elevation and latitude. The coldest section within the region is found in the northern part of the Allegheny Plateau where the temperature during the summer months of June, July, and August averages less than 66° F. Frosts may occur in this section during 10 months of the year and may limit, in places, the number of consecutive days without frost to less than 125. On account of these cool and short summers, corn is an uncertain and relatively unimportant crop. There are also some areas in the high mountains of the southern Blue Ridge which have an equally severe climate but without affecting agriculture directly, inasmuch as the

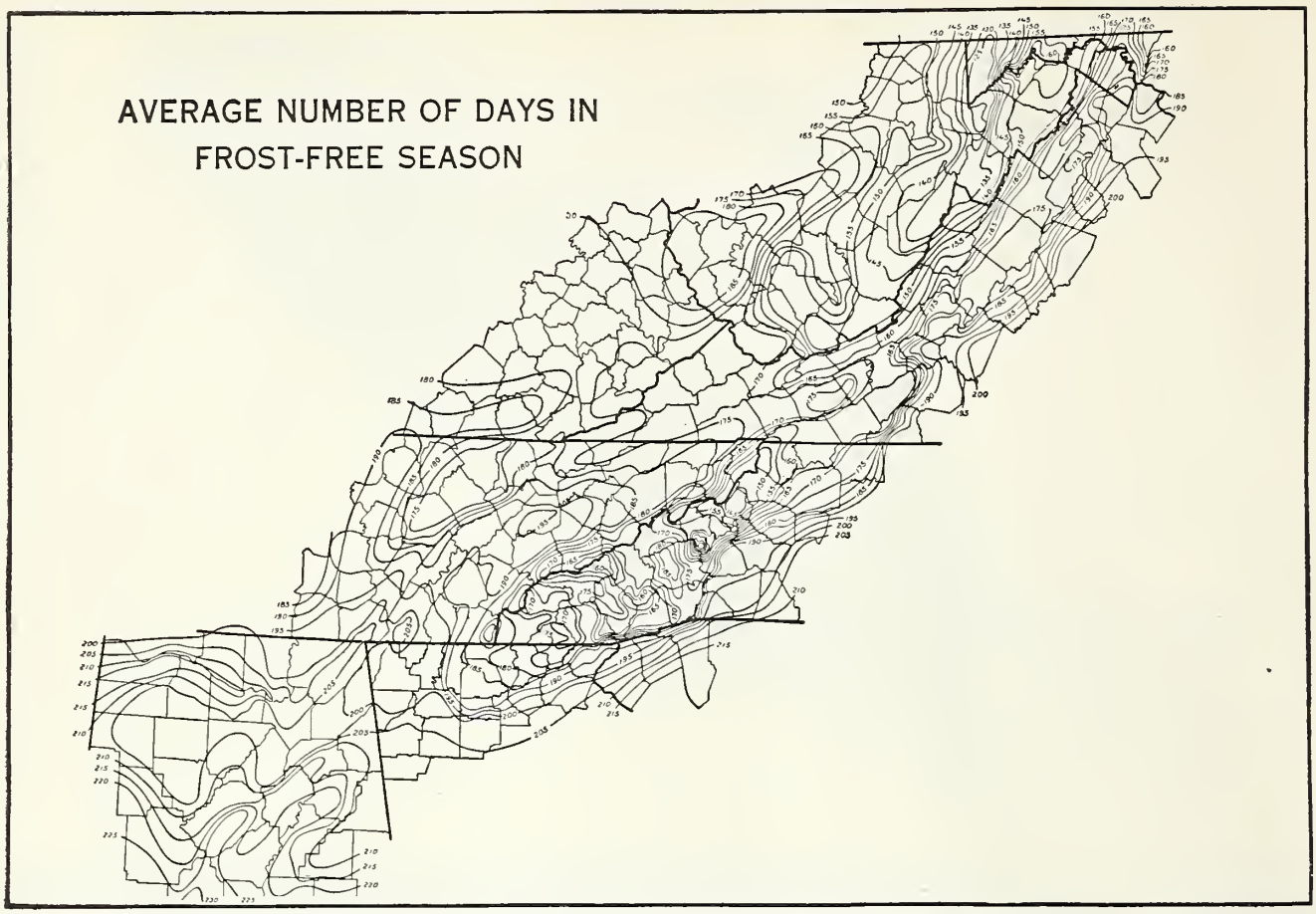

FIGURE 3.—In the northern part of the Alleghany Plateau frosts may occur in every month except July and August, reducing the average length of the frost-free season, in places, to less than 125 days. A belt with a relatively short growing season connects this area with the southern part of the Blue Ridge where the range in altitude produces strong contrasts in the length of the frost-free season. The longest frost-free season is found in the Southern Appalachian Valleys, where the average for most of the subregion is 200 days or more. (Based on the records of 200 U.S. Weather Bureau stations for 1930 and prior years (48, 49).)

land is rugged and nonarable. In contrast to this, in the southern and lower sections of the region, summers are warm, the average length of the frost-free season exceeds 200 days, which is sufficient for the growth of cotton and makes cotton in these sections the principal crop.

With a change in the kinds of crops that can be grown because of climatic conditions there is an accompanying change in the type of farming. In the northern and cooler sections the adaptability of land for pasture and the raising of livestock make for many dairy and livestock farms. For climatic reasons, commercial apple farms are almost entirely confined to the Blue Ridge and the northern part of the Appalachian Valleys and Ridges, and cotton farms to the southern part of the region.

SOILS

The soil character is another important factor influencing land use. The soils in the Southern Appalachians have all developed under forest cover, and on that account are all deficient in humus in the natural state. Textural distinctions in these soils are largely derived from the lithological nature of the parent rock. Color, chemical composition, and structure of the soils show the reaction to climatic and relief conditions under which they developed. Soil leaching and soil erosion are nearly year-long processes as a consequence of the abundant rainfall and the open ground during all or the greater part of the winter.

For a number of counties in the Southern Appalachians the soils have been mapped and described in more or less detail, but they are irregularly distributed. The available information relating to soils has been freely drawn upon in the following description of physical subregions.

PHYSICAL SUBREGIONS

To facilitate correlation of physical with economic and social factors the region has been divided, on the basis of work done by Barnes and Marschner,[7] into subregions (fig. 4). These subregions are characterized by greater uniformity of physical features than the three physiographic divisions of the region as a whole. Delimitation of these subregions is based mainly on distinctions in relief forms, soil types, and climatic differences.

Of the three physiographic divisions in the Southern Appalachians (p. 7) only the Blue Ridge comprises a single subregion. For a subregion, the range in the combinations of physical factors found in the Blue Ridge is greater than in any other, but the areas possessing distinctive characteristics are too small to justify separate treatment. The Appalachian Valleys and Ridges, largely because of climatic variations, break up into five subregions—the Central Appalachian Valleys, Central Appalachian Ridges, Appala-

[7] BARNES, C. P., and MARSCHNER, F. J. NATURAL LAND AREAS. U.S. Dept. Agr., Bur. Agr. Econ. map. 1933.

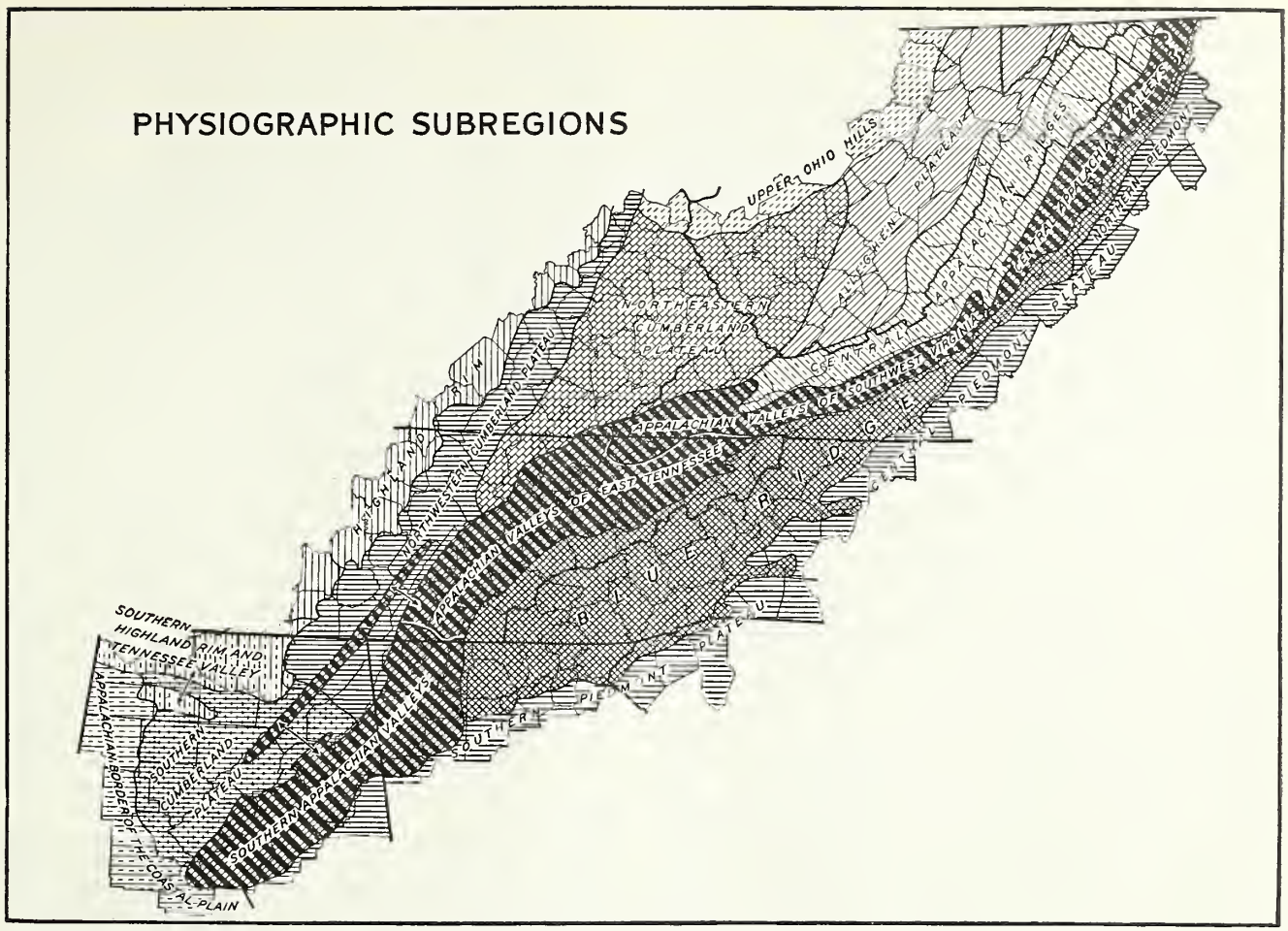

FIGURE 4.—There is great diversity in the physical characteristics of the Southern Appalachians. To facilitate comparisons of the type of land use, farm organization, and other cultural characteristics within areas having considerable uniformity in physical conditions, subregions were established. Delimitation of these subregions was based principally on relief, soil, and climate. (Reproduced from Natural Land Areas, a map prepared by C. P. Barnes, assistant agricultural economist, and F. J. Marschner, research assistant, Bureau of Agricultural Economics.)

chian Valleys of Southwest Virginia, Appalachian Valleys of East Tennessee, and Southern Appalachian Valleys. The Appalachian Plateaus, largely because of topographic features, break up into four subregions—the Allegheny Plateau, the Northeastern Cumberland Plateau, the Northwestern Cumberland Plateau, and the Southern Cumberland Plateau. The Southern Appalachians therefore embrace, wholly or partly, 10 subregions. In addition, fringes of 6 other subregions embraced by counties lying along the borders of and partially included in the Southern Appalachians are shown in figure 4.

The subregion comprising the Blue Ridge extends from Georgia into Pennsylvania. North of Roanoke the subregion consists of a narrow ridge cut by several gaps. Nearly all this part of the Blue Ridge is steep, rocky, forest-covered land, although some orchards, cultivated fields, and pastures may occasionally be found in coves and other favorable sites. South of Roanoke the Blue Ridge spreads out to form a mass of mountains, plateaus, and basins. A considerable part of this portion of the subregion is taken up by the Blue Ridge Plateau, an area some 100 miles long and in places more than 20 miles wide. Floyd, Carroll, and Grayson Counties in Virginia, and Alleghany, Ashe, and the eastern portion of Watauga Counties in North Carolina, identify fairly closely this plateau area of over 2,000 square miles.

This plateau is an old erosion surface with an elevation, for the most part, of 2,500 to 3,000 feet. Its surface is broken by sharp-cut drainage channels. Scattered over the area are disconnected, smooth-sloped, round-topped hills and knobs. The soils are mostly medium-textured yellow or red-brown loams and clay loams, deficient in lime but moderately fertile under proper management. Suitable soil types and topography, rather cool summers, and abundant moisture make the land well adapted to pasture, for which much of it is used. Roughly, only one-third of the land is forest and woodland. Livestock is the most important farm enterprise. Communication and transport facilities until recently have been rather poor. No railroads cross the plateau but some enter and others touch the periphery of the area. The population is all rural and is fairly evenly distributed.

The second largest area in the Blue Ridge in which there is considerable agriculture, is found on the Buncombe Intermountain Plateau, or Asheville Basin as it is also called, comprising parts of Transylvania, Henderson, Buncombe, Haywood, and Madison Counties in North Carolina. This plateau is surrounded by mountains except in the southeast where the brink of the Blue Ridge escarpment forms the boundary. Over much of its area this plateau has the character of a broad valley with side branches extending between the mountain spurs. Drainage is from the rim of the escarpment to the northwest, where the French Broad and the Pigeon Rivers have cut channels through the surrounding mountains. The surface of the plateau is rolling with a gradual increase in the steepness of

the slopes at the foot of the mountains. The mean elevation is from 2,000 to 2,500 feet.

The climate of the Ashville Basin is modified by the surrounding mountains. Precipitation is lower in the central and northern parts, where the annual average is 40 to 48 inches, than in the southern part, where the annual average is over 60 inches near the rim of the Blue Ridge escarpment. Summer temperatures are somewhat higher and the average length of the growing season is a week or two longer, than on the Blue Ridge Plateau. The soils are mostly light-brown or reddish-brown loams and clay loams, low in humus content and deficient in lime and phosphorous. They are naturally not very strong soils, but can be readily improved with proper management. General farming is practiced but some special crops such as fruit, vegetables, and tobacco are also grown. Both railroads and good roads cross this plateau from east to west and north to south. A few urban centers have grown up, of which Asheville is the most important.

In addition, there are a number of smaller basins and broad valleys in the Blue Ridge which have a natural setting somewhat similar to that of the Asheville Basin. Although restricted in size, they form important agricultural communities in areas that otherwise are inhabited by mountaineer families engaged in a primitive kind of agriculture in the sheltered coves and upper valleys.

The greater part of the mountain land in the Blue Ridge is too rough and stony for agricultural use. The mountains are the stronghold of the forests. A considerable area, 4,372 square miles, is already included in the purchase units of the established national forests, and 1,178 square miles in the established and projected national parks. Some land in the Great Smokies, 87.5 square miles, has been set aside as an Indian reservation. Prevention of serious erosion damage and the regulation of stream flow make the maintenance of forest cover on the mountain sides a necessity, aside from its value in replenishing the timber supply of the region. Preservation of the forest cover on the mountain slopes is also necessary to retain the natural beauty for which this subregion is widely noted.

The Central Appalachian Valleys are represented in the Southern Appalachians by a broad continuous valley (of which the Virginia part is commonly known as the Shenandoah Valley) that extends from Natural Bridge, Va., northeastward into central Pennsylvania. The land is rolling to hilly, with the exception of Massanutten Mountain, an isolated, rough mountain ridge with an area of about 230 square miles. This ridge forms a part of the George Washington National Forest. Climatically, the Central Appalachian Valleys form the driest subregion of the Southern Appalachians, with an average annual precipitation of not quite 40 inches on the valley floor. The average length of the frost-free season is about 2 weeks longer, and the average summer temperature a few degrees higher, than on the adjacent ridges to the west. The soils of the valley have developed from limestone and shale as light-brown to yellowish-brown loams and silt loams. These limestone soils are highly productive, but shallow and rock-outcrop areas are rather numerous. Nearly all the valley land is in farms and a large proportion is used for tilled crops.

Largely as a result of the favorable topography, the area of the cultivated land per male worker on farms in the Central Appalachian Valley is almost 30 acres, the highest average in the Southern Appalachians, and roughly four times the average in the more mountainous parts. General farming predominates in the valley, but commercial apple orchards are numerous. There are several good-sized towns, although about three-fourths of the population is rural.

The Central Appalachian Ridges comprise a belt of land along the West Virginia-Virginia boundary between the Allegheny Plateau and the Central Appalachian Valleys. This subregion is characterized by a series of roughly parallel ridges and valleys. The ridges at some points are low and narrow, whereas at other points they attain mountainous proportions. Most of the valleys are narrow. The mean elevation of the valley floors is higher than those of the Central Appalachian Valleys to the east. The frost-free season is shorter and for the most part cooler. Soils are light brown, mainly derived from sandstone and shale of rather low inherent productivity. Areas with limestone soils are numerous but in the aggregate their extent is relatively small. Only about half the land is in farms and of that only a small proportion is cultivated. The adjustment of farm practice to the broken surface of this subregion is reflected in the use of a large portion of the land in farms for pasture and forage crops. Livestock is the principal farm enterprise. The steep and stony ridge and mountain land is largely forest covered. About 1,300 square miles of such land are included in the purchase units of national forests. Settlements are scattered along the valleys and lower slopes. Only a few small towns are found in this subregion.

The Appalachian Valleys of Southwest Virginia extend southwestward from the Central Appalachian Valleys. In comparison with the latter the valley floors are much more hilly. Interspersed ridges add to the broken character of the surface of the subregion. Most of the land is located at an elevation of over 2,000 feet and, as a corollary, has cooler and shorter summers than either the Central Appalachian Valleys to the northeast or the Appalachian Valleys of East Tennessee to the southwest, which are at lower elevations. The soils resemble those found in the Central Appalachian Valleys, but the area of limestone soil, a great part of which is cherty or stony, is relatively much smaller. About 70 percent of the land is in farms. The proportion in cultivated crops is relatively small and the proportion in pasture is relatively large. The rough and stony ridge land is forest covered. Farming is diversified, but is largely centered around the production of livestock. The population is essentially rural outside of Roanoke.

A less broken surface and a longer frost-free season are the main factors distinguishing the Appalachian Valleys of East Tennessee from the Appalachian Valleys of Southwest Virginia, while the greater precipitation and warmer climate to the south is the basis of separation from the Southern Appalachian Valleys. Included in the Appalachian Valleys of East Tennessee is also the northern end of the Sequatchie Valley, an exclave area having practically the same soil and climate as the main part of the subregion. The relief of the subregion is mostly rolling, with rounded ridges interspersed with a number of sharper and higher ridges. The elevation of the valley floors decreases southward, and accentuates the latitudinal thermal changes. The average length of the frost-free season increases from the northern to the southern boundary by about 3 weeks, where it reaches an

average of 200 days. The average summer temperature also increases a few degrees from the northern to the southern parts.

The soils in the subregion follow in their distribution the belt arrangement of the underlying rocks. The major part is derived from limestone, but there are also belts developed from sandstone and shale. The limestone soils exhibit two important distinctions. Soils developed from pure limestone are red or red-brown silt and clay loams, very productive but not extensive in area; the others, derived from cherty dolomized limestone, are gray to pale yellowish loams and silt loams that contain such large quantities of chert or flint gravel in the soil and subsoil as to constitute often more than half of the soil mass. The cherty limestone soils are more extensive than those developed from pure limestone but are only moderately productive. The sandstone and shale soils are gray or pale yellow loams and silt loams, often stony. The inherent fertility of these soils is not high but can be improved with proper management.

A large percentage of the land in the Appalachian Valleys of East Tennessee is in farms, and a relatively large percentage of the land in farms is in cultivated crops. Farming in the subregion is diversified. Several special crops, such as tobacco and fruits, mainly peaches and apples, are grown on some farms, and dairying and the growing of truck crops are important on others. The density of rural population is relatively great, yet nearly one-half of the total population is urban.

The Southern Appalachian Valleys in many respects are like the Appalachian Valleys of East Tennessee. This is especially true of the relief and the character of the soils. The main distinction is in the climate. With the extension southward beyond the sheltering Blue Ridge to the east and Cumberland Plateau to the west, the Southern Appalachian Valleys are open from three sides to the moisture-carrying winds from the Atlantic Ocean and Gulf of Mexico. As a result, the annual average precipitation is over 50 inches throughout the entire subregion. The most important climatic distinction is temperature. Decrease in the mean elevation and the advancement into lower latitudes are accompanied by a rise in temperature and an increase in the average length of the frost-free season to 200 days and longer, which is sufficient to permit the cultivation of cotton. A large percentage of the land is in farms and cotton is the main crop. Nearly a million people inhabit this subregion, of which more than half live in urban areas.

The Allegheny Plateau embraces the highest part of the Appalachian Plateaus, extending from southern West Virginia northeastward into Pennsylvania (fig. 4). This subregion is called a plateau, but it is a plateau deeply furrowed. Stream erosion has cut down and back into the plateau leaving mountains with summit flats as the remnants of the old peneplain. This process more specifically characterizes the southeastern margin where the land is especially steep and mountainous and the summit flats are relatively small and isolated. Near the western margin the land is lower, not quite so thoroughly dissected, and therefore is proportionately better adapted to agricultural use. Climatic conditions are also somewhat more favorable on the lower levels. Soils have developed from sandstone and shale, are light-colored, sandy to silt loams, deficient in lime and humus. Some of the soil types are closely associated with steepness of slope. On the rugged and steeper slopes the soil is usually rocky and stony, while the soil on rolling lands is mostly loam and silt loam.

About three-fourths of the land along the western margin of the Allegheny Plateau is in farms, but only about one-third is in farms in the more mountainous sections. Land in farms, however, is not confined altogether to the areas better adapted to agriculture. As was shown in a land utilization survey of Nicholas and Webster Counties, W.Va., in 1927 (*32*), many farms are located on stony and steeply sloping land unfit for cultivation. A relatively small portion of the land in farms is used for cultivated crops. Farming is largely of the general type with considerable emphasis upon the production of livestock and livestock products. By far the greater portion of the land is better adapted to forest than to agricultural uses. About 560 square miles of the roughest land is included in the purchase area of the Monongahela National Forest. Settlements are predominantly rural, although a few small towns are scattered throughout the subregion. The summit flats in the higher and rougher sections are much more thinly populated than are the lower and more accessible flats and ridges. Moreover, coal mining has concentrated population in the coal fields.

The Northeastern Cumberland Plateau comprises the maturely dissected portion of the Cumberland Plateau, adjoining the Allegheny Plateau to the southwest, and including parts of West Virginia, Kentucky, Virginia, and Tennessee. Not much of the old plateau character remains in this subregion. Creeks and streams have dissected it so thoroughly into a maze of low and narrow ridges that there is no level upland left nor any level lowland formed, except the very narrow strips of bottom land along the streams. Although the ridges are rather low, nearly all the land is steeply sloping. The difference in elevation between the sharp crests of the ridges and the valley bottom is fairly uniform, usually not exceeding 500 or 600 feet. For this reason, the actual roughness of the surface in some parts is not at all apparent on the topographic map (in pocket) on which relief is shown by means of contour intervals of 500 feet. The soils are light colored, mostly stony, sandy loams, derived mainly from sandstone, and of low productivity. The proportion of land in farms varies greatly but, as a whole, forms a very large part of the total area in view of the physical characteristics. Of the land in farms only about 24 percent is used for cultivated crops.

Settlements in the Northeastern Cumberland Plateau are along the creek bottoms. Communication and transport facilities are poor. Farming is predominantly of the general type with production mainly for home consumption. Livestock raising is relatively unimportant. Population is dense in and about the coal-mining centers in the eastern portion. There is a relatively large farm population throughout much of the subregion, although physical characteristics of the land limit the cultivated acreage to 7 acres per male worker on farms, the smallest average for any subregion of the Southern Appalachians.

A sample study [8] in this subregion showed that in 1930 only 15 percent of the crop land and less than 1 percent of the open pasture land had a slope of 10 per-

[8] Unpublished economic and social study of Knott County undertaken in 1930 by the Bureaus of Agricultural Economics and Home Economics and the Forest Service of the U.S. Department of Agriculture in cooperation with the Kentucky Agricultural Experiment Station.

cent or less. Land in this range of slope lay mostly along the valley floors. Approximately 77 percent of the crop land and 96 percent of the open pasture land had a slope of 40 percent or more. It is impossible to till this steep land with machinery. Hand cultivation involved a heavy labor cost; for example, in the production of corn, the principal crop, an average of ten and six-tenths 10-hour days of man labor per acre was required to obtain an average yield of 20.6 bushels.

The Northwestern Cumberland Plateau forms a belt averaging about 40 miles in width and extending from northeastern Kentucky into northern Alabama, a distance of more than 300 miles. In striking contrast to the adjoining maturely dissected northeastern part of the Cumberland Plateau, this subregion is a true tableland. It is divided from the southern part on a climatic basis and includes on that account the northern and higher portion of Sand Mountain, although the mountain is detached from the main area by the Tennessee River. Steep cliffs separate the tableland from the Highland Rim on the west and the Appalachian Valleys on the east. The surface is an undulating to rolling plain, crossed and cut into by V-shaped stream channels bordered by belts of land dissected by runnels along the rims. Rainfall is heavy, with an annual average of nearly 50 inches in the northern and over 50 inches in the southern part. Temperatures are lower on the plateau than in the valleys to the east, but temperatures below freezing usually last only a few days.

The soils on the tableland are sandy loams derived from sandstone, light gray or yellowish in color, and shallow or rocky in places. With heavy rainfall and open ground during most of the winter, soil leaching is an almost continuous process. Deficiency in lime and humus and a natural rather low productivity are characteristic of these plateau soils. The proportion of land in farms ranges from 50 percent or more of the total area in the northern portion to only about 25 percent in the southern or Tennessee portion. An even greater disparity between the northern and southern portions of the subregion is found in the percentage of the total land area cropped. This difference in the agricultural development in the two parts of the subregion becomes more remarkable in view of the fact that in the Kentucky portion, as indicated in the study of Laurel County, Ky., (7), nearly all the smooth land is in farms, whereas in the Tennessee portion of the plateau, where the extent of smooth land is relatively larger than in Laurel County, only a small proportion of the land is in farms.

A full explanation of the underlying reasons for these differences in land use in the Northwestern Cumberland Plateau would require a special local investigation. The major reasons are undoubtedly of a geographic nature. The southern end of the Northwestern Cumberland Plateau is a strip of land 30 to 40 miles wide, wedged in between the two most populous districts in Tennessee. It is at an elevation of about 1,000 feet above the surrounding country, and is separated from it by bluffs and gorges. It is not easy of access; transportation and communication facilities have as yet only partially surmounted the barriers of isolation. Besides, the soils are relatively low in productivity. The natural setting, therefore, is not such as to attract new settlers; on the contrary, this part has not even been able to keep many of its own population from emigrating during recent decades.

Farming in the subregion is principally of the general type with production largely for home consumption. The use of land for pasture and the raising of livestock are somewhat more important than on the Northeastern Cumberland Plateau. The population is almost wholly rural, with a density of 20 per square mile in the Tennessee portion, and about 40 per square mile for the Kentucky portion.

The Southern Cumberland Plateau is entirely in Alabama. It comprises all of Sand Mountain with the exception of the northern points reaching into Tennessee and Georgia. As a plateau, it has not preserved the tableland character quite so well as has the adjacent Northwestern Cumberland Plateau. In contrast to the latter, it is fairly well dissected by water channels leaving a rolling to hilly and in places even rough surface. The general altitude is also much lower, ranging from about 500 feet in the south to about 1,500 feet in the north. The relatively low altitude of the Southern Cumberland Plateau has a great deal to do with the almost complete obliteration of the climatic distinctiveness of this subregion from the surrounding country to the east, west, and south. Rainfall is a few inches higher, temperature a few degrees lower, and the frost-free season average is 200 days and more.

Soils are mainly light-colored, gray-yellowish to reddish sandy loams and silt loams developed from sandstone and shale. They are deficient in lime, low in humus, and rather low in natural productivity. Of the total land area about half is in farms. The western margin contains a greater amount of rough and stony land and relatively less land in farms than the remainder of the subregion. About 310 square miles of this rough land are included in the purchase unit of the Alabama National Forest. Cotton is the principal crop although there is a considerable growing of truck in the southeastern section. The population over most of the area is rural with a range in density from about 25 to 50 per square mile. An exception occurs in the vicinity west of Birmingham, where suburban settlements and coal mining have concentrated the population.

The subregions so far described are those lying partly or wholly in the Southern Appalachians. Included in the study, however, are the fringes of six bordering subregions—the Northern, Central, and Southern Piedmont Plateaus to the east and the Upper Ohio Hills, the Highland Rim and the Southern Highland Rim and Tennessee Valley to the west. The surface of the bordering upper Piedmont sections are strongly rolling to hilly and rough in places. Soils are mostly heavy textured, yellowish to reddish-brown clay loams and clays. They are fairly productive but erode easily on exposed slopes. Division of the Piedmont Plateau into subregions is largely on the basis of climatic differences. In the Northern Piedmont, farming is centered around cattle raising; in the Central Piedmont, farming is diversified; and in the Southern Piedmont, cotton is the chief farm crop.

The Upper Ohio Hills are really a part of the Appalachian Plateaus, but can hardly be considered as forming part of the Southern Appalachians; only the bordering fringe is included in the study. The surface is thoroughly dissected but the hills and ridges are usually not so high nor so uniformly steep as in the adjacent Northeastern Cumberland Plateau. The soils, too, are better in that they are in part derived from limestone or calcareous shale. Agriculture is

based on raising of livestock. Some fruit and tobacco are grown.

The Highland Rim bordering the Appalachian Plateau to the west is part of a high plain. Relief varies from level to rolling and near the streams and borders is even hilly and broken. The northern end is partly hilly, but the southern end gradually merges into the Tennessee Valley. Cherty silt loams, yellowish in color and derived from impure limestone, predominate. They are only moderately productive and in level areas they lack adequate drainage. General farming predominates with production largely for home consumption. Some tobacco is grown in the northern part.

The southern portion of the Highland Rim, the Tennessee Valley, and the Moulton Valley, are combined in a subregion called the Southern Highland Rim and Tennessee Valley. It is separated from the Highland Rim on account of warmer climate and better soils. The surface configuration is undulating to rolling. The soils are primarily derived from limestone, but there exist also the two distinctions noted in the Appalachian Valleys of East Tennessee. One is a yellowish silt loam, developed from impure limestone, containing a considerable quantity of chert, and is only moderately productive, while the others are reddish-brown clay loams and clays, free from chert and very productive. The climate is warm enough and the frost-free season long enough to grow cotton to maturity. Cotton is the leading crop.

In this brief description of the physical features of the Southern Appalachians only broad generalizations can be made. Surface relief and mineral deposits are undoubtedly the two factors that have contributed more than any others to creating divers economic and social conditions. Distinct climatic and certain soil characteristics are the result of relief conditions and are coextensive with areas of similar elevation or gradient of slope. The routes of transportation and communication follow natural advantages in their courses and show their adjustment to relief.

The Appalachians provide, in fact, an historical example of the effects of rugged topography. For a long time the mountains acted as a barrier to the westward movement of the white man, and retarded the opening and development of the Middle West. Modern engineering has now largely overcome the difficulties of rugged relief but even today road and railroad connections in the rougher parts of the Southern Appalachians are poorly developed. Thus some sections are still more or less secluded from the rest of the world. The main arteries of transport and travel follow the joined valleys in the central physiographic division and connect the many cities and towns. But relief and steepness of slope affect land use particularly. The use of land for cultivated crops becomes increasingly difficult with the increase in steepness of slope. On the steeper slopes only primitive methods of cultivation can be employed and the hazard of erosion is great.

TYPES OF LAND UTILIZATION

By L. J. Peet, *assistant agricultural economist, Division of Land Economics, Bureau of Agricultural Economics,* and R. V. Reynolds, *forest examiner, Forest Service* [9]

Less than two centuries have passed since the Southern Appalachians [10] were entirely forested. With the coming of the white man, land was cleared for home sites, crops, and pasture. With the passing of the years, urban centers developed and land was taken for highways, railroads, and manufacturing sites. By 1929 the major types of land use in the several physiographic divisions and subregions of the Southern Appalachians were approximately as shown in table 1. The table indicates clearly that, from the standpoint of area, forest and woodland still predominate in most parts of the region.

Physical conditions have been effective barriers to any large increase in the acreage of land used for crops and pasture. Not only has this been true for the region as a whole but also for most of the several subregions. However, physical conditions interpose more severe limitations on the use of the land for agriculture in some parts of the region than in others. In general, the possibilities of using large acreages of land for crops and pasture have been greatest in the five subregions comprising the Appalachian Valleys and Central Appalachian Ridges (valley division) and least in the Blue Ridge and in the Cumberland and Allegheny Plateaus (mountain divisions) (fig. 4). The differences in major types of land use in these three principal divisions are outstanding. In the Appalachian Valleys and Ridges over two-thirds of the land was in farms in 1930 and nearly two-thirds of the land in farms was crop and open pasture land in 1929, while in both the Blue Ridge and the Cumberland and Allegheny Plateaus roughly one-half of the land was in farms in 1930 and only one-half of the land in farms was used for crops and open pasture in 1929.

The remainder of the region, consisting of fringes of subregions bordering the Blue Ridge on the east and the Cumberland and Allegheny Plateaus on the west, serves as a useful contrast to the three main divisions of the Southern Appalachians. The inclusion of the border counties as a unit also avoids the difficulties involved in including only parts of counties. By so doing, however, the area of the region is increased 18 percent, the number of farms 22 percent, and the total population 20 percent. Approximately three-fourths of the total area of the "fringes" was in farms in 1930, and about four-sevenths of the land in farms was crop and pasture land in 1929.

Although the classification of land in table 1 serves a useful purpose it omits several important specialized uses of the same land. The development of these specialized uses began shortly after settlement by the white man but such uses have become relatively important only during the last few decades. The most important specialized use of the land, exploitation of minerals, embraces several million acres in the Cumberland and Allegheny Plateaus and the Upper Ohio Hills—subregions in which the opportunities for agriculture are very limited. In terms of value of products this use of the land was more important in the region in 1929 than the use of land for agriculture although in terms of the number of persons gainfully employed, agriculture was more than three times as important as mining.

[9] Mr. Reynolds contributed the discussion of forest and woodland; Mr. Peet contributed the remainder of the section.

[10] In the preceding section describing the extent and physical characteristics of the Southern Appalachians that term was applied to the region as a whole. In this and succeeding sections of this publication the terms Southern Appalachians and region will be applied to the 205 counties in the States of Virginia, West Virginia, Kentucky, North Carolina, Tennessee, and Georgia, which are wholly or partly in the Southern Appalachians.

TABLE 1.—*Major types of land use in the Southern Appalachians, by physiographic divisions and subregions, 1929*

Physiographic division and subregion	Farms	Crop land		Pasture land		Forest and woodland		Other uses		Total land area [3]
		Cropped	Idle or fallow	Plowable	Other [1]	In farms	Not in farms	In farms	Not in farms [2]	
	Number	*1,000 acres*	*1,000 acres*	*1,000 acres*	*1,000 acres*	*1,000 acres*	*1,000 acres*	*1,000 acres*	*1,000 acres*	*1,000 acres*
Eastern division:										
Blue Ridge	73,220	1,068	291	1,014	339	2,523	4,523	327	178	10,263
Central division:										
Central Appalachian Valleys	15,454	672	38	398	178	430	800	74	67	2,657
Central Appalachian Ridges	17,173	443	44	484	490	1,317	2,196	115	78	5,167
Appalachian Valleys of Southwest Virginia	22,908	438	58	549	269	563	733	77	79	2,766
Appalachian Valleys of East Tennessee	48,762	1,172	296	827	146	1,100	959	222	165	4,887
Southern Appalachian Valleys	17,509	448	170	82	52	494	561	88	50	1,945
Total	121,806	3,173	606	2,340	1,135	3,904	5,249	576	439	17,422
Western division:										
Allegheny Plateau	26,976	506	50	471	552	1,009	2,443	102	171	5,304
Northeastern Cumberland Plateau	55,460	676	293	663	200	1,873	3,860	251	282	8,098
Northwestern Cumberland Plateau	21,291	366	129	202	64	735	2,569	119	70	4,254
Total	103,727	1,548	472	1,336	816	3,617	8,872	472	523	17,656
Eastern fringe:										
Northern Piedmont Plateau	4,979	219	20	330	50	196	130	28	19	992
Central Piedmont Plateau	23,128	447	142	300	101	881	623	171	60	2,725
Southern Piedmont Plateau	15,802	359	63	46	33	470	446	56	37	1,510
Total	43,909	1,025	225	676	184	1,547	1,199	255	116	5,227
Western fringe:										
Upper Ohio Hills	13,766	228	32	392	242	303	390	61	98	1,746
Highland Rim	27,547	629	195	334	81	806	612	120	52	2,829
Total	41,313	857	227	726	323	1,109	1,002	181	150	4,575
All subregions	383,975	7,671	1,821	6,092	2,797	12,700	20,845	1,811	1,406	55,143

[1] Excludes woodland.
[2] Includes railroad rights-of-way, roads, urban centers, and nonfarm dwelling sites.
[3] Excludes 232,580 acres of water surface.

Based on the census (*50*) and the area of minor civil divisions as determined by using a planimeter on topographic maps of the U.S. Geological Survey and maps from other sources.

Development of water power, though a specialized use of the land in only a small part of the region, is economically significant, particularly in North Carolina and Tennessee where power is not obtained from coal. In 1932 the capacity of water wheels at plants of 100 horsepower or more was approximately 924,000 horsepower or nearly 6 percent of the total produced at plants of a similar description in the United States. Moreover, the proposed developments in the Tennessee Basin will greatly increase this figure.

Other specialized uses of the land are as yet less important, although they are gaining in significance. Recreational uses, for instance, include many health and recreational centers particularly in the Blue Ridge, numerous camp and summer homes, and the Shenandoah and Great Smoky Mountains National Parks.

Development of the specialized types of land use has permitted the growth of manufacturing and a degree of specialization which has stimulated the exchange of goods and the development of transport facilities. This sequence of events has served, in a measure, to relieve the otherwise heavy pressure of a rapidly increasing labor supply on farms by providing increased employment in nearly all industries. As a consequence, the nonfarm population increased, it is estimated, from roughly one-third of the total in 1900 to nearly three-fifths in 1930. In some sections farms were abandoned during this period and in nearly all sections the acreage of crops decreased, largely as a result of the increasing number of farmers employed part-time in work off the farm.

A knowledge of the changes in major types of land use that have accompanied a rapidly developing complex economic organization is essential to an understanding of why land in different parts is used as it is and of what the trends in use may be. The following is a discussion of the changes that occurred from 1900 to 1930 and consequently includes little about the important changes which, at least temporarily, have occurred during the period of severe economic depression beginning in 1929.

LAND IN FARMS AND NUMBER OF FARMS, 1900-30

In the Southern Appalachians as a whole, land in farms decreased at an increasing rate from 1900 to 1930 (figs. 5–13). During the same period the number of farms first increased at a decreasing rate and then decreased at an increasing rate (figs. 14–22). Over the 30-year period, land in farms decreased 18 percent while number of farms increased 5 percent. This exceptional situation at least in part, was the result of the following forces: (1) Purchase of parts of farms for the timber or minerals, thereby reducing the acreage of land in farms; (2) purchase of entire farms for the timber or minerals, with the subsequent exclusion (*a*) of all land in those farms purchased or (*b*) all land not actually operated by a tenant; (3) division of farms among the heirs, resulting (*a*) in an increase in number of farms without an increase in the land area in farms and (*b*) in a further loss of land in farms whenever an heir's share of the farm was not operated; (4) increase in number of tenant cotton farmers in the Southern Appalachian Valleys and the Southern Piedmont Plateau (figs. 23–26) without an increase of land in farms. The combined effect of these forces was to reduce the average size of farms from 109 acres in 1900 to 86 acres in 1930.

During the first decade of the twentieth century the acreage of land in farms showed little change in the Appalachian Valleys or in the fringes that form the

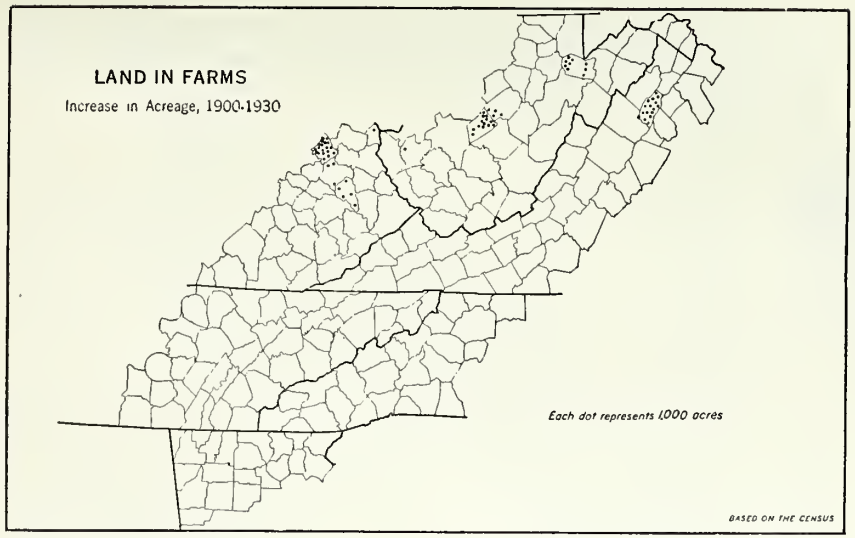

FIGURE 5.—Between 1900 and 1930 land in farms in the Southern Appalachians increased in only 9 scattered counties out of a total of 205. Such increases as occurred were small and in 5 of the 9 counties were accompanied by a decrease in acreage of harvested crops. In the region as a whole, land in farms decreased 18 percent.

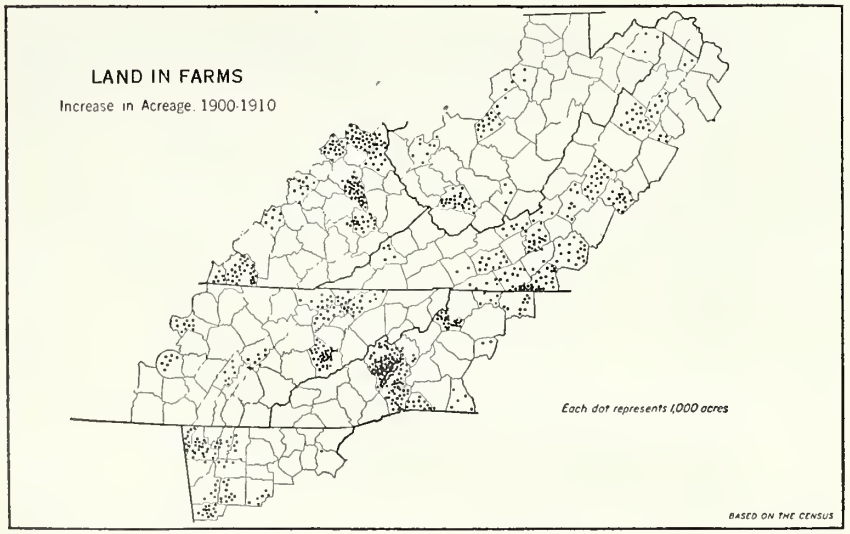

FIGURE 7.—Considering only the period 1900–10 land in farms increased in more than one-third of the counties and decreased only 3 percent in the region as a whole. Moderate increases occurred in the Asheville Basin in North Carolina, in the Southern Appalachian Valleys, in several counties partly in the Central Piedmont Plateau and partly in the Blue Ridge in Virginia, and in the Highland Rim.

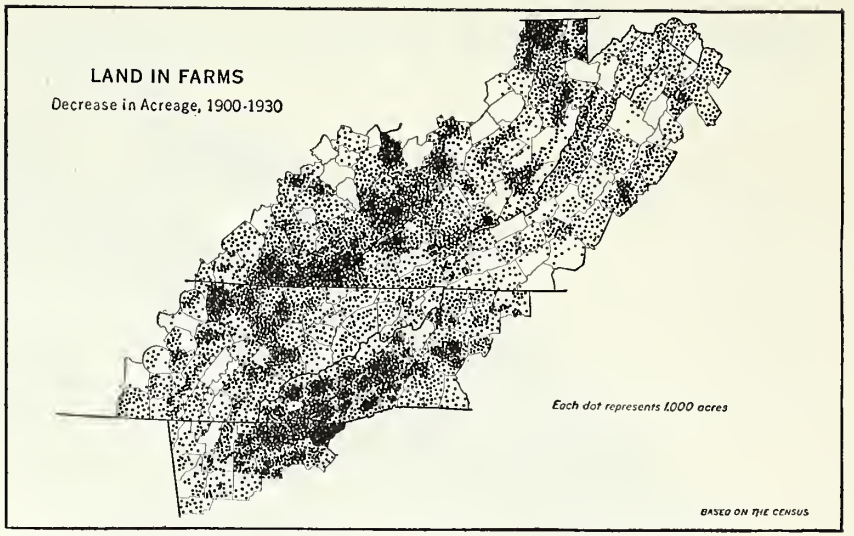

FIGURE 6.—Land in farms decreased 34 percent between 1900 and 1930 in the Northwestern Cumberland Plateau, 26 percent in the Northeastern Cumberland Plateau, 25 percent in the Blue Ridge, and 18 percent in the Allegheny Plateau (fig. 4). Most of the land in these subregions is poorly adapted to agricultural use. In the remaining subregions decreases ranged from 8 to 17 percent.

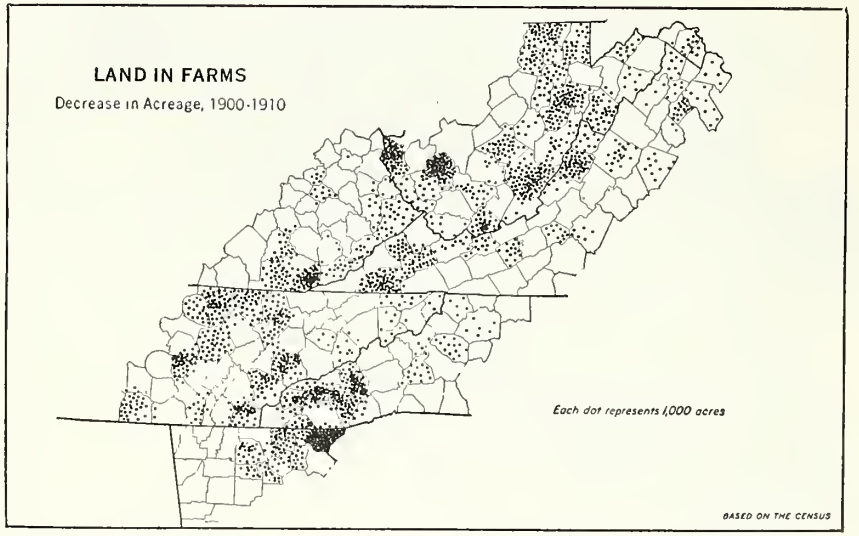

FIGURE 8.—The decrease in land in farms between 1900 and 1910 was pronounced in certain coal-producing counties in West Virginia and Kentucky and in mountainous counties in the southern half of the Blue Ridge in North Carolina, Georgia, and Tennessee. During the decade land in farms decreased 10 percent in the Allegheny and Northwestern Cumberland Plateaus and 5 percent in the Central Appalachian Ridges.

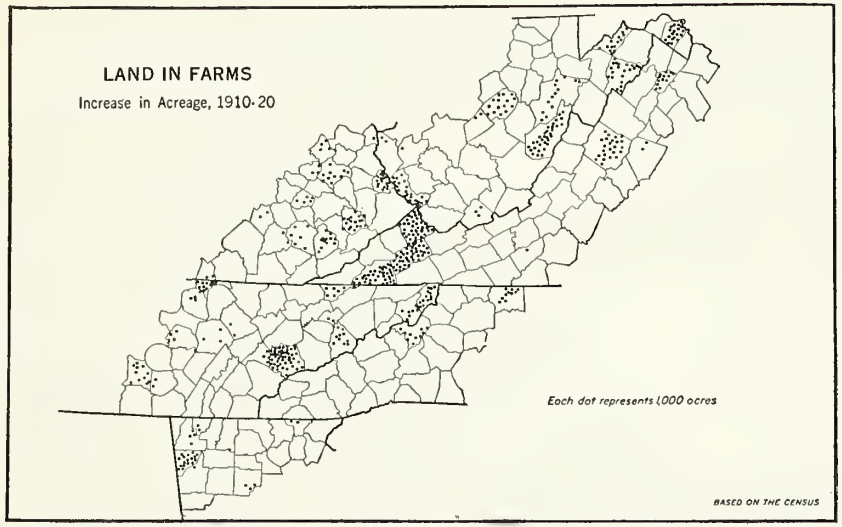

FIGURE 9.—During the war decade, 1910–20, land in farms increased in only one-fourth of the 205 counties and decreased 5 percent in the region as a whole. Frequently large increases occurred in counties adjoining others in which large decreases occurred (fig. 10), indicating that local conditions had an important bearing on the changes that took place.

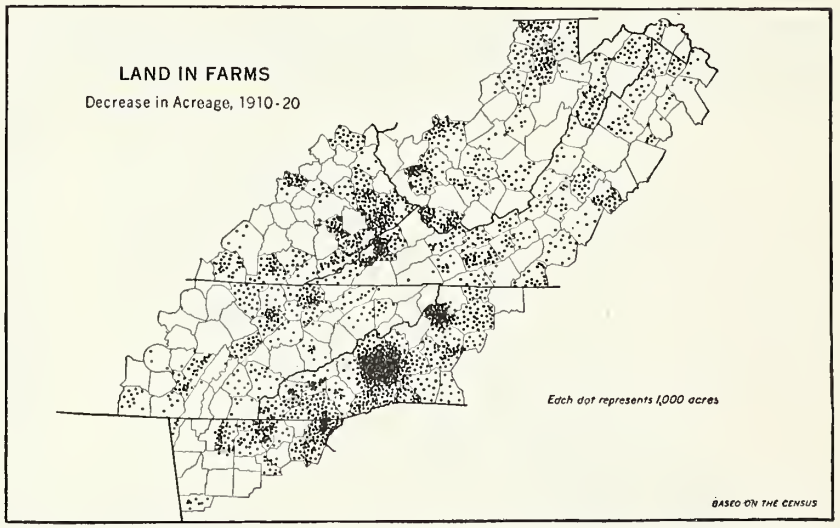

FIGURE 10.—The decrease in land in farms between 1910 and 1920 was most pronounced in the Asheville Basin in North Carolina, an area that showed a considerable increase in the preceding decade (fig. 7). Land in farms decreased in every subregion during the decade—the decrease in the Blue Ridge amounting to 11 percent, and in the Northeastern Cumberland Plateau to 7 percent.

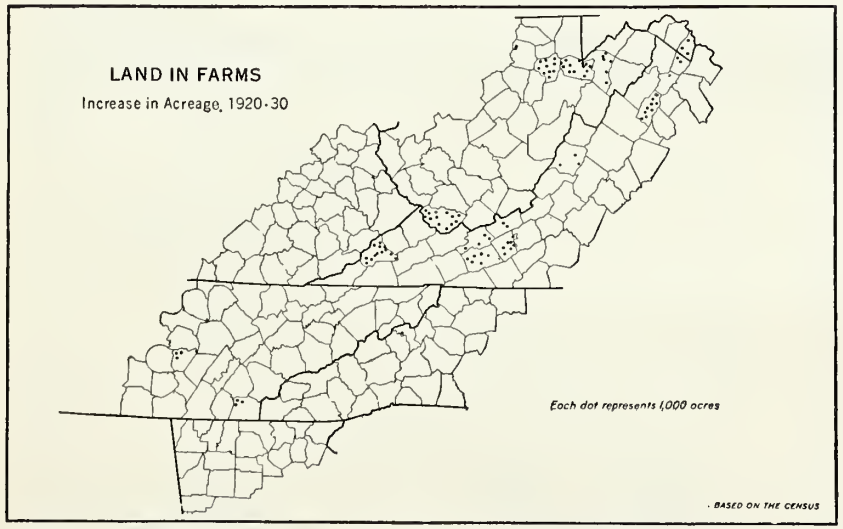

FIGURE 11.—During the post-war period, 1920–30, less than 1 county in 10 showed an increase in land in farms. Such increases as occurred were small and were contrary to the general trend. In the region as a whole, land in farms decreased 11 percent.

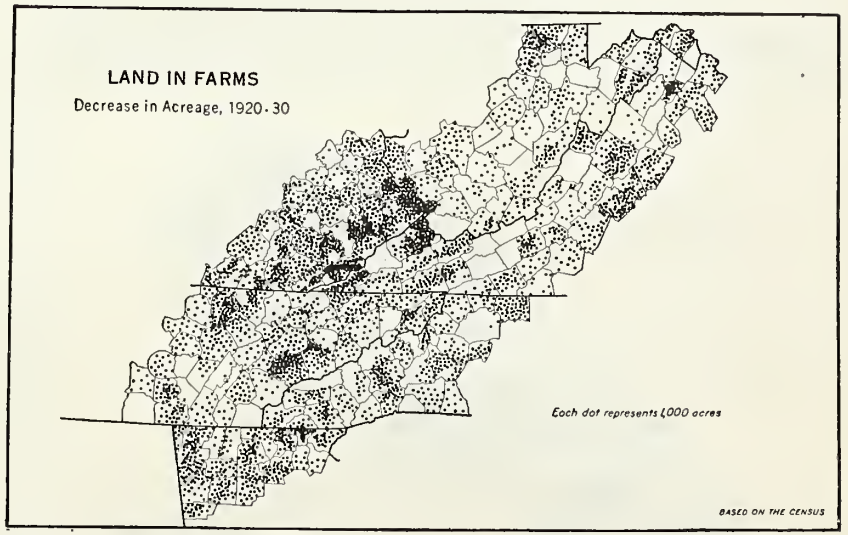

FIGURE 12.—The general decrease in the acreage of land in farms in this decade may be attributed largely to a shift from agriculture to other industries. The decrease was especially large in the newly opened coal fields of eastern Kentucky. In the Northwestern Cumberland Plateau, land in farms decreased 22 percent, in the Northeastern Cumberland Plateau 17 percent, and in the Blue Ridge 11 percent.

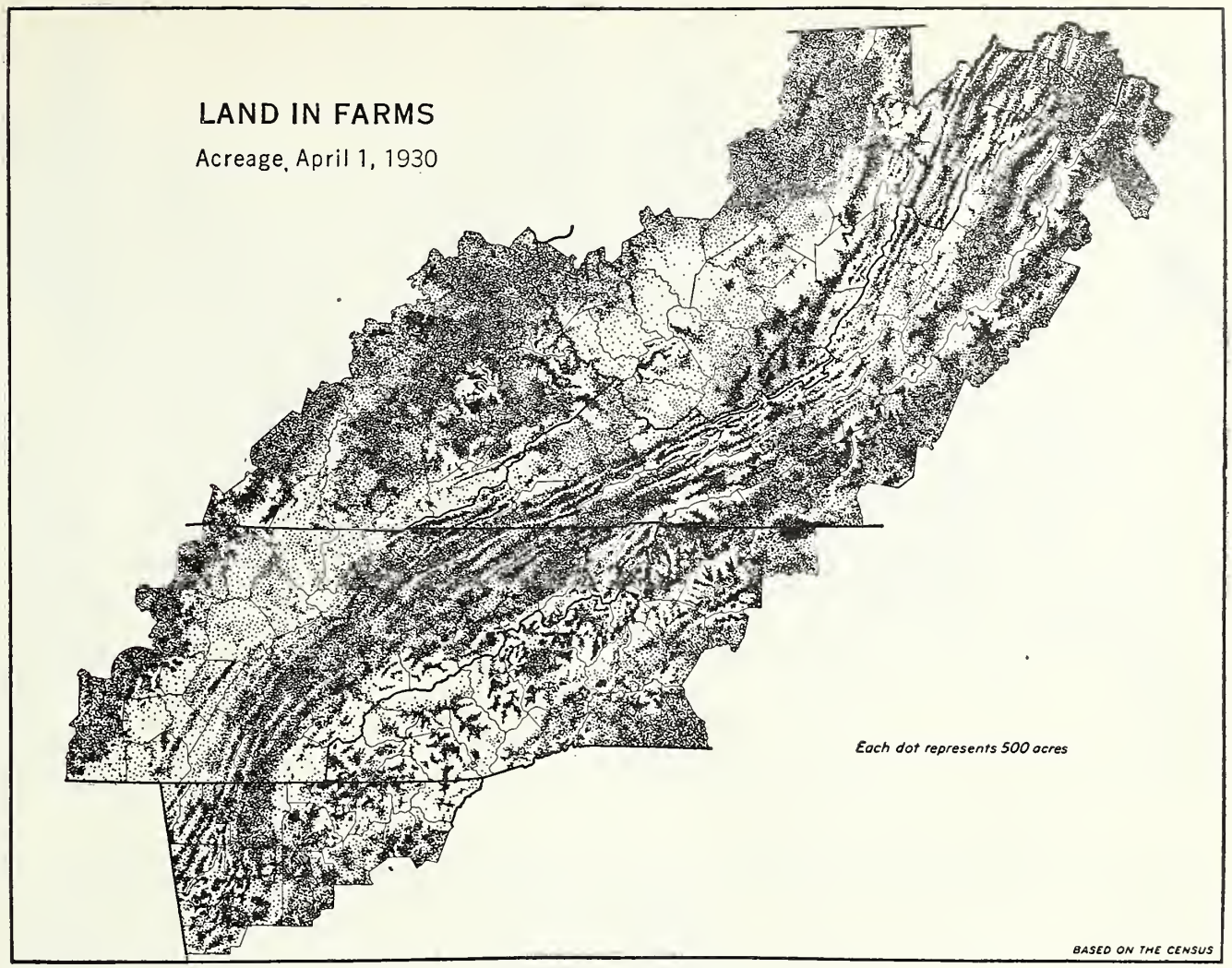

FIGURE 13.—In 1930, practically five-eighths of the 55,000,000 acres in the Southern Appalachians was in farms. In the Northwestern and Northeastern Cumberland Plateaus, the Allegheny Plateau, and the Blue Ridge, the four subregions in which land in farms declined most sharply between 1900 and 1930, roughly one-half of the land was in farms. In other subregions, except the Central Appalachian Ridges, from 67 to 85 percent of the land was in farms. In those subregions with a small percentage of the land area in farms, physical conditions sharply limit the use of the land. In the Blue Ridge, much of the land is very mountainous. In much of the Northwestern and Northeastern Cumberland Plateaus and in the Allegheny Plateau the topography is relatively rough. In the other subregions the hills and ridges are interspersed with sufficient land adapted to agricultural use to result in a larger percentage of land in farms. Coal mining has caused large variations in the acreage of land in farms within certain subregions, notably in the Northeastern Cumberland Plateau.

eastern and western edges of the region. But during the following period, 1910–30, land in farms decreased in each of the subregions comprising the valleys and the fringes, and, apparently, at a more rapid rate near the close of the period. The larger decreases over the period 1900–30, on the other hand, were in those subregions less well adapted to agriculture—the Blue Ridge and the Cumberland and Allegheny Plateaus.

Unlike the trend in land in farms, the trend in number of farms was irregular between 1900 and 1930 in several subregions. Considered as a whole, number of farms increased from 1900 to 1910 and decreased from 1910 to 1920. Where there was a large increase between 1900 and 1910, as in the Southern Appalachian Valleys, there was a smaller increase between 1910 and 1920 and where there was a small increase between 1900 and 1910, as in the Upper Ohio Hills, there was a considerable decrease between 1910 and 1920. Between 1920 and 1930, however, the downward trend in number of farms was reversed, or was materially slowed up in the Blue Ridge, the Appalachian Valleys of Southwest Virginia, the Allegheny Plateau, the Northeastern Cumberland Plateau, and the Southern Piedmont Plateau.

The change in direction of the trend may have been caused partly by the rapid return of families to farms at the beginning of the present economic depression, partly by the rapid natural increase in population, and partly by the large number of rural families that, under the census definition, produce enough from the land to be classed sometimes as farm families and at other times as nonfarm families. During the period 1900–30, number of farms increased 8 percent in the Appalachian Valleys and Ridges, 1 percent in the Blue Ridge, 4 percent in the Cumberland and Allegheny Plateaus, and 4 percent in the fringes. In other words, the change in number of farms was only partially associated with the physical adaptability of the land for agricultural use. In fact, number of farms tended to increase more rapidly during the 30-year period in some of the subregions relatively poorly adapted to agriculture than in other subregions much better adapted.

A fact which must be not overlooked in connection with the decrease in average acreage per farm, particularly in the subregions poorly adapted to farming, is that farmers in the region have relied to a continually increasing extent upon part-time employment

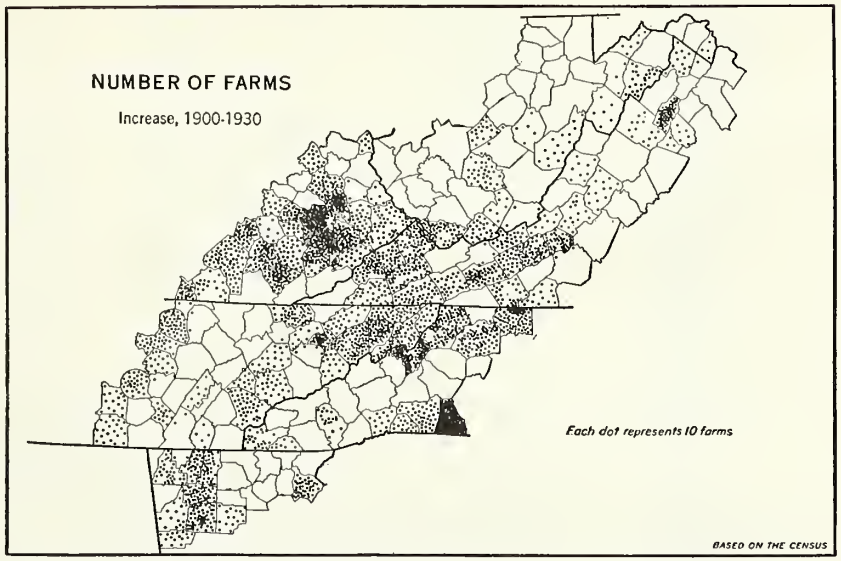

FIGURE 14.—Although the acreage of land in farms in the Southern Appalachians declined between 1900 and 1930 (figs. 5 and 6), the number of farms increased 5 percent. During the 30-year period the number of farms increased 15 percent in both the Appalachian Valleys of Southwest Virginia and in the Southern Appalachian Valleys, 13 percent in the Highland Rim, and 12 percent in the Southern Piedmont Plateau.

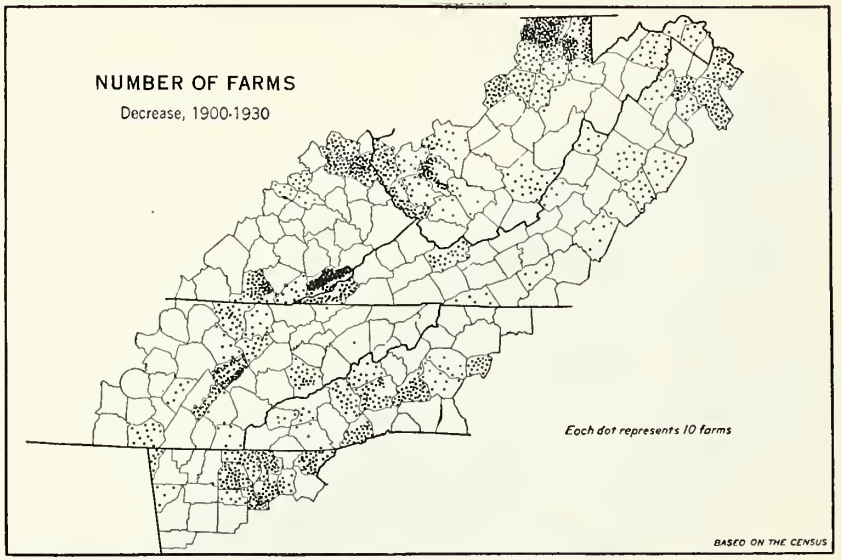

FIGURE 15.—The number of farms decreased in approximately two-fifths of the 205 counties between 1900 and 1930. The most marked decreases occurred in or near those counties in West Virginia and Kentucky having coal mines or industrial centers. Considerable decreases also occurred in a number of mountainous counties in the Blue Ridge in North Carolina and Georgia.

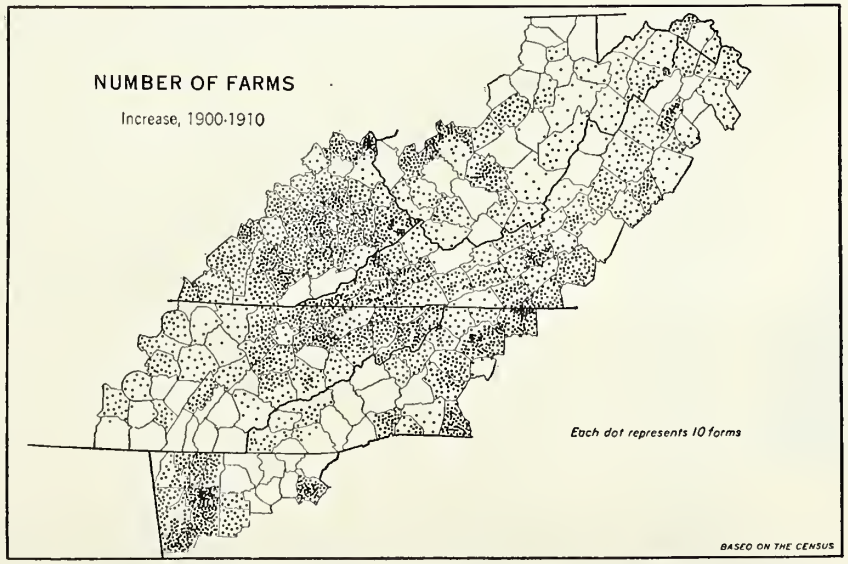

FIGURE 16.—Considering only the decade from 1900 to 1910 the number of farms increased in every subregion the average increase for all subregions being 9 percent. The increase was 22 percent in the Southern Appalachian Valleys, 17 percent in the Appalachian Valleys of Southwest Virginia, 15 percent in the Northeastern Cumberland Plateau, and 12 percent in the Central Piedmont Plateau.

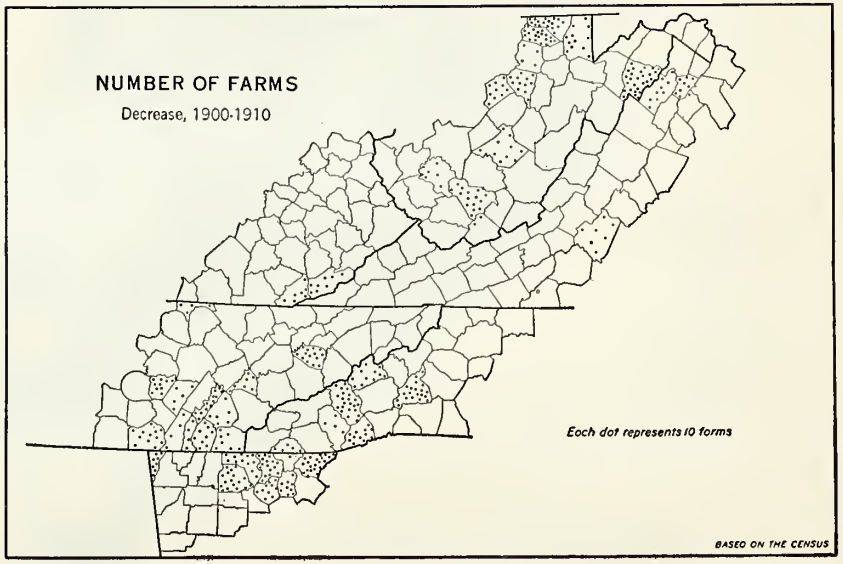

FIGURE 17.—The number of farms decreased in only 43 counties between 1900 and 1910. Several of these counties were in the Blue Ridge in North Carolina and Georgia, several were in the Appalachian Valleys of East Tennessee near the growing cities of Knoxville and Chattanooga, and several others were in coal producing areas in West Virginia and Kentucky.

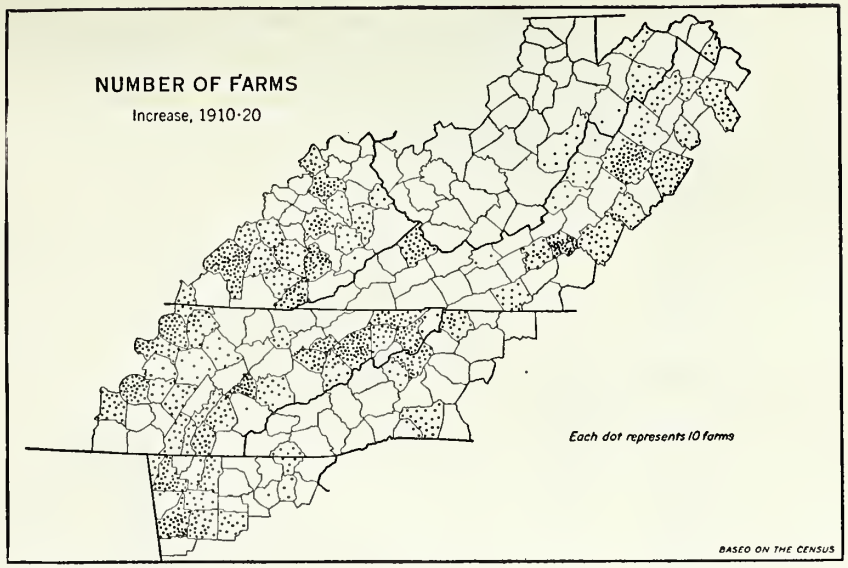

FIGURE 18.—During the decade from 1910 to 1920 the number of farms increased 6 percent in the Southern Appalachian Valleys and the Highland Rim, 5 percent in the Central Appalachian Valleys, and 2 percent in the Appalachian Valleys of East Tennessee. In the region as a whole the number of farms decreased 1 percent.

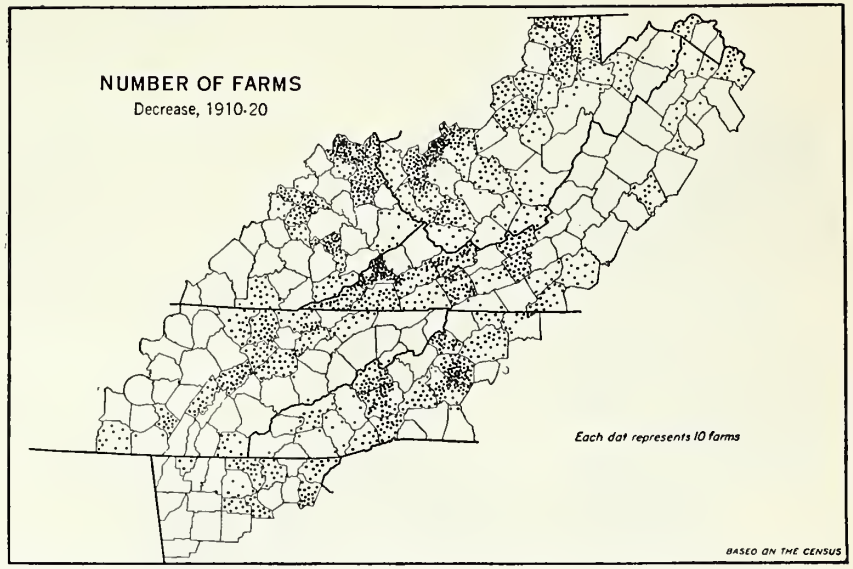

FIGURE 19.—The decrease in the number of farms between 1910 and 1920 was particularly large in and near those counties in which coal was mined, and near industrial centers. The number of farms decreased 10 percent during the decade in the Upper Ohio Hills, 7 percent in the Allegheny Plateau, and 5 percent in the Appalachian Valleys of Southwest Virginia and in the Northeastern Cumberland Plateau.

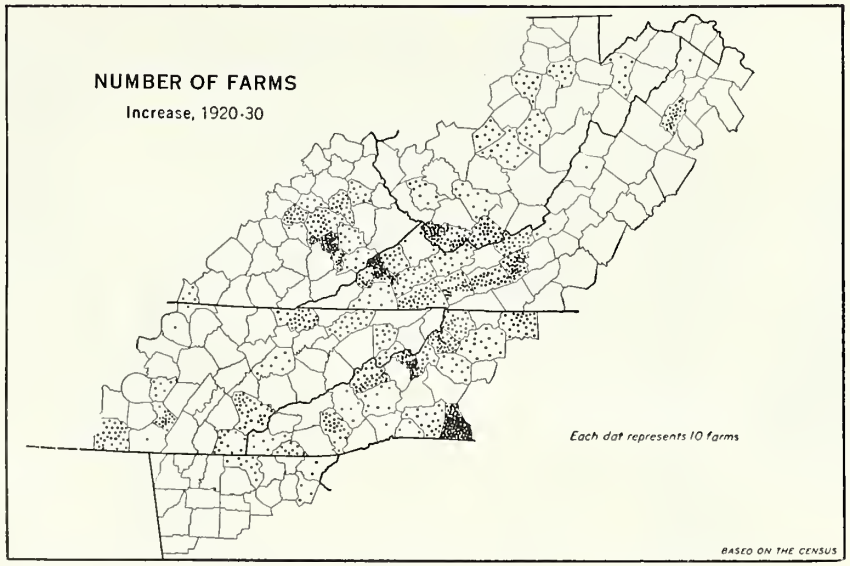

FIGURE 20.—Between 1920 and 1930 the number of farms increased in about one-third of the 205 counties. A very heavy increase occurred in Southwest Virginia, where a decrease had occurred between 1910 and 1920. Farms increased greatly in number in Cleveland County, N.C., because of a shift to cotton farming. In the region as a whole the number of farms decreased 3 percent.

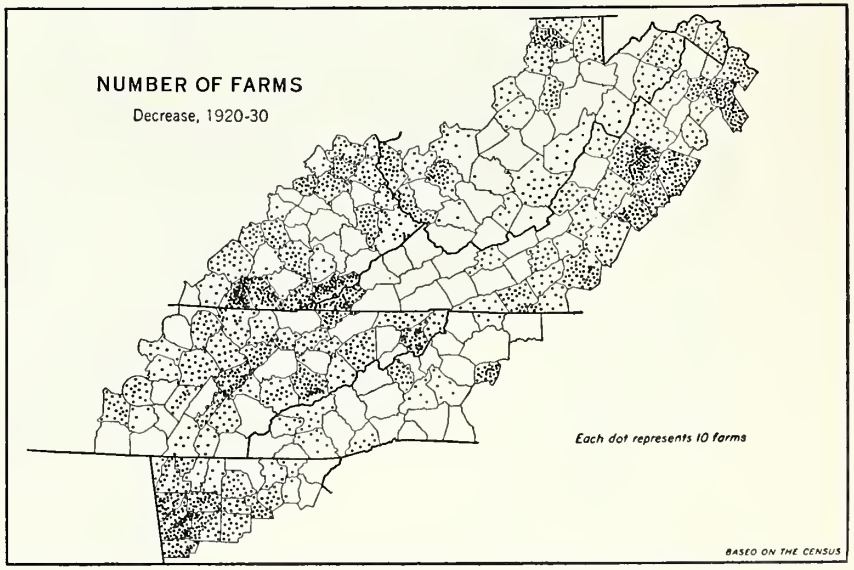

FIGURE 21.—The number of farms declined 17 percent between 1920 and 1930 in the Northern Piedmont Plateau, 12 percent in the Southern Appalachian Valleys, 9 percent in the Northwestern Cumberland Plateau and Central Appalachian Valleys, and 8 percent in the Upper Ohio Hills. The land in only one of these subregions, the Northwestern Cumberland Plateau, is, relative to the other subregions, poorly adapted to agricultural use.

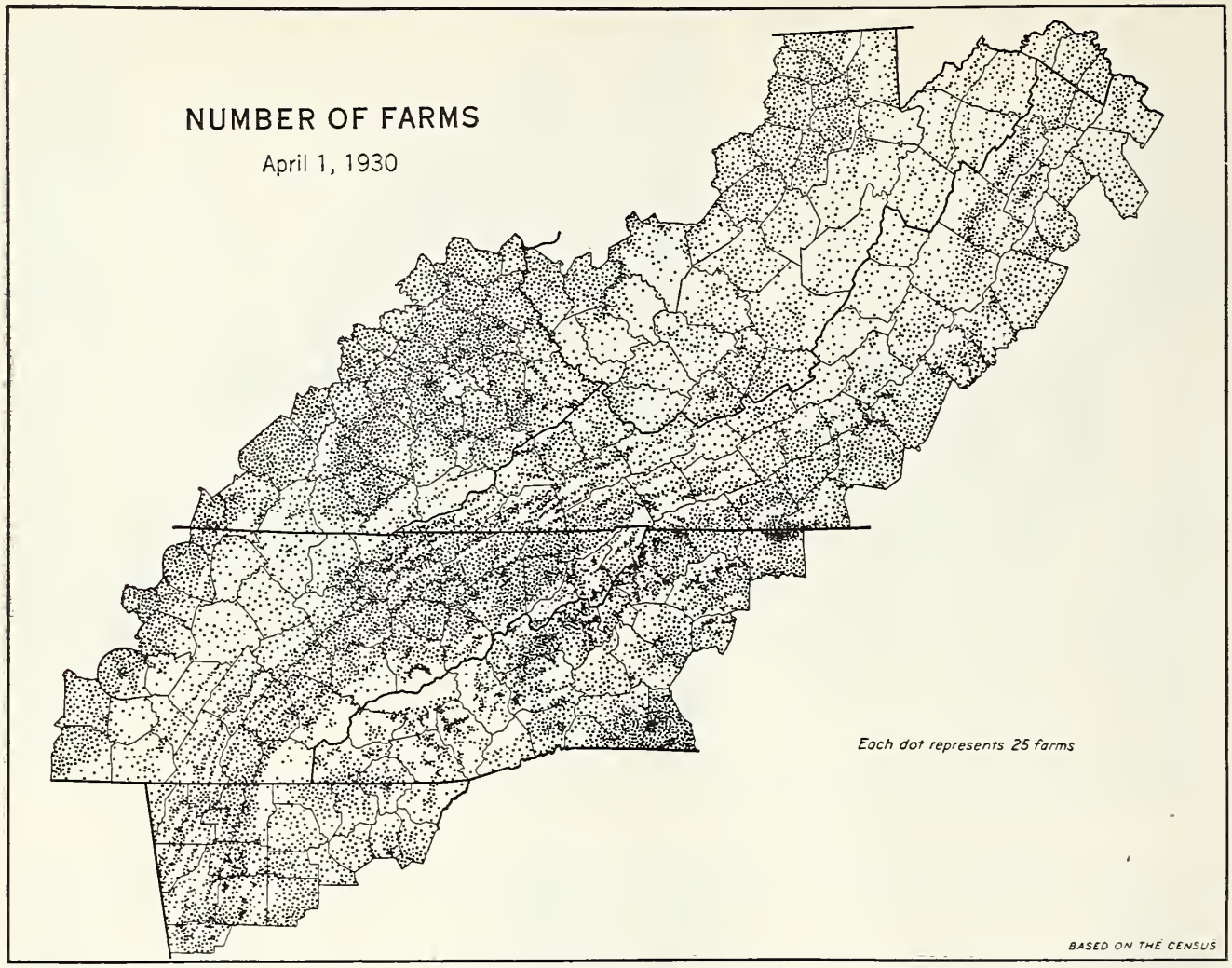

FIGURE 22.—In 1930 there were approximately 384,000 farms in the Southern Appalachians. In those parts of the Blue Ridge in North Carolina, Tennessee, and Georgia, the Northwestern Cumberland Plateau in Tennessee, and the Northeastern Cumberland Plateau in West Virginia, where the land is very poorly adapted to agricultural use, relatively little land was in farms in 1930 (fig. 13) and the farms were scattered. In the Kentucky portion of the Northeastern Cumberland Plateau land is also very poorly adapted to agricultural use, but much of the land was in farms in 1930 and the farms were numerous. Elsewhere farms were relatively more numerous in the southern than in the northern portions of the region.

off the farm and that such employment has been made possible by the development of specialized types of land use, particularly coal mining, and by manufacturing, so that farmers as a whole were probably obtaining a better living in 1930 than in 1900.

The combination of agriculture and industry, however, has been haphazard, irregular, and has resulted in changes in number of farms and land in farms that can be explained only by an understanding of local conditions. For instance, in the West Virginia portion of the Northeastern Cumberland Plateau, opportunities in industry were apparently sufficient to result in fewer farms (fig. 15) and less land in farms (fig. 6) while in much of the Northeastern Cumberland Plateau in Kentucky, although land in farms decreased the number of farms increased, apparently because industrialization was not sufficiently rapid to absorb the increase in population.

In general, continued industrialization has resulted in a gradual shift of families on the poorer farms from part-time farming to full-time employment in industry. In the Upper Ohio Hills, where industrialization has been in process longest, number of farms decreased 16 percent from 1900 to 1930 and land in farms decreased 17 percent. Probably both the farms and land in farms that were abandoned were poorer than average. In parts of the Northeastern Cumberland Plateau, on the other hand, industry has not completely absorbed a sufficiently large number of farm families to decrease the number of farms, with the result that many farmers are endeavoring to obtain a living from land that is less well adapted to agriculture than land that has passed out of use in the Upper Ohio Hills, and in many other parts of the region. The situation in the Northeastern Cumberland Plateau, moreover, is not greatly unlike that in many isolated sections and localities throughout the region, particularly in areas of rugged topography.

Clearly no uniform relationship between the physical characteristics of the land and distribution of farms and land in farms (figs. 13 and 22) prevails in the region as a whole. In 1930 there was an average of 3.2 farms per square mile in the Northern Piedmont Plateau and 3.7 farms per square mile in the Central Appalachian Valleys, two of the subregions well adapted to agriculture and having a large percentage of land area in farms, as compared with 6.4 farms per square

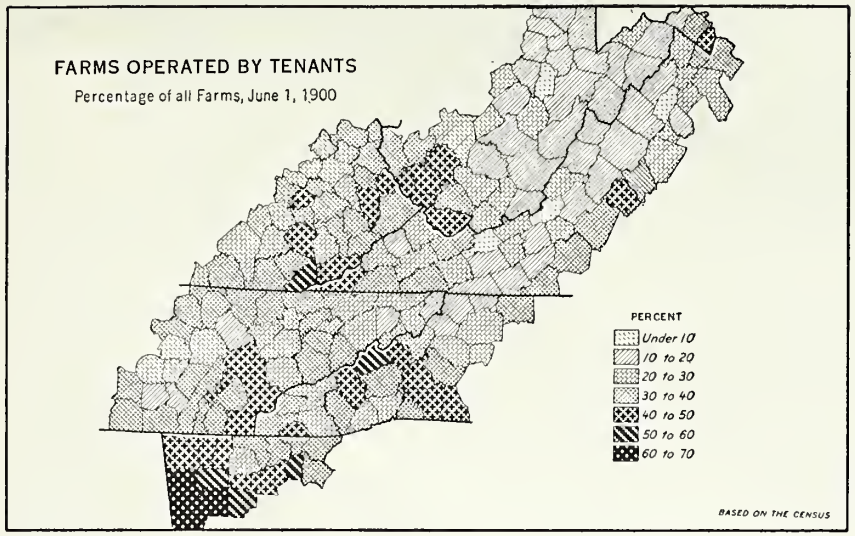

FIGURE 23.—In 1900, 30 percent of the farm operators in the Southern Appalachians were tenants. The percentage of tenancy was largest in the cotton-producing counties in Georgia, North Carolina, and Tennessee, and in several counties in the Northeastern Cumberland Plateau, where the amount of tenancy was associated with purchases of land for the minerals and timber.

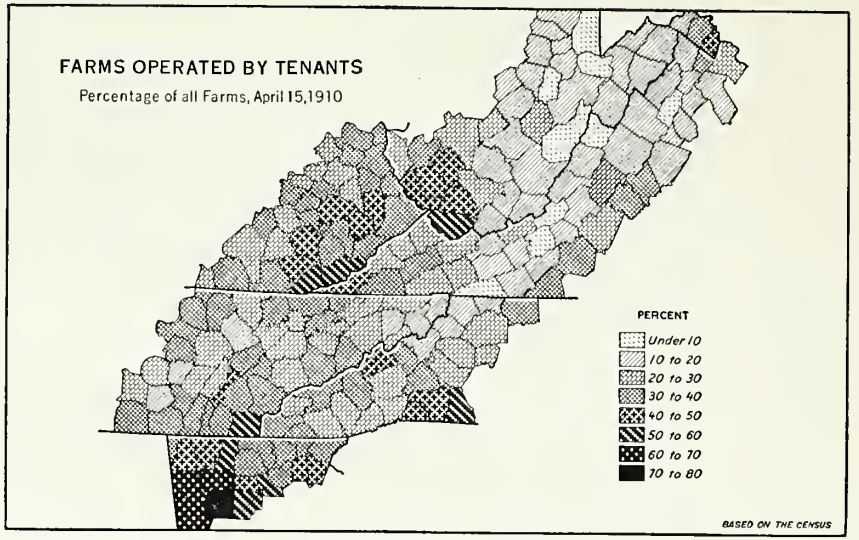

FIGURE 24.—In 1910, 29 percent of all farm operators were tenants. In general, between 1900 and 1910 farm tenancy decreased in the Blue Ridge and Appalachian Valleys of East Tennessee and in Virginia, West Virginia, and Kentucky, except in parts of the Northeastern Cumberland Plateau. Elsewhere there was little change.

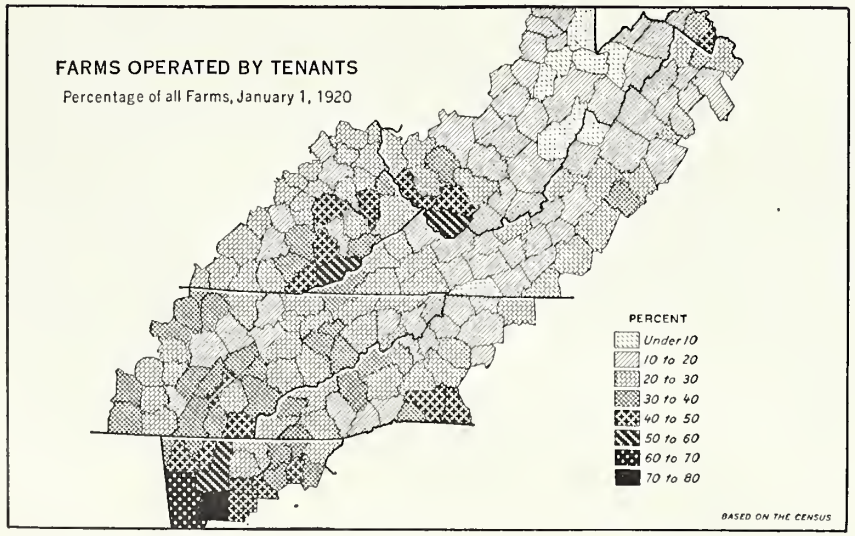

FIGURE 25.—In 1920, 26 percent of the farm operators were tenants. Compared with the year 1910, farm tenancy had decreased in all subregions except two, the Northern Piedmont Plateau and the Central Appalachian Valleys. A marked decrease in tenancy occurred during the decade in the Northeastern Cumberland Plateau.

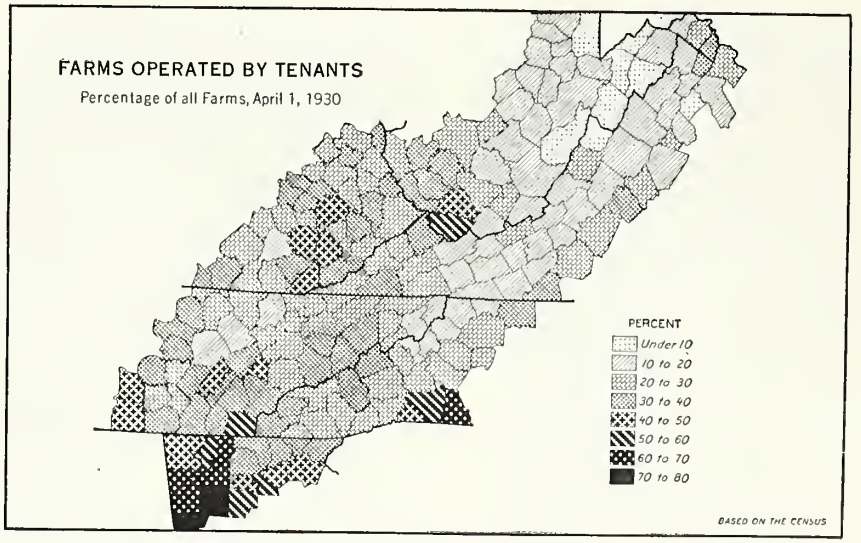

FIGURE 26.—Between 1920 and 1930 tenancy increased from 26 to 29 percent. During this period tenancy increased greatly in the Southern Appalachian Valleys and the Southern Piedmont Plateau, while moderate increases occurred in most other subregions. In the Northern Piedmont Plateau and the Central Appalachian Valleys slight decreases occurred.

mile in the Appalachian Valleys of East Tennessee, where the opportunities for agriculture are not quite so great but where nearly as large a percentage of the land area is in farms, and 5.4 farms per square mile in the Kentucky portion of the Northeastern Cumberland Plateau, where there are very few opportunities for agriculture.

In general, the density of farms is greater in the southern than in the northern part of the region. Furthermore, the density of farms per square mile in the entire region in 1930 was roughly 50 percent greater than in the best agricultural States of the Middle West, where a larger proportion of the land is adapted to agricultural use and the production per acre is greater.

CROP AND PASTURE LAND, 1899–1929

Statistics are not available to indicate the trends either in acreage of crop land or in pasture land between 1899 and 1929. Figures for the total acreage of crops harvested have been used in place of crop land, and the acreage of plowable and "other" pasture (pasture classed neither as plowable nor woodland) are shown for those years for which data are available (1909 and 1929). A shift to a less intensive type of land use is clearly indicated by these data. Between 1909 and 1929 the acreage of harvested crops decreased over 1,000,000 acres while the acreage of plowable pasture increased approximately 800,000 acres and other pasture, 1,700,000 acres. In percentage of change, harvested crops decreased 12 percent and plowable and other pasture increased 15 and 156 percent, respectively, during the 20-year period.

In the region as a whole the acreage of harvested crops decreased 3 percent between 1899 and 1909, increased 9 percent between 1909 and 1919, and decreased 19 percent between 1919 and 1929 (figs. 27–35). In general, the trend was similar in the several subregions, indicating the influence of broad regional forces. The expansion in acreage of harvested crops between 1909 and 1919 resulted directly from the demand for greater agricultural production and from the high agricultural prices during the World War. Under the conditions prevailing during the decade the acreage of harvested crops reached a peak. With a decline in the price of agricultural commodities the poorer crop land was turned into pasture land and, in some instances, probably reverted to woodland.

Roughly, 40 percent of the crop land in 1929 was in the Appalachian Valleys and Central Appalachian Ridges, 36 percent in the more mountainous parts—the Blue Ridge and Cumberland and Allegheny Plateaus—and 24 percent in subregions along the borders of the region. The area of crop land ranged from 24 percent of all land in farms and 12 percent of the total land area in the more mountainous parts to 32 percent of the land in farms and 22 percent of the total land area in the less mountainous Appalachian Valleys and Central Appalachian Ridges.

The changes in acreage of harvested crops in the region from 1899 to 1929 fairly well represent differences in the extent of farming and, indirectly, the extent of dependence of farmers on work off the farm. These changes bear little relation either to the trend in number of farms or to land in farms already described. In general, the downward trend in acreage of harvested crops has been largely the result of changes in the relative returns from farming and work off the farm while the trend in number of farms and land in farms has been the result of the number of families seeking a place on which to live and the demand for land for the timber or minerals—factors having little effect on the extent of crop and plowable pasture land in farms.

The trend in acreage of harvested crops in the various subregions during the period from 1899 to 1929, peculiarly, bore little relation to the physical characteristics of these subregions. For instance, between 1899 and 1919 the acreage of harvested crops increased 7 percent in the Cumberland and Allegheny Plateaus as compared with 6 percent in the Appalachian Valleys and Ridges and, in the next decade, 1919 to 1929, decreased 21 percent in the former and 19 percent, or nearly as much, in the latter. Of course, forces were present that had a tendency to force out of use the poorer land and, except for differences in alternative opportunities, probably would have done so. In fact, wherever there were equal alternative opportunities and a decrease in acreage of harvested crops occurred, the land taken out of crop production was poorer than average.

To a considerable extent the changes in acreage of harvested crops have resulted from changes in the relative returns from farming and work off the farm. However, these changes should be considered along with the differences in physical conditions, changes in number of farms, and shifts in type of farming. These latter factors have continually exerted a strong influence even though the former factor exerted the dominant influence.

Largely because of the opportunities in industry the acreage of harvested crops decreased between 19 and 29 percent from 1899 to 1929 in each of the four following subregions: the Upper Ohio Hills, the Blue Ridge, the Appalachian Valleys of East Tennessee, and the Northeastern Cumberland Plateau. But parts of these subregions were so little affected by industrialization that the acreage of harvested crops increased (fig. 27). It should also be kept in mind that in three of these subregions the physical conditions are particularly conducive to a decrease in acreage of harvested crops and that in the Upper Ohio Hills the number of farms decreased appreciably during the 30-year period (fig. 15).

In the Northwestern Cumberland Plateau the decrease in acreage of harvested crops was 17 percent over the 30-year period. Some of this decrease probably resulted from the slight decrease in number of farms. Although there was no extensive development of mining, as in the Northeastern Cumberland Plateau, or manufacturing, as in the Appalachian Valleys of East Tennessee, there was developed, nevertheless, an increasingly complex economic organization in which many farmers found profitable part-time employment off the farm. Besides, most of the Northwestern Cumberland Plateau has been sufficiently accessible to areas that have offered greater economic opportunities not only for many people to leave the subregion, but also for many members of farm families to work part-time outside the subregion instead of on the home farm. In addition to all of these things, the physical conditions in much of the subregion are not conducive to the raising of cultivated crops.

In each of the remaining subregions the decrease in acreage of harvested crops between 1899 and 1929 was less than 17 percent. In the Northern Piedmont Plateau, the Central Appalachian Valleys, and Central

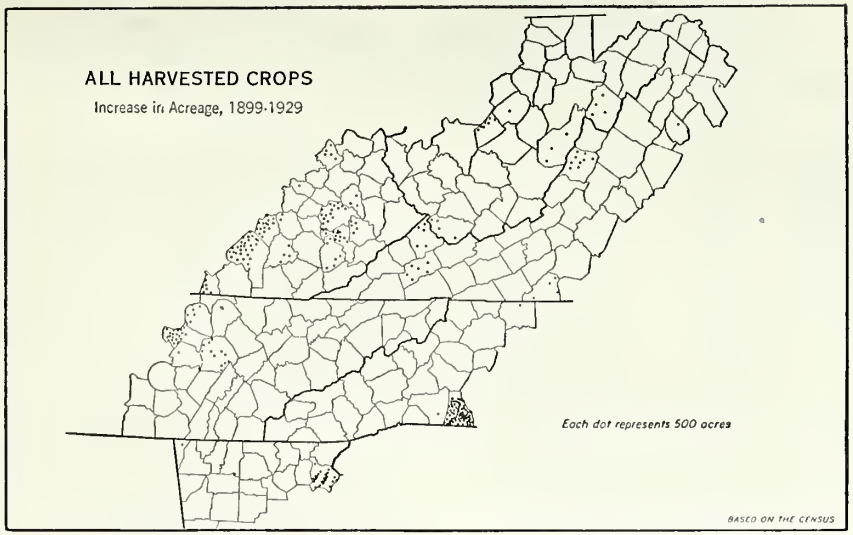

FIGURE 27.—Between 1899 and 1929 the acreage of harvested crops in the Southern Appalachians decreased about 15 percent, although increases occurred in 31 counties. Most of the increases in acreage were in the Highland Rim, in a group of isolated counties in the Northeastern Cumberland Plateau, and in two cotton-producing counties in Georgia and North Carolina.

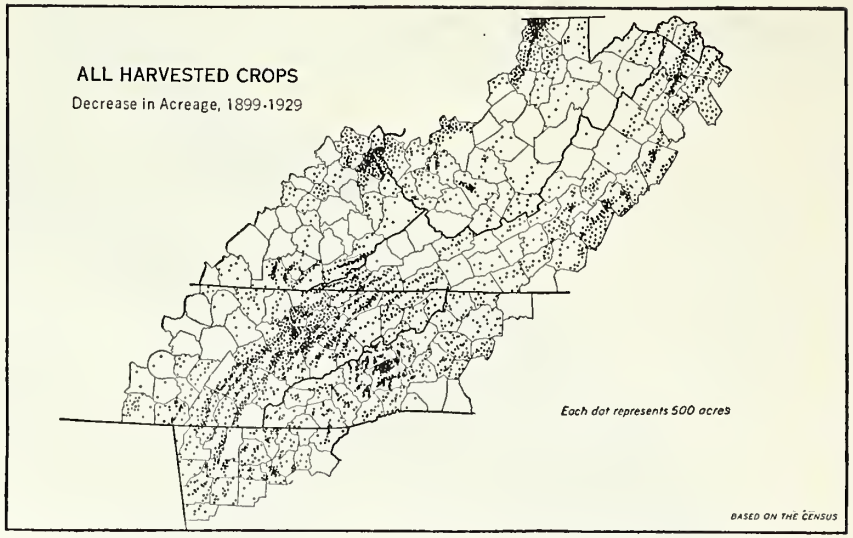

FIGURE 28.—The acreage of harvested crops decreased 29 percent between 1899 and 1929 in the Upper Ohio Hills, 25 percent in the Blue Ridge, 20 percent in the Appalachian Valleys of East Tennessee, and 19 and 17 percent, respectively, in the Northeastern and Northwestern Cumberland Plateau. The decrease in acreage of harvested crops during the 30-year period was accompanied by an increase in the acreage of open pasture.

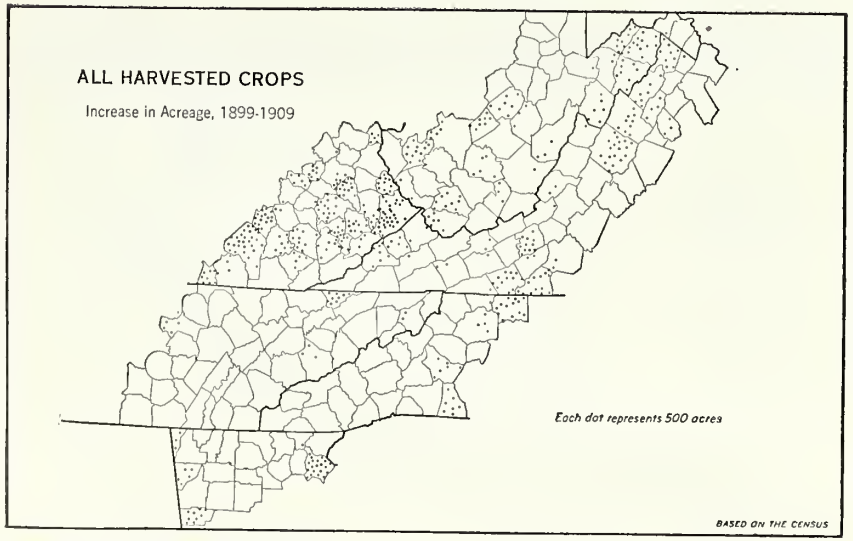

FIGURE 29.—In the first decade of the period 1899–1929 the acreage of harvested crops increased in 80 of the 205 counties. The increases were chiefly in the northern part of the region, largely in the Northeastern Cumberland Plateau, and were only slightly associated either with the increases in land in farms from 1900 to 1910 (fig. 7) or in number of farms (fig. 16).

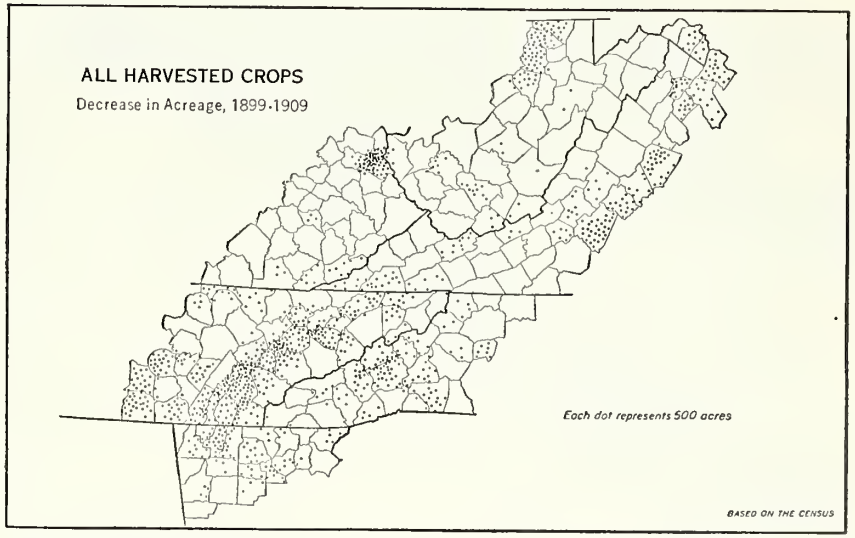

FIGURE 30.—The decrease in acreage of harvested crops between 1899 and 1909 was particularly large in the Appalachian Valleys of East Tennessee and in the Upper Ohio Hills. Decreases also occurred in most counties in the Blue Ridge, the Northern Piedmont Plateau, and in the Southern Appalachian Valleys. In the region as a whole the acreage of harvested crops decreased 3 percent.

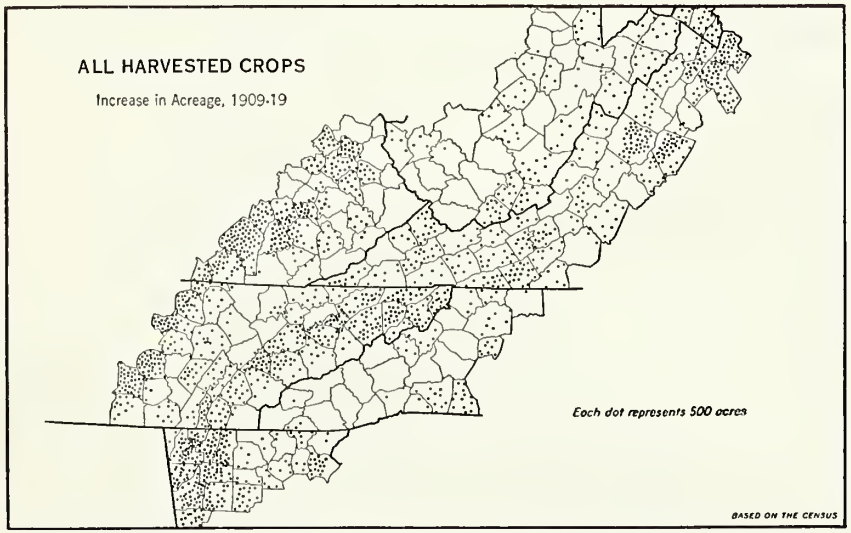

FIGURE 31.—Largely because of the impetus given to agriculture by the World War, the acreage of harvested crops increased 9 percent between 1909 and 1919. The increase amounted to 24 percent in the Highland Rim, 21 percent in the Southern Appalachian Valleys, 14 percent in the Northern Piedmont Plateau, 11 percent in the Southern Piedmont Plateau, and 10 percent or less in other subregions.

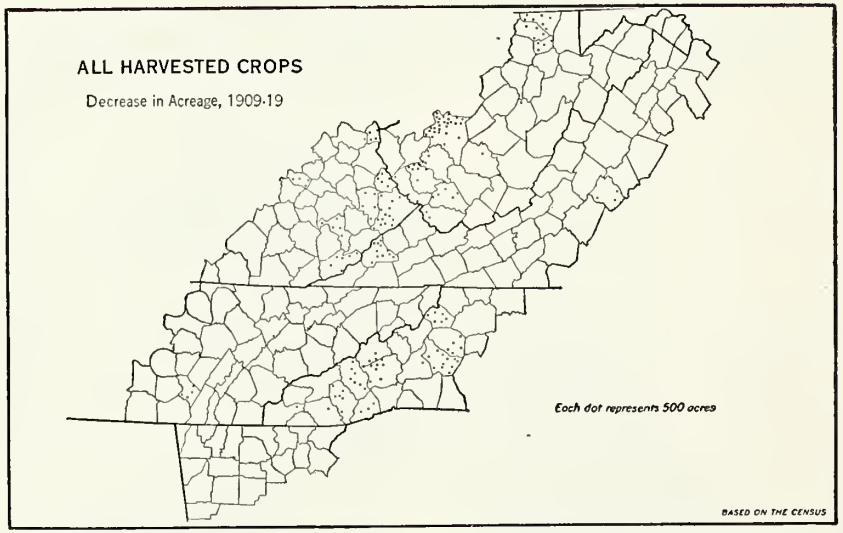

FIGURE 32.—The decreases in acreage of harvested crops between 1909 and 1919 were almost wholly limited to the Blue Ridge in North Carolina and to coal-producing counties in West Virginia and Kentucky. Only 34 of the 205 counties showed decreases and these decreases were small.

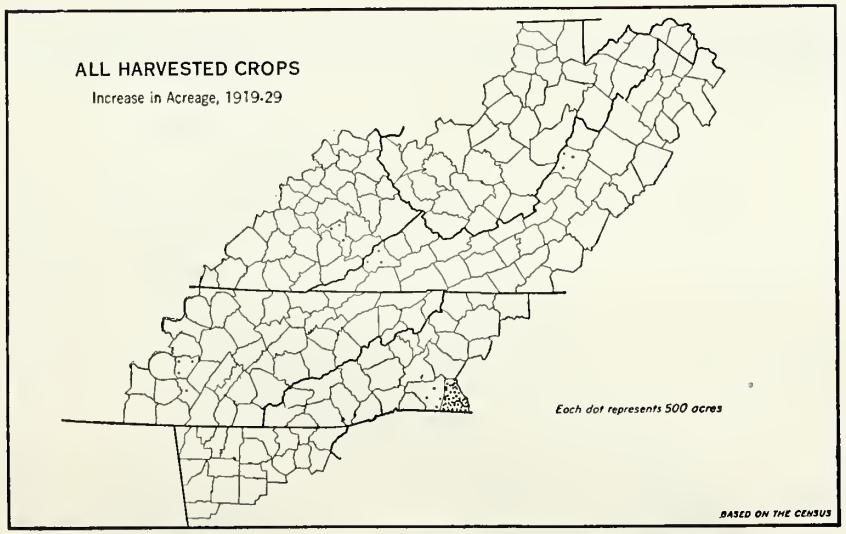

FIGURE 33.—In contrast to the increase of 9 percent in the acreage of harvested crops during the period 1909–19, there was a decrease of 19 percent in the following period, 1919–29. In the latter decade the acreage of harvested crops increased in only 7 counties, The only large increase was in the cotton-producing county of Cleveland, North Carolina,

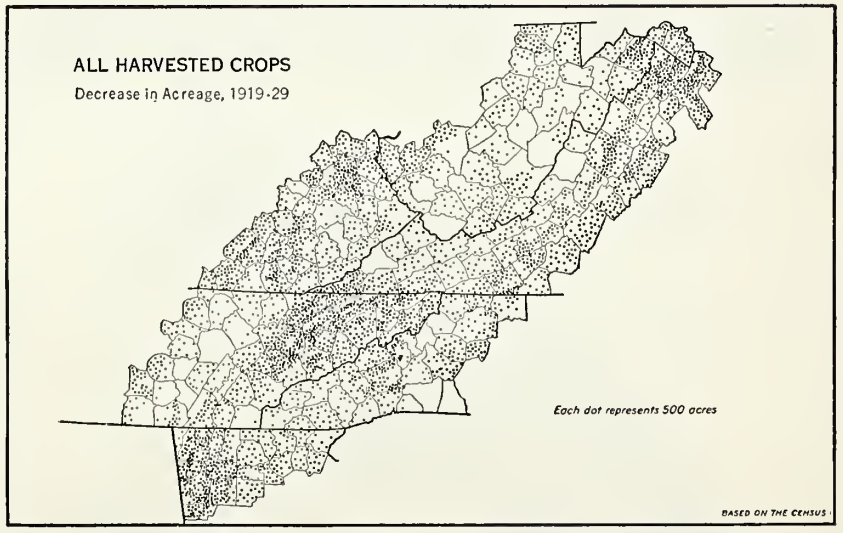

FIGURE 34.—Between 1919 and 1929 the decreases in acreage of harvested crops ranged from 16 to 25 percent in all subregions except the Southern Piedmont Plateau where the acreage decreased only slightly. The general decrease in acreage of harvested crops resulted largely from a shift of rural population from farm to industrial employment,

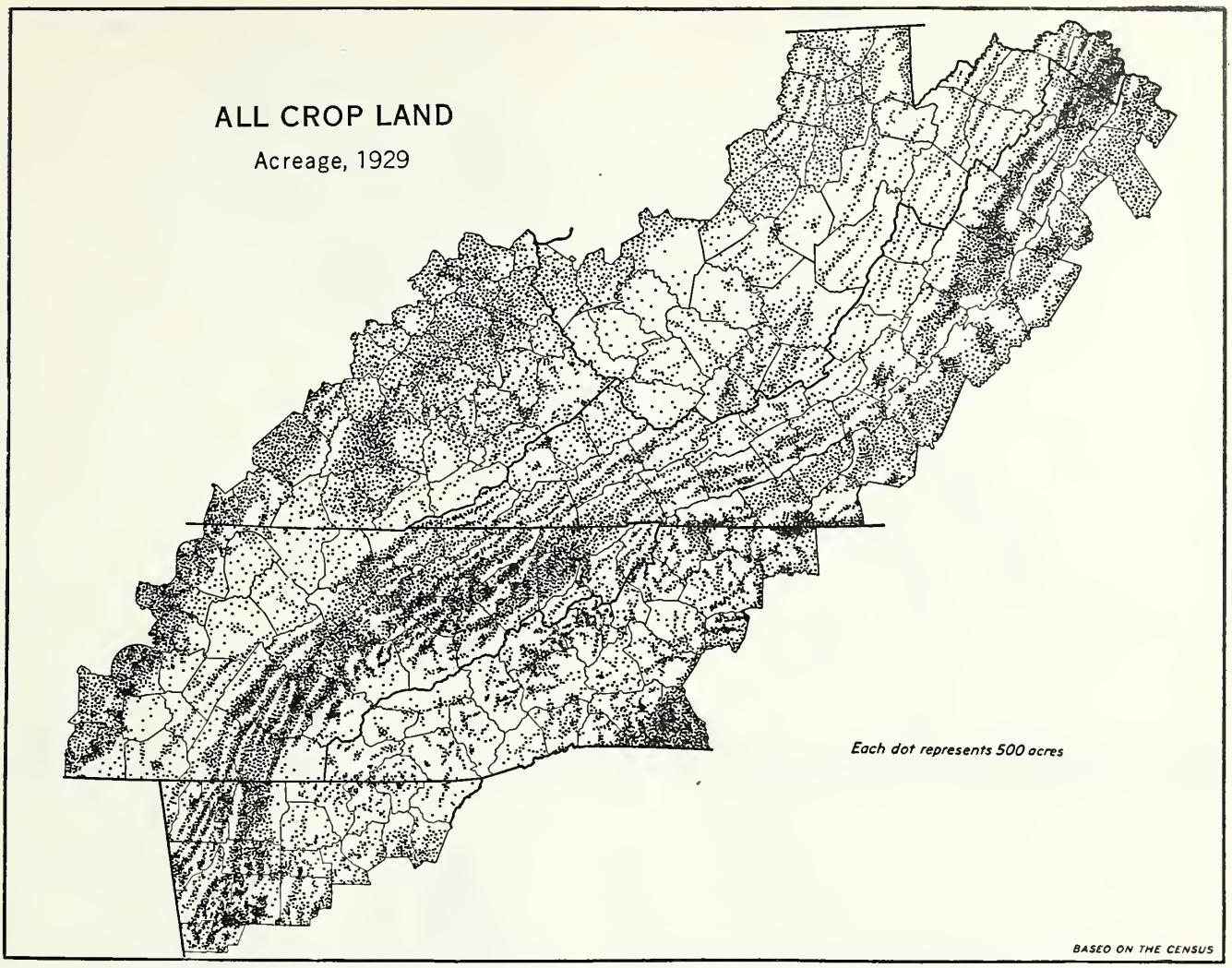

FIGURE 35.—In 1929 there were approximately 9,490,000 acres of crop land in the Southern Appalachians. Crop land comprised 29 percent of the land in farms and 17 percent of the total area of the region. Crops were harvested on about 7,500,000 acres. Of the remaining acreage of crop land approximately 1,820,000 acres were idle and on 170,000 acres there was a crop failure. In those subregions in the northern part of the region (the Northern Piedmont Plateau, the Appalachian Valleys in Virginia, the Central Appalachian ridges, the Allegheny Plateau, and the Upper Ohio Hills), idle crop land comprised 8.8 percent and crop failure 1.1 percent of the total crop land, compared with 23.4 percent and 2 percent, respectively, in all other subregions.

Appalachian Ridges the slight change not only in acreage of harvested crops but also in number of farms and land in farms seemed to indicate a fairly stable agriculture. Although in these subregions there is considerable competition between agriculture and industry, apparently the relative returns from farming have compared rather favorably with the returns from other activities.

In the Southern Appalachian Valleys, the Central and Southern Piedmont Plateaus, and the Highland Rim, cotton and crop specialty farms are numerous and, between 1900 and 1930, they greatly increased in numbers. In these subregions many of the farm operators are tenants and the percentage of tenancy increased during the 30-year period, except in the Central Piedmont Plateau (figs. 23–26). Although there is considerable industrialization in each of these subregions, particularly in the Southern Appalachian Valleys and Southern Piedmont Plateau, it has not been sufficient to prevent an increase in number of farms, particularly where it has been possible to become a tenant farmer with little capital and where, during the 30-year period, it was found both possible and profitable to increase the acreage of cotton and tobacco.

There was a slight increase in acreage of harvested crops between 1899 and 1929 in the Southern Piedmont Plateau and Highland Rim, but the percentage of increase was considerably less than that for the number of farms. Moreover, between 1919 and 1929, the acreage of harvested crops decreased appreciably while industrialization increased rapidly, indicating that probably during the decade the opportunities in industry were greater than in agriculture.

The large decrease in acreage of harvested crops between 1899 and 1929 in most parts of the Southern Appalachians resulted in a pronounced shift to plowable and other pasture (figs. 36–41). To some extent the change was accentuated by a shift from the growing of crops to the raising of livestock, although in most parts of the region the acreage of pasture land probably increased more rapidly than the number of livestock. In other words, in many parts the increase in acreage of pasture land resulted from the turning of cattle into fields that under ordinary circumstances would no longer be used for the growing of crops. In parts of

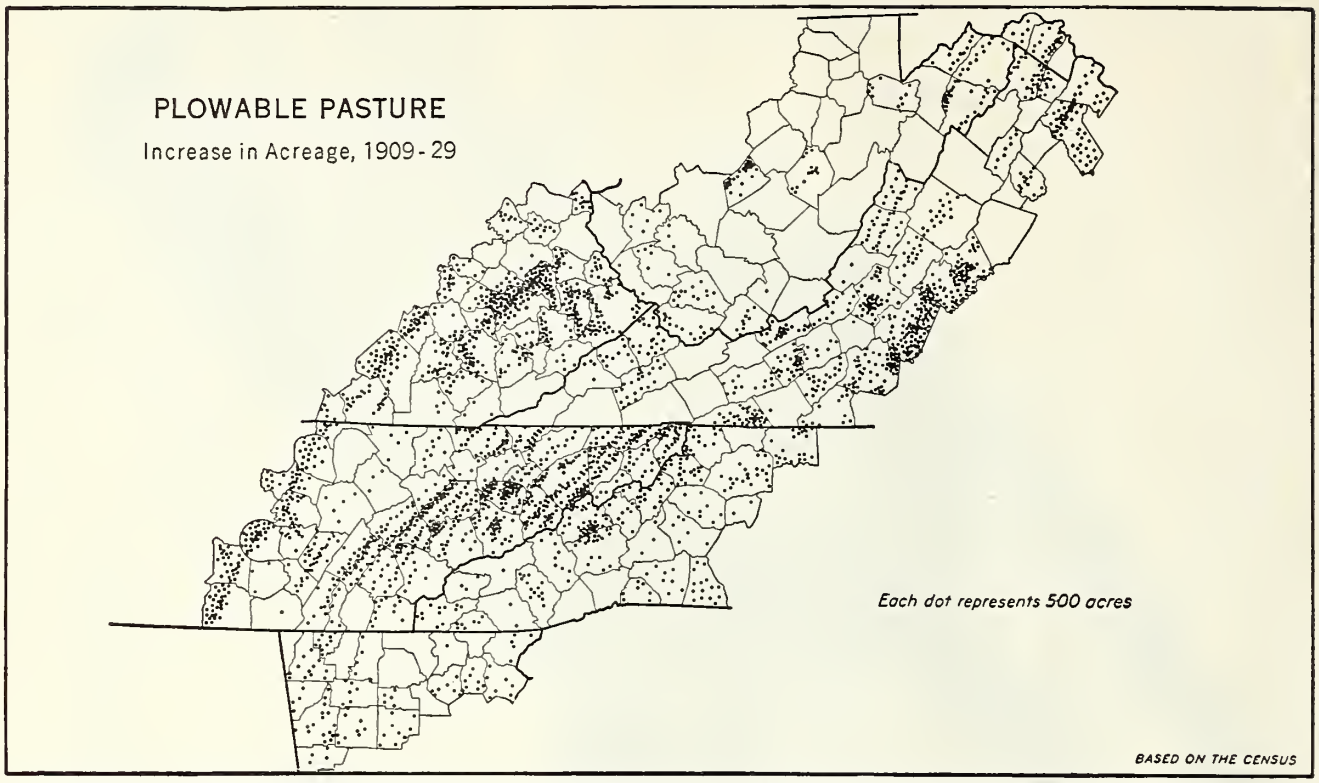

FIGURE 36.—Plowable pasture in the Southern Appalachians increased from approximately 5,300,000 acres in 1909 to 6,100,000 acres in 1929. Much of this increase came from the conversion of crop land to pasture land. The increase was most pronounced in the Appalachian Valleys of East Tennessee, the Central Piedmont Plateau, the Highland Rim, and the Northeastern Cumberland Plateau. Large increases also occurred in portions of the Blue Ridge.

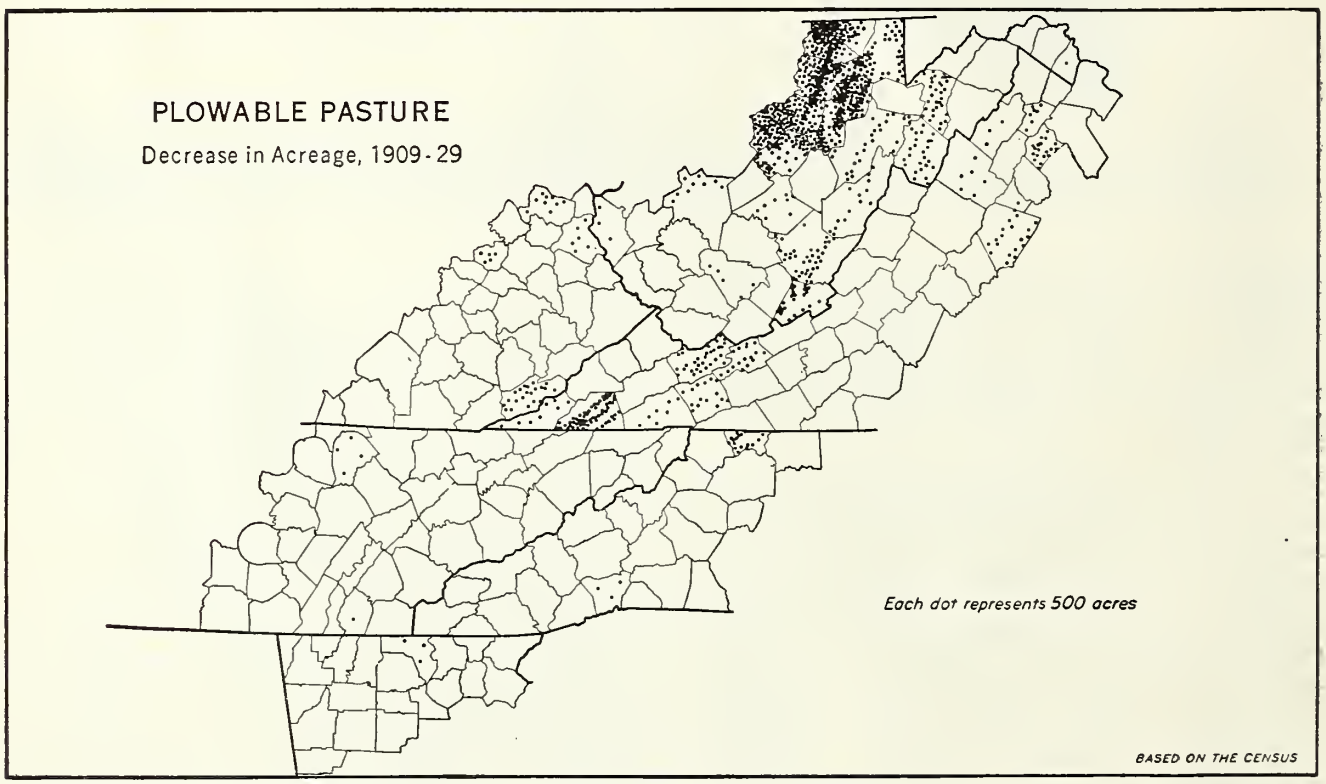

FIGURE 37.—The decrease in acreage of plowable pasture between 1909 and 1929 was confined almost wholly to the northern part of the region. This decrease resulted principally from a shift from plowable to other pasture. Most of the shift was in the Upper Ohio Hills, the Allegheny Plateau, the Central Appalachian Ridges, and the Appalachian Valleys of Southwest Virginia.

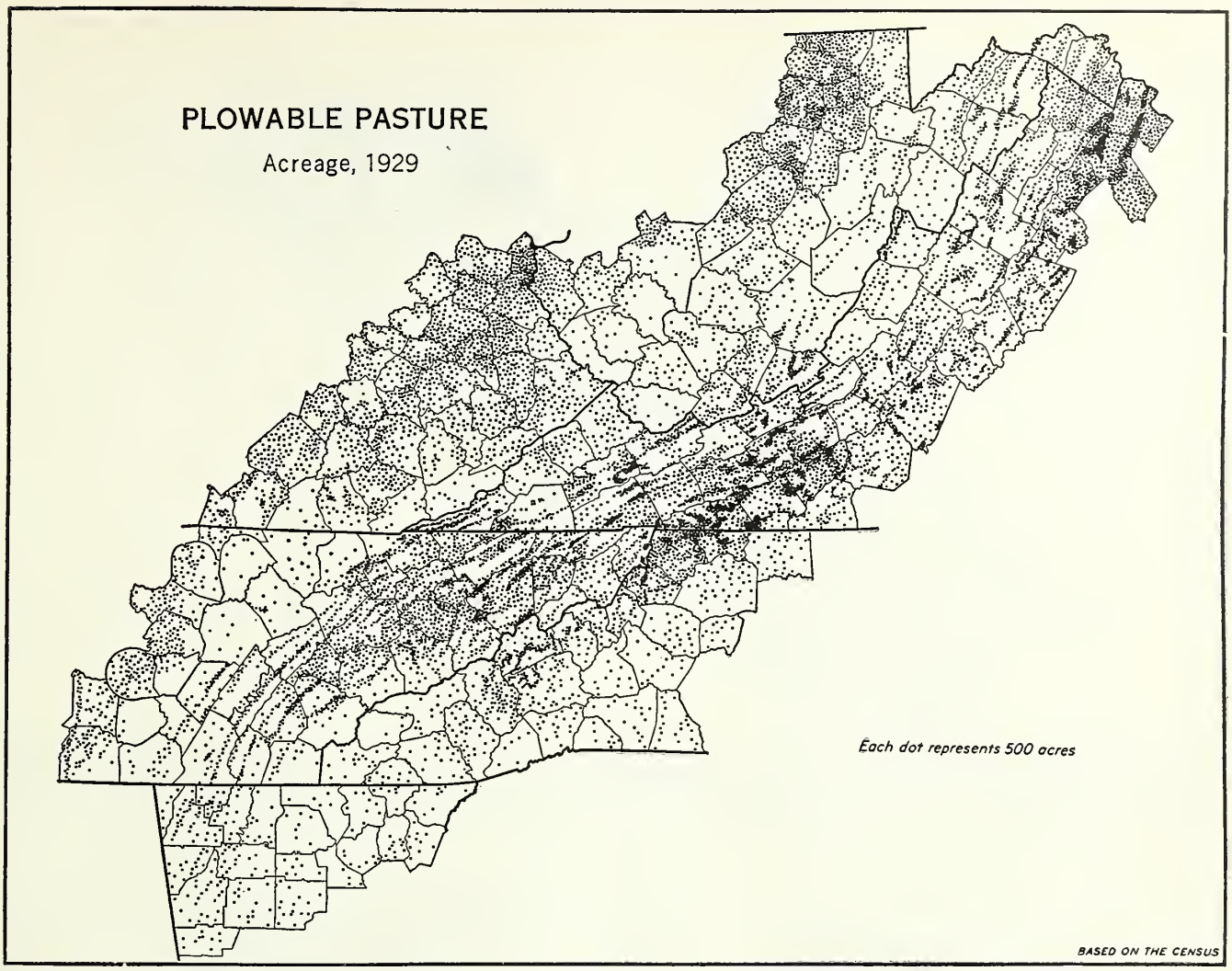

FIGURE 38.—In 1929, over one-half the acreage of plowable pasture in the Southern Appalachians was in Virginia and West Virginia. The plowable pasture land in the southern part of the region was largely in the Appalachian Valleys of East Tennessee and in adjacent counties in the Blue Ridge. In event of much higher prices for farm products some of this pasture land might again be cropped. Much of it is of low fertility or is poorly adapted to cultivation.

the region, at least, some of the pasture land reverted to woodland and in every subregion, the acreage of land classed as other pasture increased.

The explanation of the fact that the increase in acreage of open pasture exceeded the decrease in acreage of harvested crops lies in the cycle of land use, particularly in the more mountainous sections, involving clearing of land, cropping, pasturing, reversion to woodland, reclearing, etc.[11] This rotation has resulted from the rapid loss of fertility of cleared land because of continued cropping, poor cultural practices, application of only a little or no fertilizer, and erosion. For these reasons, new land is continually being cleared and worn land is turned into pasture or allowed to lie idle.

In the 20-year period from 1909 to 1929 there was a substantial increase in total acreage of plowable and other pasture except in the Upper Ohio Hills where the decrease in number of farms and land in farms was apparently sufficient to result in a slight decrease. The largest acreage increases, however, were in the northern part of the region, where there was considerable land in pasture at the beginning of the period, and in the sections of mountainous topography, where the decreases in acreage of harvested crops were most pronounced.

The shift to plowable and other pasture between 1909 and 1929, although important, was accompanied by an equally important shift in the character of the pasture as interpreted by the farmers who reported to the census enumerators. Farmers in the region reported that 17 percent of the pasture land other than woodland was in the class described as other in 1909 but that, in 1929, 31 percent of all pasture land other than woodland was in the class described as other. In only one subregion, the Southern Piedmont Plateau, did plowable pasture increase as rapidly as other pasture. Moreover, in the region as a whole the increase in plowable pasture was substantially less than the decrease in acreage of harvested crops.

Although the exact process of the shift from plowable to other pasture is not known, the consensus of opinion among farmers has apparently been that an increasing amount of the land now used for pasture is no longer adapted to use for crops. That is, although the shifts may be accounted for in part by erosion, and the gradual reversion of land to woodland, probably it also represents a gradual change in the opinion of farmers

[11] This cycle of land use in Laurel County, Ky., has been described in detail by C. F. Clayton and W. D. Nicholls (7).

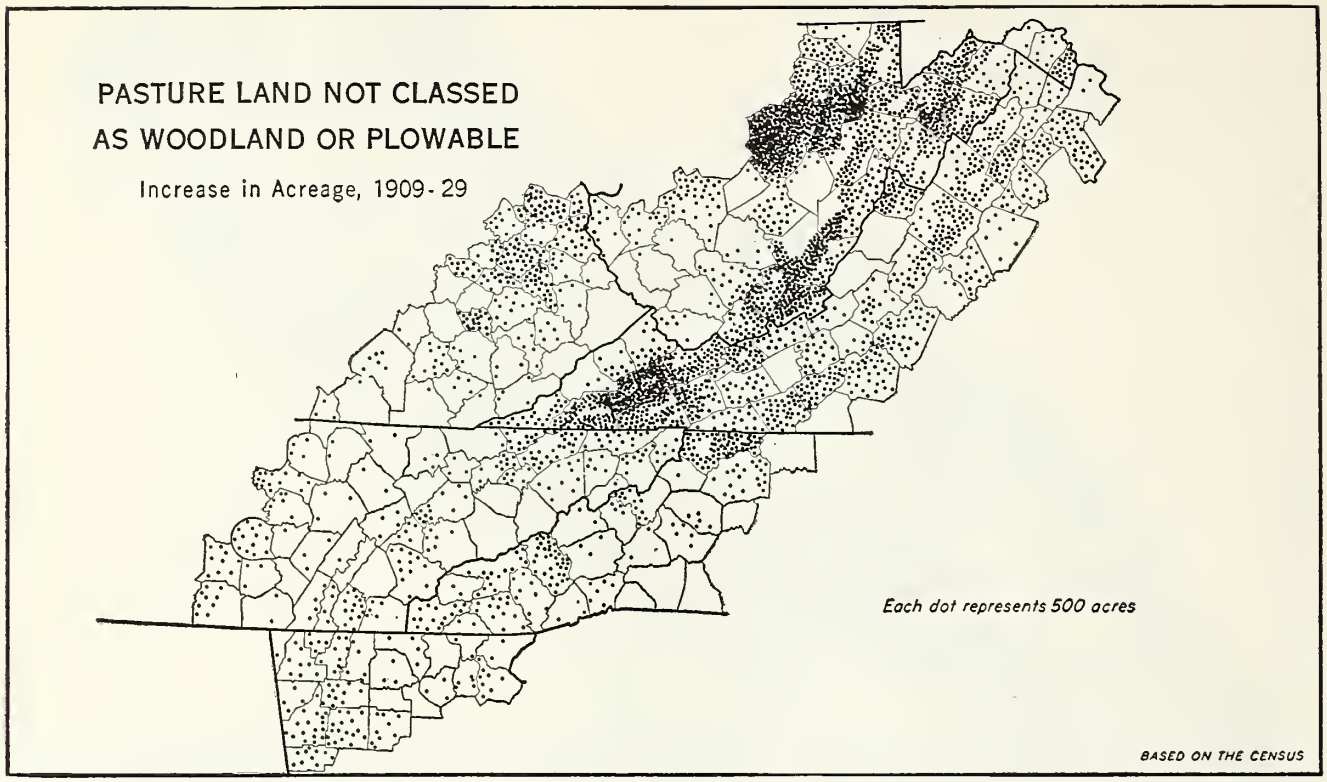

FIGURE 39.—The acreage of other pasture increased from 1,100,000 acres in 1909 to 2,800,000 acres in 1929. An increase occurred in nearly every county, but was large only in Virginia and West Virginia. Most of the counties showing a large increase in acreage of other pasture had a decrease in acreage of plowable pasture (fig. 37).

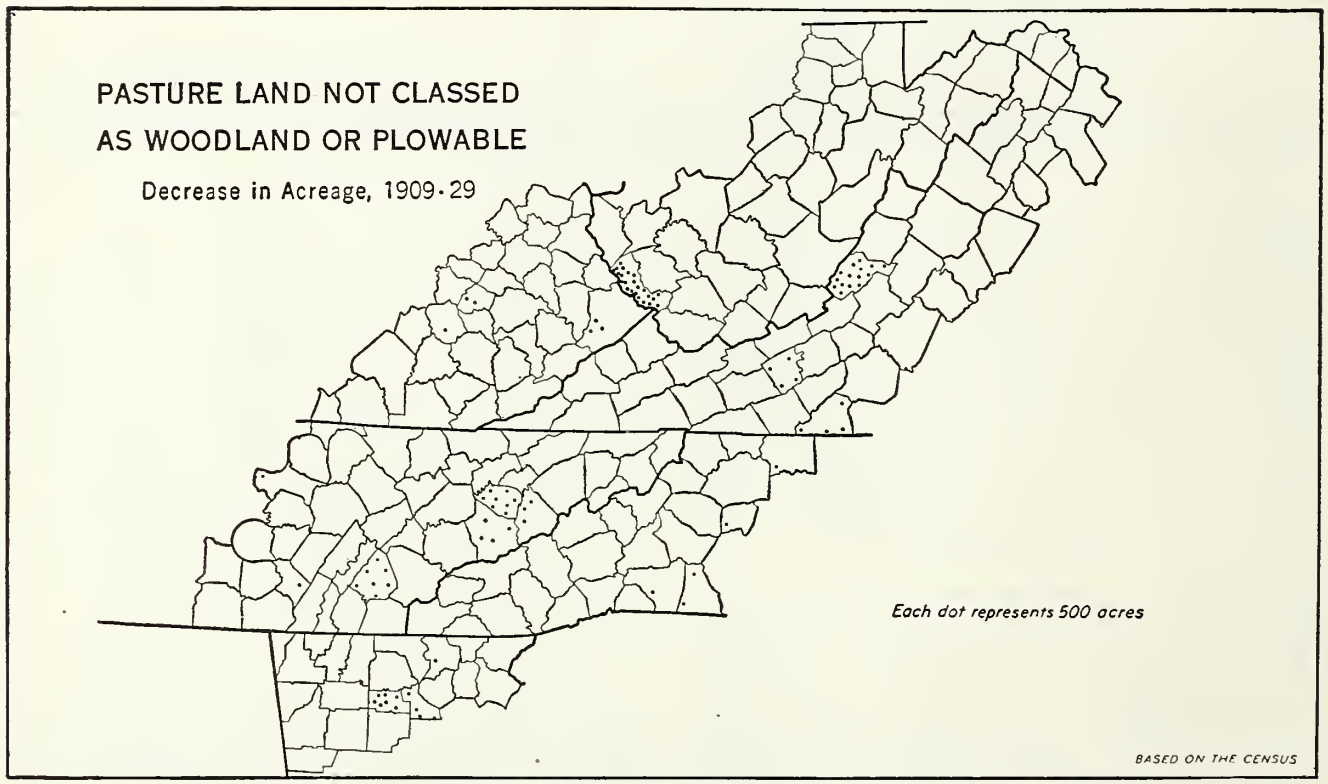

FIGURE 40.—The decrease in acreage of other pasture between 1909 and 1929 was confined to a few scattered counties. The few decreases emphasize the general tendency to classify the poorer cleared land as unsuitable for cultivation.

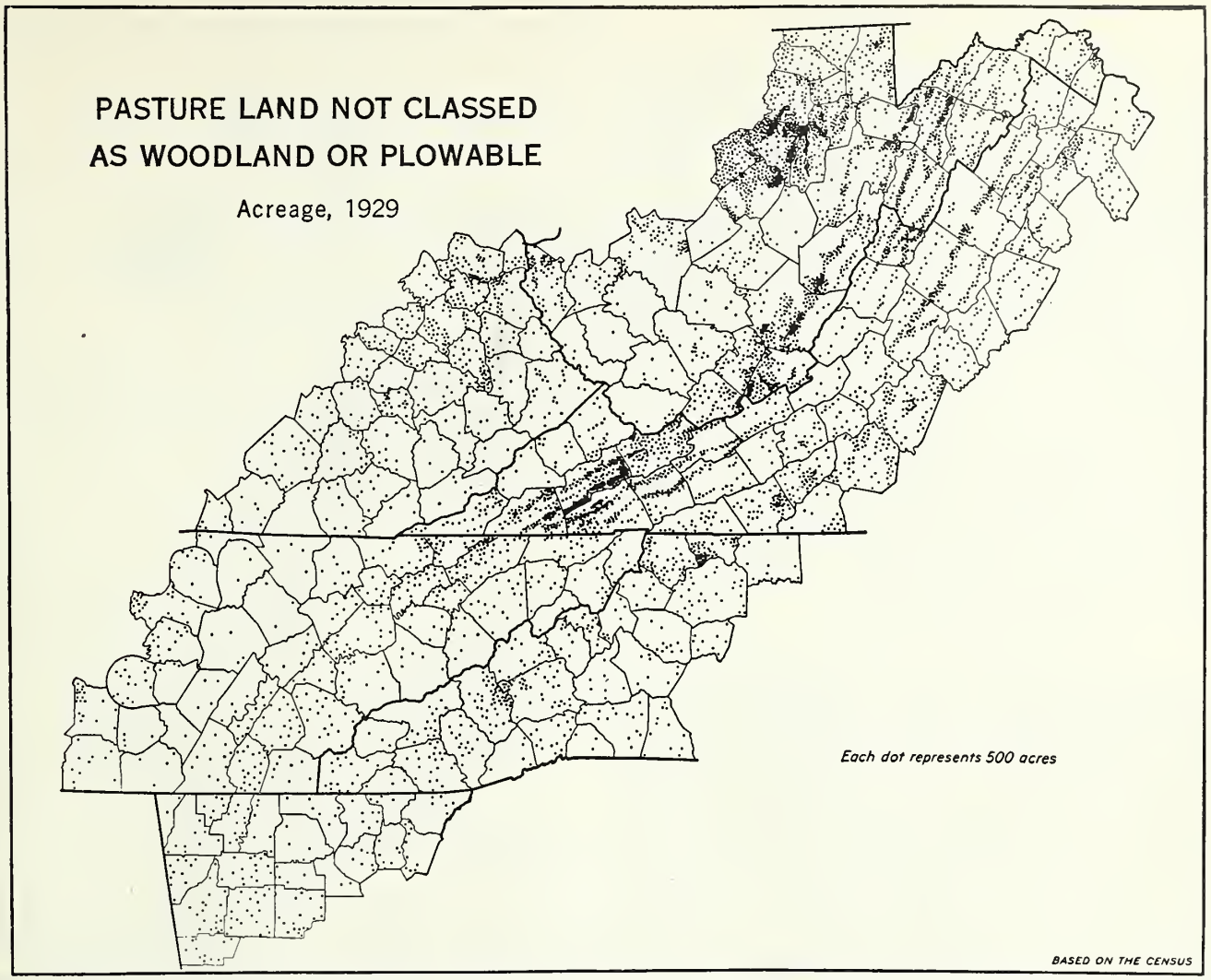

FIGURE 41.—Over two-thirds of the other pasture land in 1929 was in Virginia and West Virginia. Physical conditions (figs. 1–4) are favorable for grazing in the Appalachian counties of these States; consequently, considerable rough, nontillable land can be used for pasture. In Kentucky, Tennessee, North Carolina, and Georgia the acreage of other pasture in 1929 was principally eroded and depleted crop land no longer classified as plowable.

of what is tillable land. This latter factor probably explains, in large part, the very pronounced shift from plowable to other pasture between 1909 and 1929 in the Upper Ohio Hills, Allegheny Plateau, and Central Appalachian Ridges.

Interestingly, in three of the subregions with rugged topography, the Blue Ridge, and the Northeastern and Northwestern Cumberland Plateau, a relatively small part of the plowable and other pasture land was classed as the latter in 1929. Also of interest is the fact that in these subregions of rough topography, compared with other subregions the acreage of cleared land has shown no greater and, in many localities, even a less tendency to decrease, during the period 1909–29. One explanation is that the economic opportunities other than farming have been generally greater in proportion to population in the better sections than in those more poorly adapted for agriculture. Consequently, the pressure of population upon the land and the tendency to class very rough and poor land as tillable has been frequently greater in the poorer than in the better farming sections.

Figures 35, 38, and 41, showing the distribution of the acreage in 1929 of crop land, plowable pasture, and other pasture, respectively, provide a fairly accurate picture of the uses of the land in farms, except woodland. These uses of the land, however, comprise only a small part of the total area of most subregions. Forest and woodland comprised 61 percent of the area of the region in 1929. Returns from farming compared with returns from other economic activities were apparently relatively small. Attention must be given, therefore, to the relation of other major uses of the land and types of economic activity to the problems of land utilization.

Nonagricultural uses of land are of particular significance in the Southern Appalachians, both because of the importance of such uses in a region where the ratio of good agricultural land to population is small and because of the danger that these uses in the region may not be carried out in the best interests of the people. In the past, and to a large extent at present, the cutting of timber, the development of water resources, and the production of minerals have been done without regard for the future. Economic and social losses have resulted and it is partly as a protection against these losses that the Tennessee Valley Authority was formed.

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FOREST AND WOODLAND [12]

The topography and climatic conditions of the Southern Appalachians (p. 8) are generally favorable for timber growth. There are some bald or grassy areas, but the region as a whole is very well adapted to the production of a large variety of economically useful timber trees, especially hardwoods.

Originally, there was a heavy stand of timber, mostly hardwoods, but this stand has been largely depleted by clearing land for agriculture, by ill-advised lumbering methods, and by fire. The repeated burning over of the land has had a particularly deleterious effect on tree growth and has aggravated the problem of erosion by destroying the protective cover of the forest floor.

Interest in the forest resources of the region is heightened by the fact that one-fourth of the annual cut of saw timber in the United States is hardwood, although hardwoods constitute only one-tenth of the remaining saw timber. For many years Southern Appalachian hardwoods have been a dominant factor in the markets of the entire country. That dominance has been based not only upon quantity but also upon the quality of the products.

TOTAL FOREST AREA

The area within the scope of this investigation which is available for forests comprises roughly all woodland in farms and all land outside of the farms which is not in urban centers, nonfarm dwelling sites, and the rights-of-way for highways and railroads (figs. 42 and 43). The total of these lands in 1930 approximated 33,545,000 acres (table 1). About 3 percent of this total has little or no bearing upon the welfare of the people as a source of forest materials. Slightly more than one-half of the 3 percent consists of "balds", mountain meadows, and badly eroded lands, or has a timber cover of no prospective value for commercial purposes. The remainder of the 3 percent is devoted to recreational purposes, and, although it includes some of the finest timber in the region, no cutting is permitted because of the need for preserving the unusual scenic values. Forest lands devoted to recreational purposes include the areas proposed for the Shenandoah National Park and the Great Smoky Mountains National Park. On July 1, 1932, 297,000 acres had been acquired for the latter by the Federal Government. The remaining 97 percent, or 32,526,000 acres, is discussed hereafter as commercial forest land. By this term is meant lands capable of producing timber of commercial quality and quantity, and available for commercial use.

COMMERCIAL FOREST LANDS

The commercial forest lands are classified in table 2 by forest types based on the prevailing timber species. Five such types occur, the most important of which is the oak-chestnut-yellow-poplar type, covering three-fourths of the commercial forest area, and found in all of the six States involved. Oaks of one kind or another are characteristic species in the three leading types, which, combined, include 94 percent of the acreage of commercial forest land.

The great preponderance of private ownership in the commercial forest lands is shown by table 3.

[12] Except as otherwise specified, the statistics of area, stand, growth, and drain used in this section are derived from estimates prepared by the Forest Service on a State basis. In adapting the State figures to a region comprising parts of 6 States the reliability of these data probably has been reduced. Nevertheless, these statistics are the best available, in the absence of an intensive forest survey of this region and are used as the simplest means of describing the forest conditions.

TABLE 2.—*Acreage of commercial forest lands, by generalized forest types, 1930*

Forest type	Acreage	Percentage of total acreage	Location
	1,000 acres	*Percent*	
Oak-chestnut-yellow-poplar	24,083	74	All States.
Oak-hickory	3,384	10	Tennessee only.
Oak-pine	3,301	10	Virginia, North Carolina, Georgia.
Birch-beech-maple	1,170	4	West Virginia only.
Shortleaf-loblolly	588	2	Georgia only.
Total	32,526	100	

About 11,800,000 acres, or 36 percent of the commercial forest area, has no timber large enough for any use. Ten million acres or more of these lands are restocking with timber species, in all degrees of stocking from good to very poor. Only a relatively small area shows no present sign of regeneration of timber.

TABLE 3.—*Ownership and type of holding of commercial forest lands, 1930*

Ownership and type of holding	Acreage	Percentage of total acreage
	1,000 acres	*Percent*
Public:		
In national forests	[1] 1,832	5.6
In other holdings	120	.4
Total	1,952	6.0
Private:		
In farms	[2] 13,942	42.9
In industrial holdings	16,632	51.1
Total	30,574	94.0
Total	32,526	100.0

[1] By Oct. 21, 1933, the area of national forests had increased to 2,462,015 acres.
[2] This estimate exceeds by 10 percent the total of 12,700,000 acres reported in the census of 1930 (*50*).

Approximately 12,400,000 acres, or 38 percent of the total, now has timber of cordwood size, but too small for uses other than cordwood and products of small dimensions.

Saw timber occupies about one-fourth of the total area (roughly 8,300,000 acres) but three-fourths of the saw timber is second growth following early lumbering. Old-growth saw timber is found on less than 7 percent (about 2,200,000 acres) of the total commercial forest area.

OWNERSHIP OF THE SAW-TIMBER AREA AND STAND

Ninety percent of the acreage of saw timber in 1930 was in private ownership. Sixty-two percent of the privately owned acreage was held by industrial organizations. The remainder was in farms. Only 10 percent of the acreage of saw timber was in public ownership or control and roughly 90 percent of this acreage was within the seven national forests established in the region (see pocket map). The remainder was in the Cherokee Indian Reservation in North Carolina, and in various small holdings of States and counties (table 4).

CHARACTER AND AVAILABILITY OF THE SAW TIMBER

Nearly four-fifths of the saw-timber stand is composed of highly desirable species such as oak, chestnut, yellow poplar, birch, maple, beech, hickory, ash, basswood, cherry, and black walnut. Of these, the first three are by far the most numerous and comprise

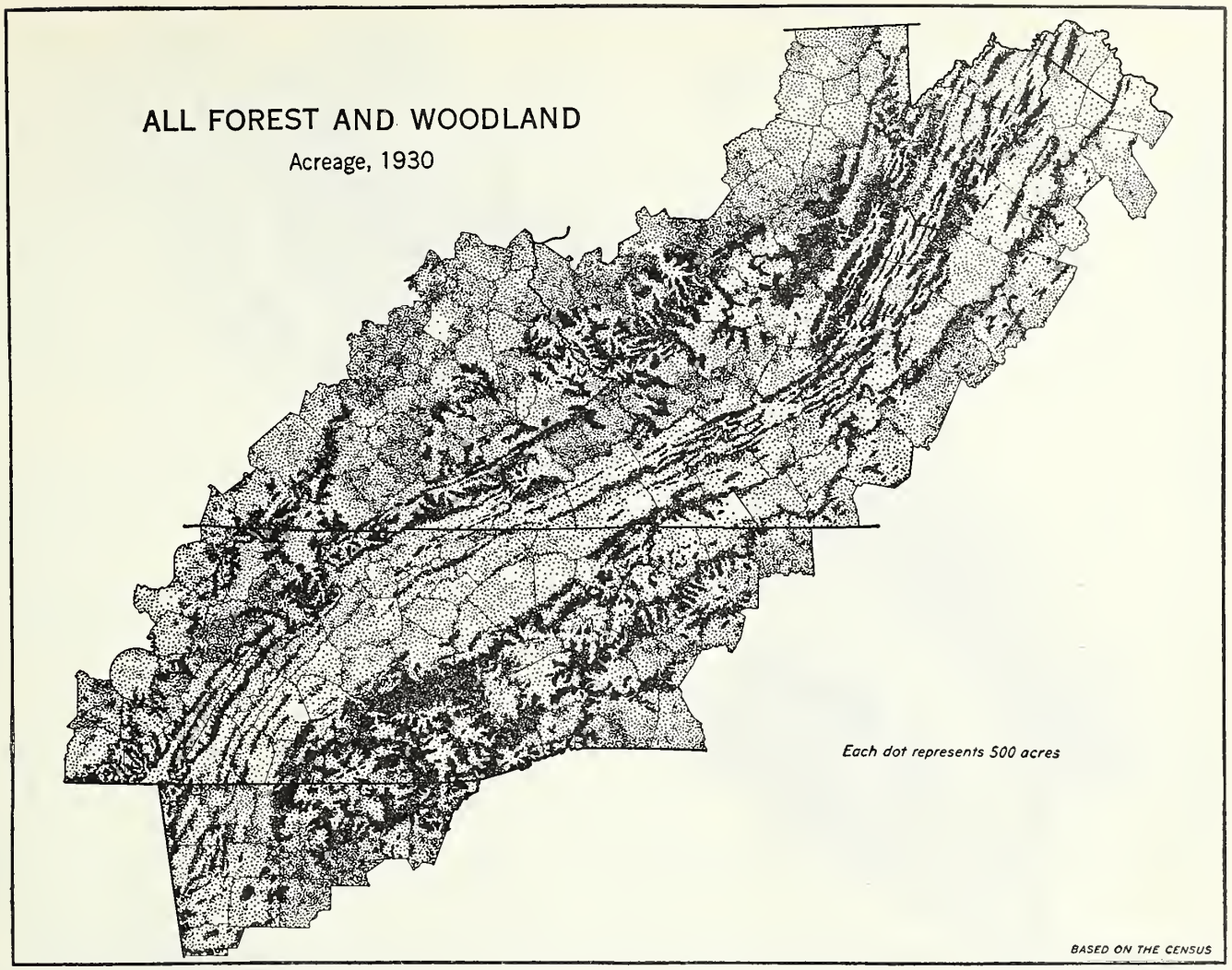


FIGURE 42.—Approximately 33,500,000 acres, or nearly two-thirds of the land area of the Southern Appalachians, was classed in 1930 as forest and woodland, a term equivalent to forest land. This classification includes all woodland in farms and land not in farms, except land in roads, railroad rights-of-way, urban centers, and nonfarm dwelling sites. The location of these forest lands is closely correlated with topography. (See pocket map.) Forest and woodland in 1930 comprised more than two-thirds of the total area of the Northwestern and Northeastern Cumberland Plateau, the Blue Ridge, and the Central Appalachian Ridges, and about two-thirds of the area of the Allegheny Plateau.

TABLE 4.—*Ownership and type of holding of the acreage and stand of saw timber, 1930*

Ownership and type of holding	Acreage		Stand of saw timber	
	1,000 acres	*Percent*	*Million feet b.m.*	*Percent*
Public:				
In national forests	730	9	2,122	9
In other holdings	79	1	257	1
Total	809	10	2,379	10
Private:				
In farms	2,874	34	7,435	33
In industrial holdings	4,609	56	13,156	57
Total	7,483	90	20,591	90
Total	8,292	100	22,970	100

TABLE 5.—*Estimated saw-timber stand, by kind of wood, 1930*

Kind	Volume of stand	Percentage of total stand
	Million feet b.m.	*Percent*
Hardwoods:		
Oaks	8,138	35
Yellow poplar	1,613	7
Birch, beech, and maple	1,616	7
Hickory	1,020	4
Other hardwoods	5,624	25
Total	18,011	78
Softwoods:		
Yellow pines	2,886	13
Hemlock	1,292	6
Spruce and fir	406	2
White pine	303	1
Other softwoods	72	(1)
Total	4,959	22
Total	22,970	100

[1] Less than 0.5 percent.

fully three-fourths of the present volume of hardwoods (table 5). Oaks alone comprise nearly one-half the volume of hardwoods. Although a dozen kinds of oak are present, some of them are of little commercial value compared with white oak, which with yellow poplar has been one of the principal trees sought when these forests were being cut.

More than half of the softwood saw timber is southern yellow pine of several species. Hemlock is also important, being more than a fourth of the volume of softwoods. Relatively small quantities of spruce, balsam fir, and white pine are found at high altitudes, white pine being still a part of the lumber cut in each of the six States involved.

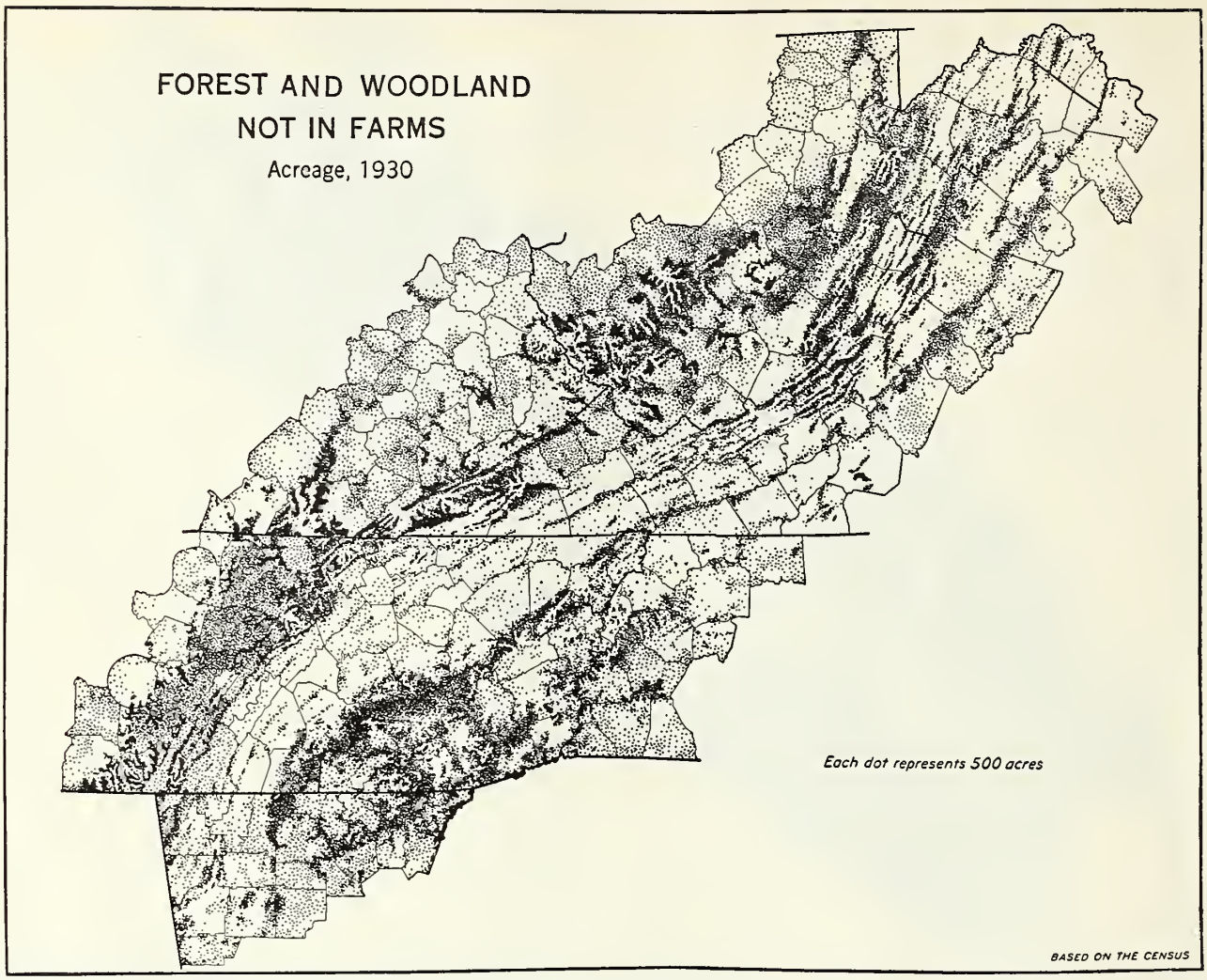


FIGURE 43.—Forest and woodland not in farms in 1930 comprised about 60 percent of all forest lands (fig. 42) and included much of the most isolated and rugged land in the Southern Appalachians. The national forests and parks (see pocket map) are all located where there is a relatively large acreage of forest and woodland not in farms. In the Northwestern Cumberland Plateau, forest and woodland not in farms comprised 78 percent of all forest lands and 60 percent of the total land area. Forest and woodland not in farms also comprised a large part of all forest lands and of the total area in the Northeastern Cumberland Plateau, the Allegheny Plateau, and the Blue Ridge.

The Appalachian counties of Tennessee, West Virginia, and Kentucky show the largest volume of hardwood saw timber, comprising more than 60 percent of the total. The leading States in volume of softwood saw timber are Georgia, Virginia, and North Carolina. Thus the bulk of the hardwood is west of the Appalachian Divide, and the bulk of the softwood lies on the southern and eastern slopes of the region.

More than 13,000,000,000 board feet, or 60 percent of the total volume of saw timber, is second growth. Slightly more than 60 percent of the hardwood saw timber is second growth, but the softwoods (far less in volume) are divided nearly equally between second growth and old growth. Old growth does not necessarily mean virgin timber, or even timber equal to the average of the original timber. The "old growth" of the present day usually means saw timber that has not been culled or burned for a moderately long period, including also that which was too poor or too remote to be attractive to the loggers of the past. It would be difficult to find an area of considerable size on which the stand is fully representative of the original conditions. Forest fires, lumbering, the clearing of lands for farms (some of it unwise), and the action of disease and insects have left only depleted fragments of the forest of the past.

It should be borne in mind that an unknown but considerable proportion of the present timber stand, especially the old growth, cannot be used at present for industrial purposes. Some stands are too isolated or too remote from transportation facilities; others are so depleted of desirable timber trees that profitable conversion will be impossible for an indefinite period.

The situation bears unfavorably upon the supply in the immediate future of such commodities as lumber, veneer logs, and cooperage stock, which not only constitute half the saw-timber cut of the region, but which call for the better grades of saw timber on account of their exacting requirements in dimensions and quality. It also tends to throw an undue proportion of the commodity cut upon the more accessible timber, such as the second growth on lands already cut over, and especially upon that part of the forest area nearest to the highways, including the farm wood lots. The latter, constituting only a third of the commercial forest area, are contributing nearly half of the saw-timber cut, as will be noted in the discussion of depletion.

CORDWOOD AREA AND STAND

The cordwood area of 12,446,000 acres bears a stand of cordwood timber averaging more than 8 cords per acre. The total volume is estimated to be 103,000,000 cords, of which about four-fifths is hardwoods. Timber of cordwood size is a resource for commodities such as fuel, pulpwood, posts, and even small poles, ties, and mine timbers. But its principal value is as a young forest from which the saw timber of the future must be grown. Because of the low commercial value of the timber, these cordwood areas are often inadequately protected. Young trees of cordwood size or smaller are easily killed by fire. Often the result of prolonged abuse or neglect, if not a barren and eroded area, is a stand of crippled, defective trees, promising only a small yield of inferior products.

CURRENT DEPLETION OF SAW TIMBER

For more than half a century the six States of which the region is a part have been an important source of the hardwood lumber supply of the United States (table 6).

TABLE 6.—*Hardwood lumber cut in 6 Appalachian States in comparison with the total cut in the United States, by census years, 1889–1929*

Year	Volume cut in—		Percentage of total volume cut in 6 Appalachian States
	6 Appalachian States	United States	
	Million feet b.m.	*Million feet b.m.*	*Percent*
1889	1,518	7,015	22
1899	2,632	8,898	30
1909	3,832	10,613	36
1919	2,481	7,145	35
1929	2,193	7,075	31

Compiled from the census (*55*).

Although their peak of production was passed in 1909, 25 years ago, these States still supply practically as much hardwood lumber as their most important regional rival, the five States of the lower Mississippi group.

In the mountain region, on account of the increasing inaccessibility of the timber, its small size, and its scattered occurrence, the bulk of the lumber cut is produced by small mills, mainly portable, except perhaps in West Virginia. The value of the cut at the mill in 1929 (tables 7 and 8) is estimated to be $47,000,000.

Lumber is the principal commodity for which saw timber is cut, but there are numerous other commodities cut wholly or partly from saw timber (particularly hardwoods) such as veneer logs, cooperage stock, furniture and vehicle stock, ties, poles, and piling. Even fuel wood, pulpwood, excelsior wood, mine timbers, and posts come in part from the saw-timber stands. Their aggregate bulk is very large.

The cut of timber products from farms within the region in 1929 (figs. 44–46), converted to board feet of saw timber was 1,449,000,000 board feet or 52 percent of the estimated total cut. Even more significant is the indication that the farm cut included 862,000,000 board feet (lumber tally) of saw logs and veneer logs, a quantity considerably more than one-half of the estimated total lumber cut. The cut on farms was disproportionately heavy in the Appalachian Valleys of East Tennessee and in some other parts.

TABLE 7.—*Estimated lumber cut in the Southern Appalachians, by States, 1929* [1]

State	Counties included in estimate	Softwoods	Hardwoods	Total
	Number	*Million feet b.m.*	*Million feet b.m.*	*Million feet b.m.*
West Virginia	38	118	459	577
Tennessee	44	44	199	243
Virginia	42	68	157	225
North Carolina	26	46	85	131
Georgia	21	51	23	74
Kentucky	34	9	59	68
Total	205	336	982	1,318

[1] Based on reported cut by States and species, Bureau of the Census (*50*).

TABLE 8.—*Estimated lumber cut in the Southern Appalachians, by kind of wood, 1929* [1]

Kind	Volume cut	Percentage of total volume cut
	Million feet b.m.	*Percent*
Hardwoods:		
Oaks	420	32
Chestnut	191	14
Yellow poplar	185	14
Birch, beech, and maple	91	7
Hickory	13	1
Ash	12	1
Other hardwoods	70	6
Total	982	75
Softwoods:		
Yellow pines	149	11
Hemlock	100	8
Spruce and fir	61	4
White pine	24	2
Other softwoods	2	(2)
Total	336	25
Total	1,318	100

[1] Based on reported cut by States and species, Bureau of the Census (*55*).
[2] Less than 0.5 percent.

TOTAL DRAIN AND GROWTH

In addition to the cut, the annual loss of saw timber by disease, fire, insects, and windfall should be considered. Disease is the leading item on account of the heavy damage done by the chestnut blight (*14 p. 49*), which threatens to exterminate that species. Taking both the annual cut and the loss through damage into consideration, the total annual drain of saw timber is estimated at nearly 3,000,000,000 board feet (table 9).

TABLE 9.—*Estimated annual depletion of saw timber in the Southern Appalachians, 1929*

Item	Softwoods	Hardwoods	Total
	Million feet b.m.	*Million feet b.m.*	*Million feet b.m.*
Lumber cut [1]	336	982	1,318
Other cut [2]	285	1,195	1,480
Damage [3]	17	150	167
Total	638	2,327	2,965

[1] Based on census (*50*).
[2] Estimate of other items cut relative to lumber, in Central and South Atlantic regions, 1925–29.
[3] Based on reports within the period 1919–29.

The standing timber of all classes in the region is being cut and destroyed at the rate of about a billion cubic feet per year or about one and one-half times as fast as new timber is growing. Depletion of the saw timber is approximately 3,000,000,000 board feet per year or about six times the growth of such material.

Thus much of the greater part of the cut is being taken from the saw timber, whereas fully two-thirds

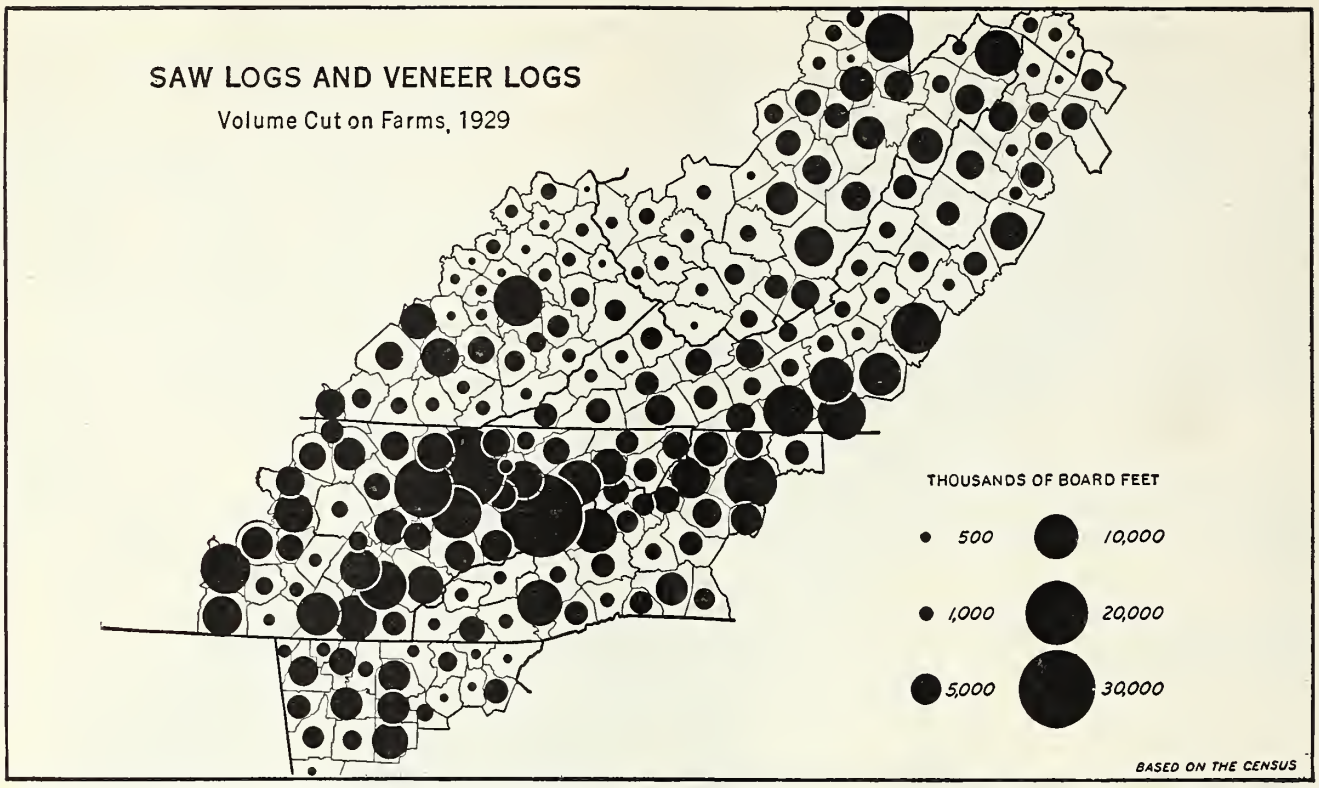


FIGURE 44.—The cut on farms was comparatively large in the Appalachian Valleys of East Tennessee, the Central Piedmont Plateau, the Highland Rim, and in West Virginia outside the Northeastern Cumberland Plateau. It probably considerably exceeded the growth on all farms in the entire region and far exceeded the growth in the Appalachian Valleys of East Tennessee and in other subregions with a heavy cut. The total cut on farms of saw logs and veneer logs was 750,000,000 board feet, log scale, equivalent to 862,500,000 board feet of sawed material.

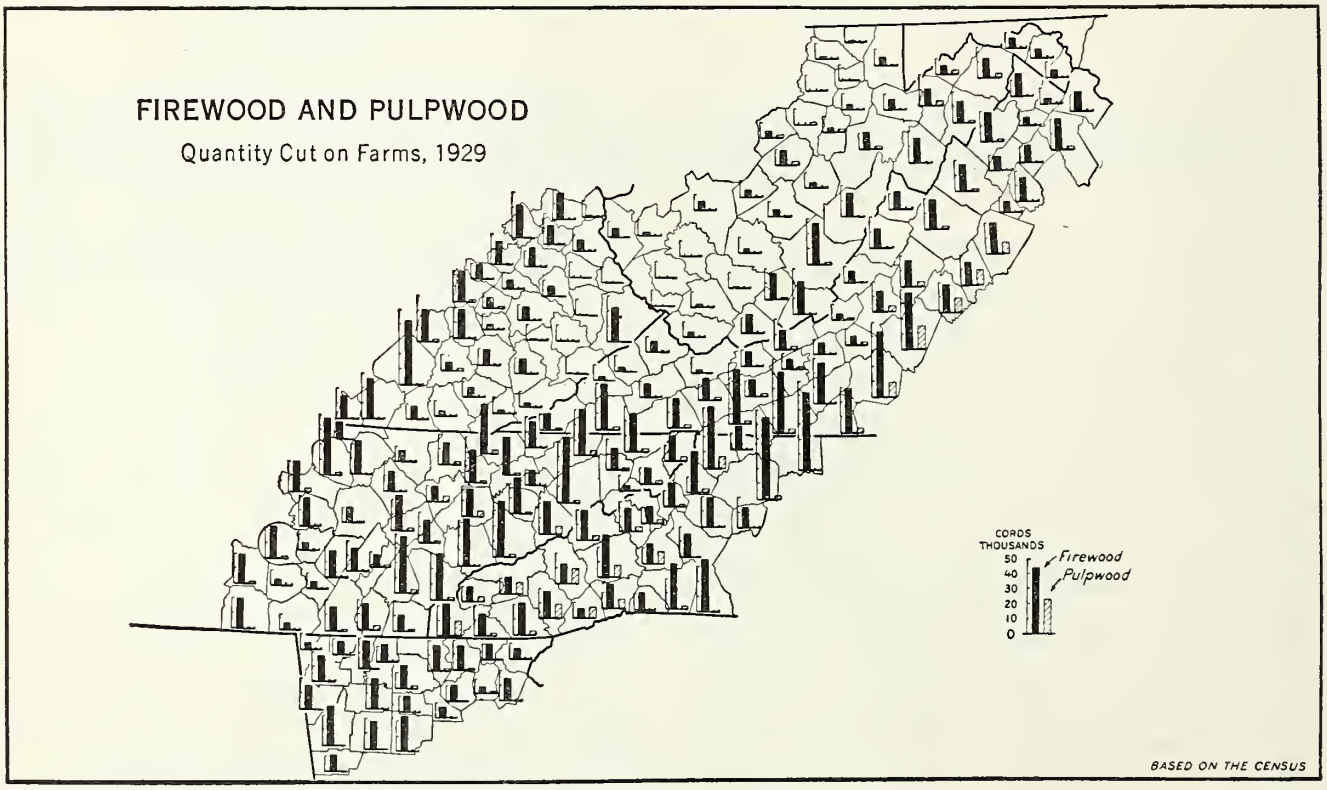


FIGURE 45.—A total of 2,900,000 cords of fuel wood was cut on farms in 1929. In most of the counties in the Northeastern Cumberland Plateau, the Upper Ohio Hills, and in parts of the Allegheny Plateau coal is used in place of firewood for fuel. Relatively small quantities of pulpwood (250,000 cords) were cut from farms. The cut was heaviest in the Central Piedmont Plateau and in the Blue Ridge in North Carolina. Lands corporately owned and not a part of the land in farms supply much of the pulpwood cut in the region.

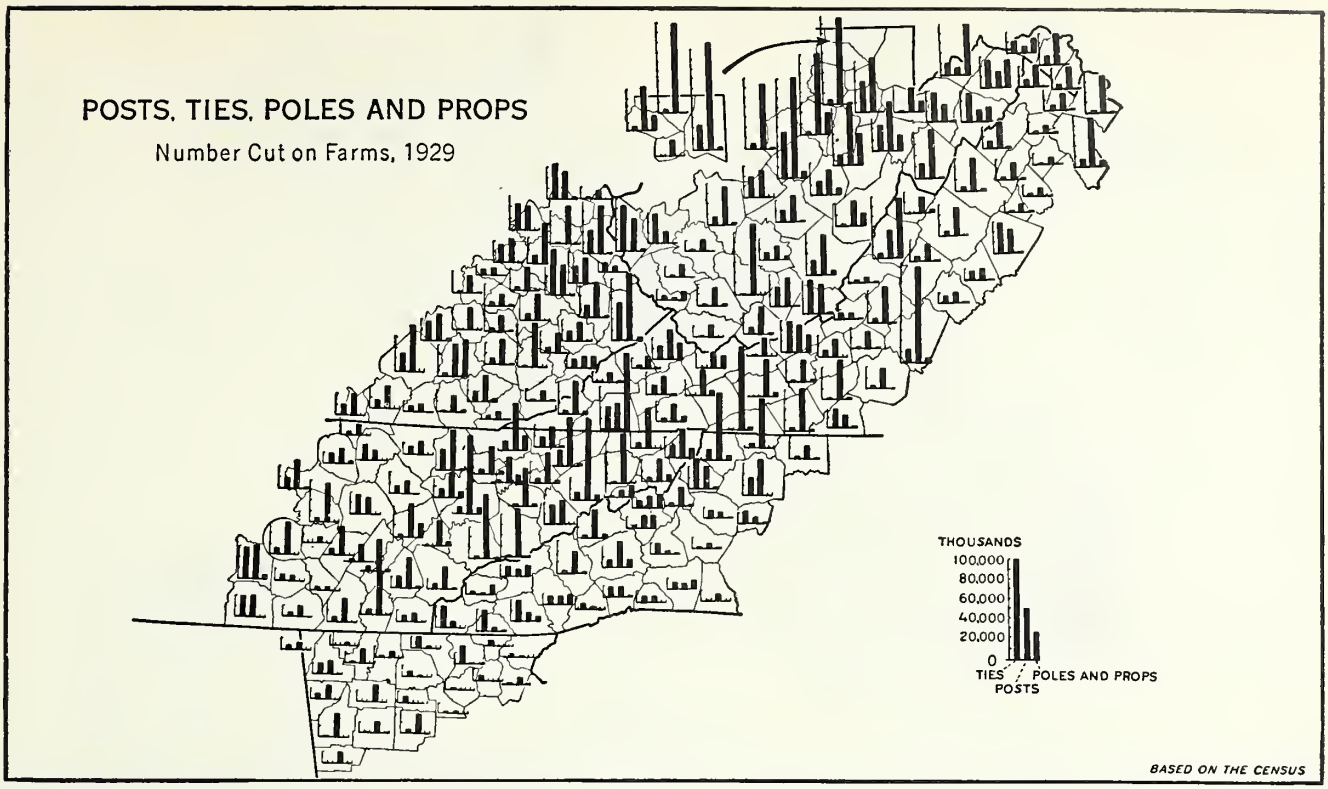


FIGURE 46.—Comparatively few ties, posts, or poles and props were cut on farms in Georgia and in most counties in North Carolina. A large number of posts were cut on farms in those counties in Virginia, West Virginia, and Tennessee where grazing is an important use of the land. Most of the poles and props were cut in Virginia and West Virginia within a comparatively short distance from counties with coal mining.

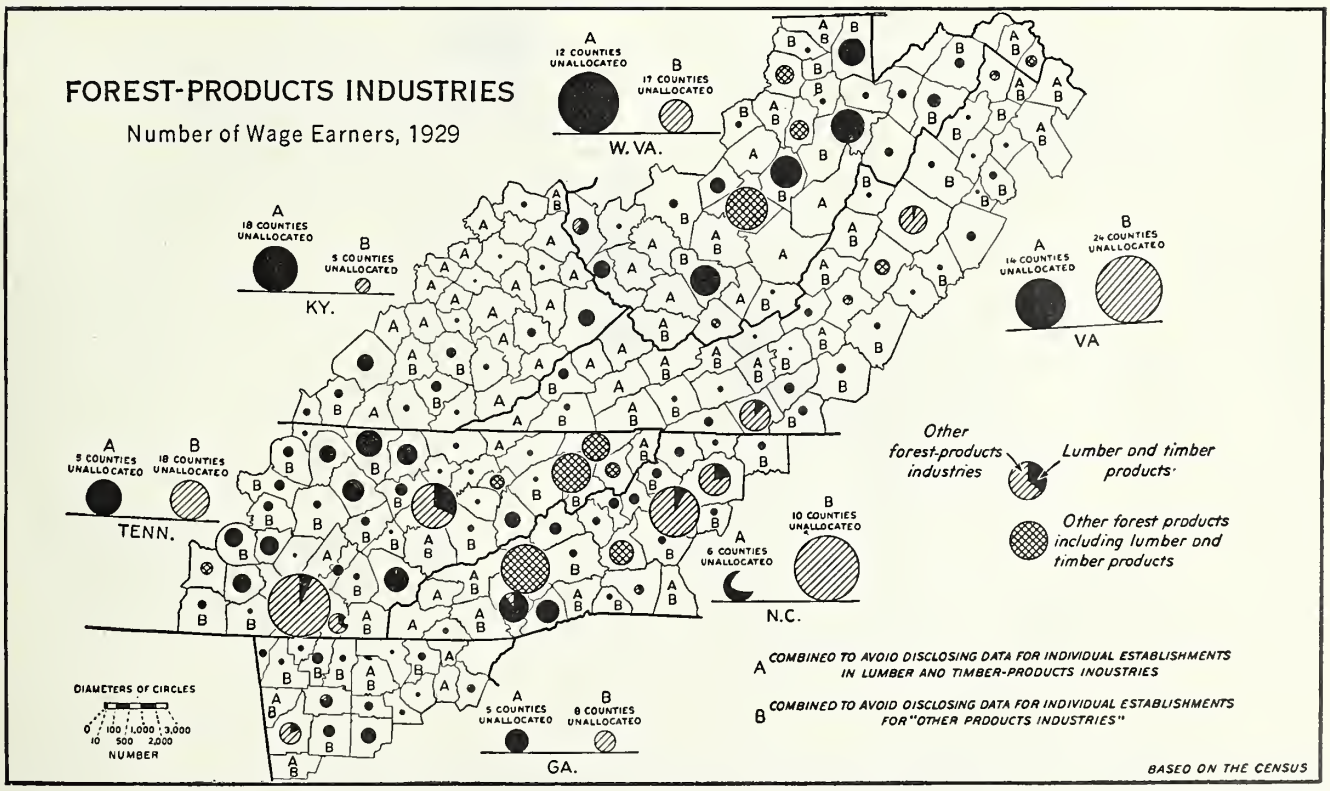
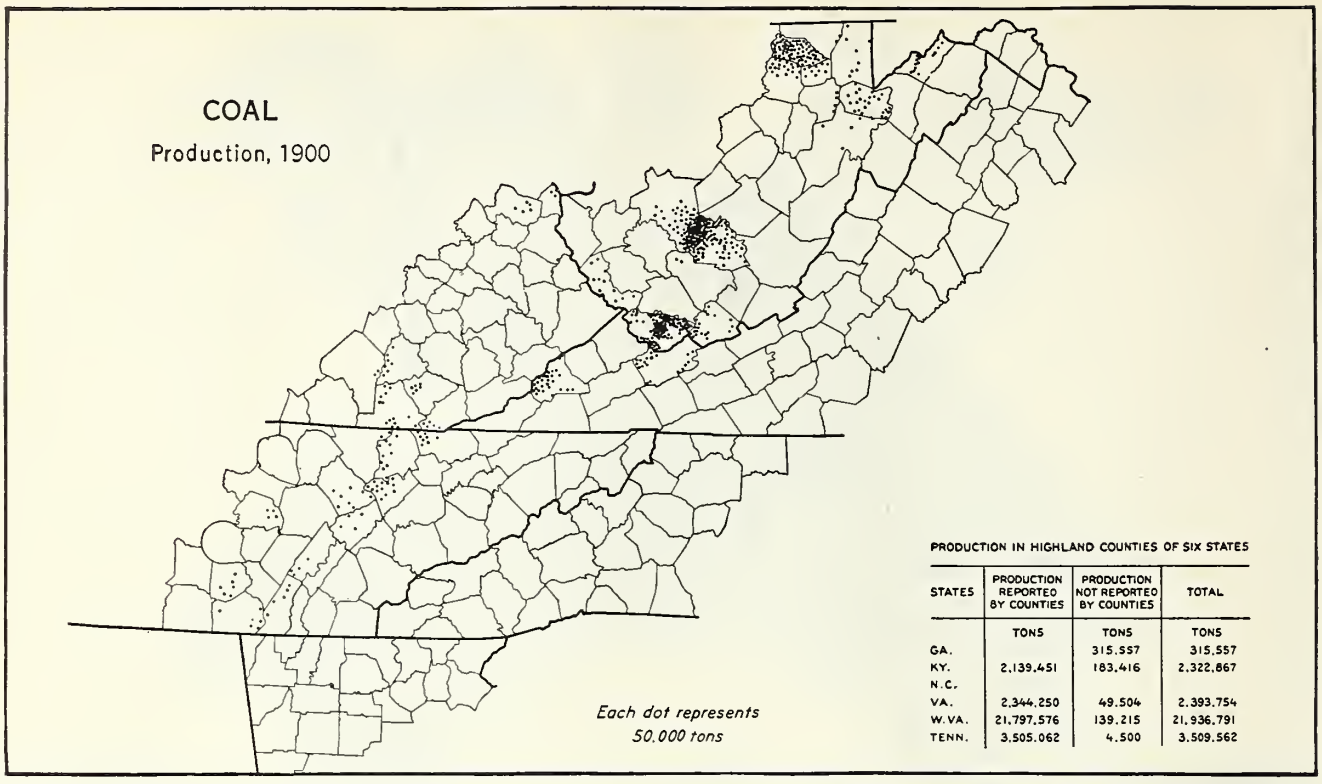


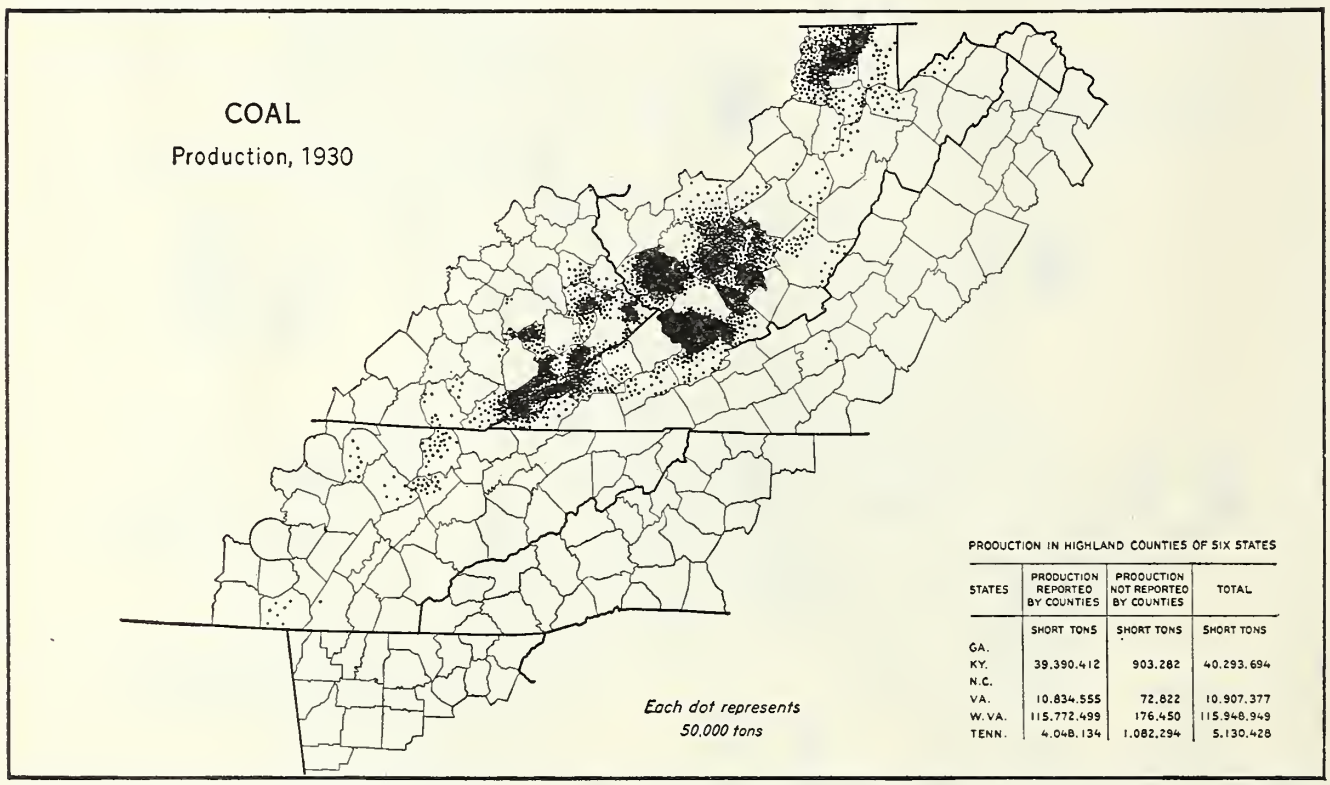
FIGURE 47.—An average of approximately 45,000 wage earners were employed in forest-products industries in the Southern Appalachians during 1929. Slightly over one-half of this number were employed in the manufacture of lumber and timber products and the remainder in other forest-products industries, which include those engaged in making boxes, caskets, furniture, paper, excelsior, turned and shaped articles, and similar products.



PRODUCTION IN HIGHLAND COUNTIES OF SIX STATES

STATES	PRODUCTION REPORTED BY COUNTIES	PRODUCTION NOT REPORTED BY COUNTIES	TOTAL
	TONS	TONS	TONS
GA.		315,557	315,557
KY.	2,139,451	183,416	2,322,867
N.C.			
VA.	2,344,250	49,504	2,393,754
W.VA.	21,797,576	139,215	21,936,791
TENN.	3,505,062	4,500	3,509,562

FIGURE 48.—In 1900, most of the coal produced in the Southern Appalachians came from three districts in West Virginia. A little was produced in two counties in Virginia and in several counties in the Northwestern Cumberland Plateau. The total production was approximately 30,500,000 tons, about one-seventh of the total production of bituminous coal in the United States in that year (*55*).



PRODUCTION IN HIGHLAND COUNTIES OF SIX STATES

STATES	PRODUCTION REPORTED BY COUNTIES	PRODUCTION NOT REPORTED BY COUNTIES	TOTAL
	SHORT TONS	SHORT TONS	SHORT TONS
GA.			
KY.	39,390,412	903,282	40,293,694
N.C.			
VA.	10,834,555	72,822	10,907,377
W.VA.	115,772,499	176,450	115,948,949
TENN.	4,048,134	1,082,294	5,130,428

FIGURE 49.—Between 1900 and 1930 the production of coal increased enormously in West Virginia, the coal fields of eastern Kentucky were developed, and the number of counties producing a considerable quantity of coal in Virginia increased from 2 to 6. The production of coal during this period declined to nearly nothing in many counties in the Northwestern Cumberland Plateau. The total production in 1930 was approximately 172,000,000 tons, more than one-third of the total production of bituminous coal in the United States (*55*).

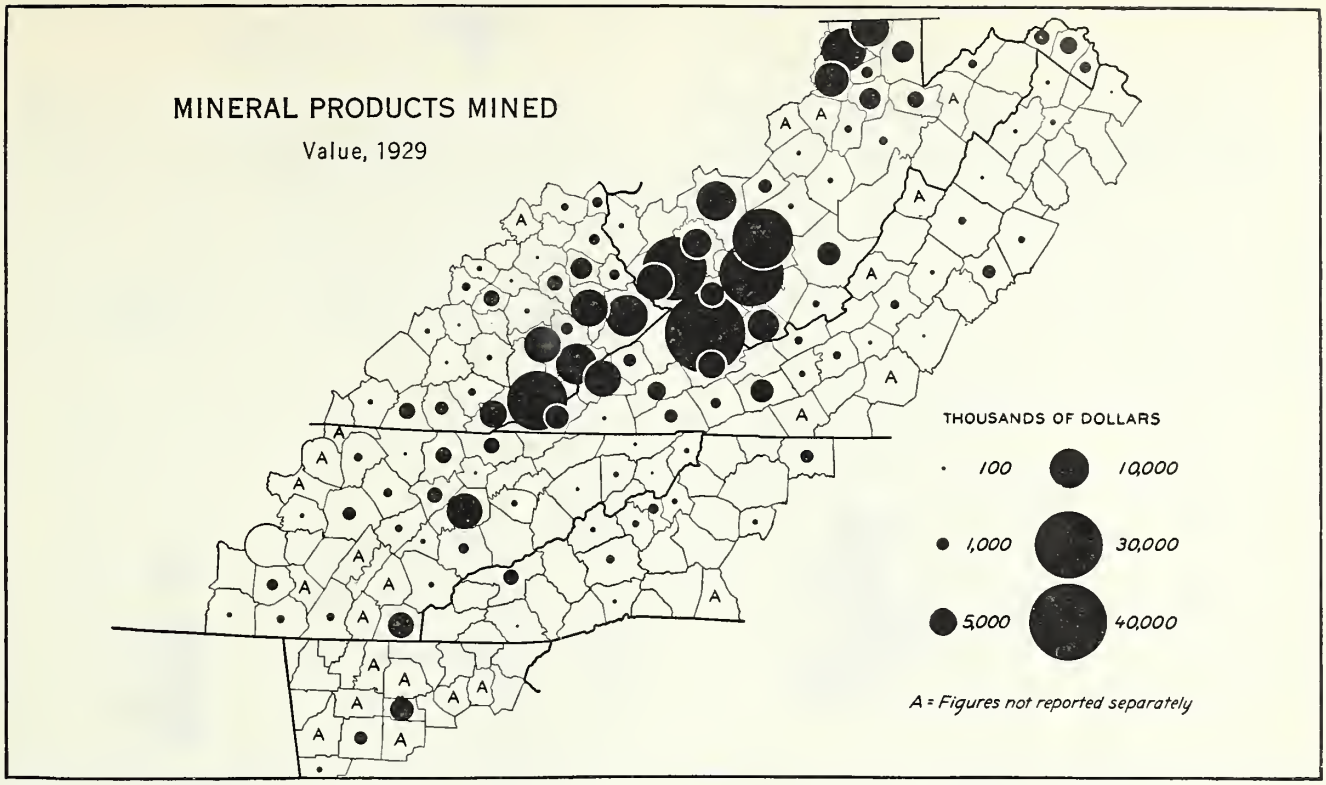


FIGURE 50.—The value of all mineral products mined in the Southern Applachians in 1929 was between 8 and 10 percent of the total value of mineral products mined in the United States. A major part of the total value was produced in the Northeastern Cumberland Plateau and the Upper Ohio Hills, heavy coal-producing subregions in which some petroleum and natural gas are also found. In other subregions the value of products mined was small in most counties (54).

of the total current growth is taking place in the cordwood stands. The growth is mostly low-grade material because of the small size of the trees.

INCOME FROM TIMBER UTILIZATION

In 1929, according to the census, the region contained about 1,900 manufacturing establishments dependent upon wood as the basic raw material. These establishments included timber camps, sawmills, planing mills, pulp and paper mills, and shops producing such products as boxes, furniture, cooperage, veneer, and handles. These plants employed about 48,000 persons, of whom 45,000 were wage earners (fig. 47). Wages and salaries amounted to $45,000,000.

In addition to the persons employed in these industrial establishments, it is estimated that roughly 200,000 farmers are engaged from 2 to 4 weeks per year in the production of fuel wood, logs, poles, piling, posts, pulpwood, mine timbers, and hewed ties from the farm woodlands. The value of such products in 1929 may have approximated $20,000,000, of which $15,000,000 represented a cash return.

Evidence as to the amount of employment that will be afforded by the timber and wood-using industries in the future is not conclusive. In view of the run-down condition of the forests, it seems improbable that the manufacturing industries will provide additional employment, except possibly of temporary duration, for many years. In fact, it may prove impossible to avoid a temporary reduction in the timber cut, with a consequent decrease of employment and reduction in the regional income from timber and timber products.

OTHER TYPES OF LAND USE

Two important specialized uses of land—exploitation of minerals and development of water power—deserve special consideration. Together they constitute the principal sources of power and, to a lesser extent, the raw materials that have permitted the development of manufacturing, and of an increasingly complex economic organization.

Bituminous coal probably constituted two-thirds of the value of products mined in 1929. Over a period of 30 years, 1900-1930, production increased from approximately 30,500,000 tons to 172,000,000 tons (figs. 48 and 49). This development drew thousands of families to coal-mining centers and explains much of the large increase in population in the Northeastern Cumberland Plateau, Upper Ohio Hills, and Allegheny Plateau. On the whole, the development of coal mining has not made for a satisfactory economic organization. The coal-mining camps, usually erected and owned by the owners of the mines, have often been unwholesome. The work in the mines has usually been irregular, and even before the present economic depression most mines were closed from one to several months each year. When the mines are closed most miners are able to earn very little. Many of the mines are located where there are few other industries and little agriculture. Moreover, it has been difficult for miners to raise their own fruits and vegetables. The land around the mining camps is frequently owned by the mine operators in large tracts and allowed to remain in forest and woodland. Even were the land available for gardening, usually little of it would be adapted to cultivation. Hence, although coal mining

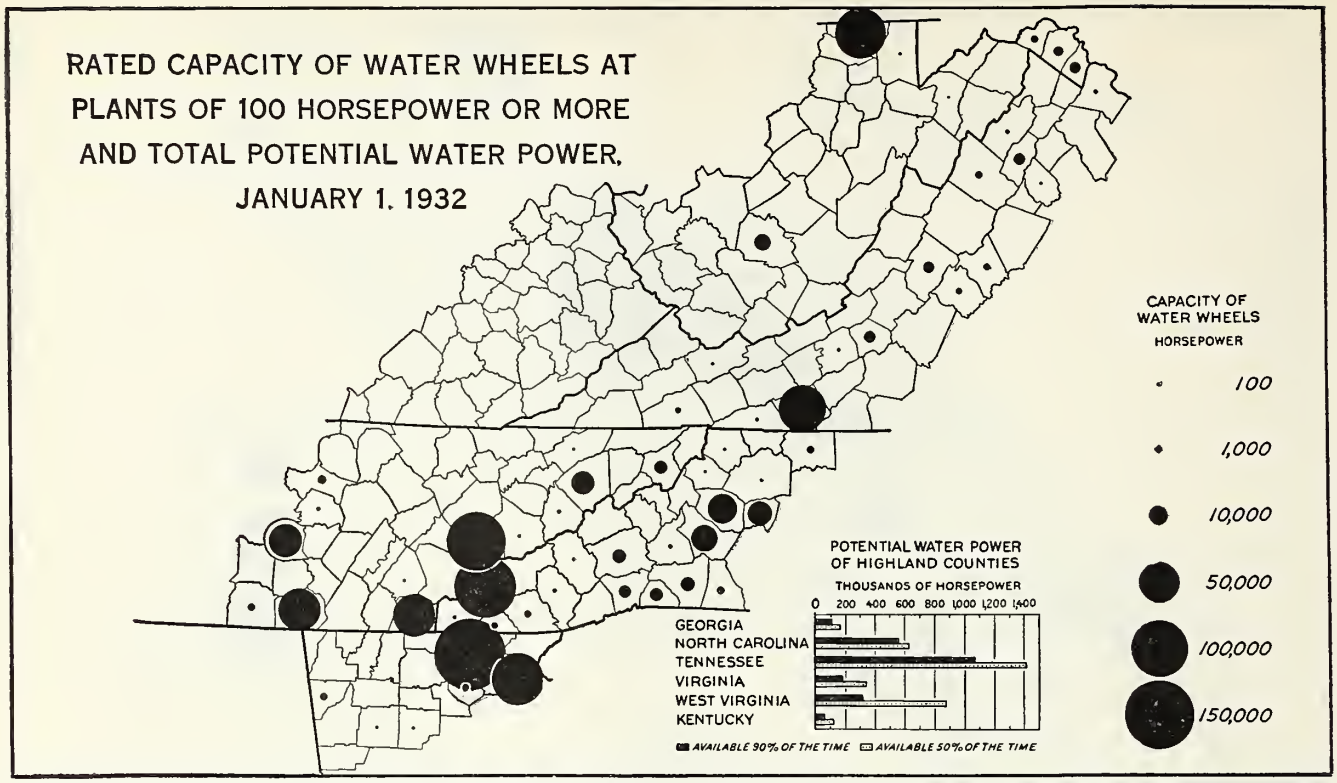


FIGURE 51.—The rated capacity of water wheels at plants developing 100 horsepower or more in the Southern Appalachians was approximately 924,000 horsepower in 1932. This estimate is considerably in excess of the probable power developed at these plants. The potential water power of the Southern Appalachians is estimated to be approximately 2, 300,000 horsepower available 90 percent of the time, and 3,600,000 horsepower available 50 percent of the time. (Based upon estimates of the U.S. Geological Survey, supplemented by figures from the census.)

has provided employment for more people than has any other occupation except agriculture, it has unfortunately relocated the people where alternative opportunities are not usually to be found, and in an industry where employment has been very irregular.

Although bituminous coal is found over a large part of the Cumberland and Allegheny Plateaus and the Upper Ohio Hills, it is improbable that the production of coal will increase the opportunities for employment in the future as rapidly as in the past. Since the World War, consumption of coal has increased very little. Moreover, production per man increased over 20 percent from 1921 to 1930, thereby tending to decrease the number of persons who can be employed full time in mining. With the very rapid natural increase of population in the coal-mining areas it would appear that either emigration is essential to the economic welfare of those remaining in coal-mining communities or some use for the coal must be developed locally.

The extent to which the value of mineral products mined is associated with coal production may be noted by comparing figures 49 and 50. It also happens, however, that many counties that produce coal also produce some petroleum and natural gas. Aside from these three mineral products—coal, petroleum, and natural gas—the production was limited. Considerable marble was produced in Pickens County, Ga.; cement and marble in Knox County and, copper in Polk County, Tenn.; and building stone in Morgan, Berkeley, and Jefferson Counties, W.Va.

Water power has been developed principally in the southern portion of the region (fig. 51). Comparatively little water is available for power in Kentucky, Georgia, or Virginia. In West Virginia, although considerable water is available, only a small proportion has been developed, perhaps partly because of the abundance of coal.

Health and recreational uses of the land are of great potential importance. The Blue Ridge, Appalachian Valleys, and parts of West Virginia have long been known for their scenic beauty. Improved roads and the automobile have made this beauty accessible to many. The attraction of these areas has been enhanced by the reputed healthfulness of the water and air. Many summer hotels in Virginia and West Virginia are located in towns famous for their mineral springs and a well-known center for treatment of tuberculosis is located at Asheville, N.C., in the heart of the Blue Ridge. Increasingly large numbers of summer houses have been built throughout the Southern Appalachians. Development of health and recreational facilities has taken land for summer houses, hotels, golf courses, bridle paths, and the like, and has brought added wealth to the region and created a demand for numerous services and kinds of goods.

These various types of land use, for the most part have been developed at particular points. Industrialization also has occurred only at definite points. Since these special uses of the land, and the industrial structure, that has so largely been built upon them, have very strongly influenced the major types of land use, it is not surprising that the latter exhibit great local differences in trend. Thus, to understand the local changes in major types of land use it is necessary to study local agricultural conditions, the relation of population to resources that are being utilized, and the strength of the pull of economic opportunities other than agricultural, whether nearby or distant. These aspects of the problem will be treated in further detail in subsequent sections.

FARM ORGANIZATION AND MANAGEMENT

By H. W. Hawthorne, *agricultural economist, Division of Farm Management and Costs, Bureau of Agricultural Economics*

Because of physical and other conditions in the Southern Appalachians, small-scale farming has been dominant in much of the region from the time of the first white settlers. The size of the business has been so small on many of the farms that only very low incomes have been obtained.

In 1930 almost one-half of the farms were under 50 acres in size, and fully one-fourth of these were farms under 20 acres in size. Largely because of the rough topographic features, less than one-third of the land in farms was crop land in 1929. Corn, hay, and wheat were the most important crops, whether measured by the acreage used for these crops or by the number of farmers growing them. On many of the farms the yields of these crops were below the average yields of the region, which, in 1929, were: Corn, 22 bushels per acre; hay, about 1 ton; and wheat, 12 bushels. Much of the field-crop production, especially on the smaller farms, was used either directly as food for the farm family, or as feed in the production of livestock products for family use. There was no work stock (horses or mules over 2 years and 3 months old) on almost one-third of the farms on April 1, 1930, and no cows were milked on about one-sixth of the farms in 1929. In 1930 the average value of land and buildings was under $2,000 per farm in about 29 percent, and under $1,000 per farm in about 4 percent, of the minor civil divisions.

In view of these facts it is not surprising that on more than 50 percent of 383,870 farms the value of all farm products sold, traded, or used by the farmer's family in 1929 was under $600 per farm, nor that on about 30 percent of the farms the value was under $400 per farm. In 292 minor civil divisions, or about 18 percent of the total number in the region, the average value of the products sold or traded was under $200 per farm, and in 47 civil divisions, or about 3 percent of the total number, the average value was under $100 per farm.

Neither is it difficult to understand that more than 40 percent of the farms classified by type by the census in 1930 were self-sufficing (*50*). A self-sufficing farm, according to the census definition, is one from which the value of the products used directly by the farm family is equal to or greater than the value of all the crops, livestock, livestock products, and forest products sold or traded.

On the other hand, not all of the farming in the Southern Appalachians has been on so small-sized, low-income, or self-sufficing a basis. In contrast, the production on many farms has been sufficiently large to permit the sale of a considerably greater value of farm products than was used by the family, even when family consumption was large. Farms of this more commercial class, in 1930 were scattered throughout the region and in some parts of the region they outnumbered farms of the self-sufficing class. The size of the business on many of these more commercial farms was sufficiently large to provide an income adequate for at least a fairly good family living. The larger farm businesses were closely associated with farms above the average in size and with those that were operated intensively.

In 1930 slightly more than one-tenth of the farms in the region were 175 acres or over in size. Farms of this size had an average of 52 acres of land from which crops were harvested in 1929, and probably 50 or more acres of pasture land, excluding woodland used for pasture. In parts of the region, there were also farms smaller in size—some of even less than 50 acres—with relatively high percentages of the acreage in level or rolling land available for the production of crops. There were also parts in which the soils are capable of returning much higher yields per acre than are the soils in many other parts. Then, too, there were farms on which the production—whether of crops, livestock, or livestock products, or combinations of 2 or all 3 of these—was carried on more intensively than on the great bulk of farms.

Examples of more intensive production are provided by farms on which the production of tobacco, cotton, fruit, or truck crops for sale was an important part of the farm organization, or where dairying or poultry farming was a major enterprise of the farm business. There were farms with 100 or more acres of cotton, tobacco, or fruit trees; farms with 40 or more dairy cows; farms with 100 or more beef cattle; and farms with 1,000 or more chickens. In a number of instances there were farms with land and buildings valued at $25,000 or more in 1930.

About one-tenth of the farmers in the Southern Appalachians had a sufficiently large farm business to realize $1,500 or more per farm from the farm products sold, traded, or used by the farm family in 1929, and about one-half of these realized $2,500 or more per farm.

These general descriptions are fairly typical of the upper and the lower strata of farming in the Southern Appalachians, both of which were found throughout practically all parts of the region, but each of which was more common to certain parts than to other parts. Reference to the description of topographic, climatic, and soil characteristics of the region (pp. 8–10) will aid in associating variations in farming with variations in physical conditions.

In the subsequent discussion, farms in the Blue Ridge and in the Allegheny and Cumberland Plateaus, because of the generally mountainous character of these subregions, will, for convenience, be referred to as "mountain" farms, and these subregions as a group, as the mountain divisions. Farms in the Appalachian Valleys and Ridges will be referred to as "valley" farms, and these subregions as a group, the valley division. The Upper Ohio Hills and Highland Rim will be referred to as the "western fringe" and the Piedmont Plateau as the "eastern fringe." In many respects, the eastern fringe is comparable with the valley division and the western fringe with the mountain divisions. For this reason, the mountain and western fringe will be contrasted at times with the valley and eastern fringe.

Within some of these divisions there are widely differing conditions, as in the southern part of the Appalachian Valleys where the production of cotton is the leading farm enterprise, and in the northern part of the valleys where there is a greater diversity of farm enterprises and where there are more farms of mixed types. To facilitate comparisons of the average size of farm, uses of the land, average number of livestock, and value of products per farm in different parts of the Southern Appalachians, the data are presented in table 10 by divisions and subregions.

TABLE 10.—*Average size of farm, value of land and buildings, and number of livestock, 1930, and value of products, 1929, by principal divisions and subregions*

Division and subregion	Farms [1]	Acreage per farm of—			Value per farm of—		Number per farm of—						Value per farm of—	
		Land in farms	Crop land harvested	Pasture land [2]	Land and buildings	Operator's dwelling	Horses and mules [3]	Cows and heifers [3]	Other cattle	Swine	Sheep and lambs	Chickens [4]	All farm products	Farm products used by family
	Number	*Acres*	*Acres*	*Acres*	*Dollars*	*Dollars*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Dollars*	*Dollars*
Eastern mountain division: Blue Ridge	73,220	76	14	18	3,094	637	1.0	1.8	2.6	2.1	3.2	27	699	287
Western mountain division:														
Allegheny Plateau	26,976	100	18	38	3,673	924	1.3	2.4	3.9	2.2	10.1	37	953	371
Northeastern Cumberland Plateau	55,460	71	12	16	2,053	465	1.1	1.4	1.6	2.3	1.0	29	561	344
Northwestern Cumberland Plateau	21,291	76	17	12	1,614	391	1.4	1.6	2.1	3.1	2.2	28	577	302
Total or average	103,727	80	15	21	2,375	566	1.2	1.7	2.3	2.5	3.5	31	668	343
Mountain divisions: Total or average	176,947	78	15	20	2,655	594	1.1	1.7	2.4	2.3	3.4	29	681	320
Western fringe:														
Upper Ohio Hills	13,766	91	16	46	4,529	1,135	1.4	2.7	4.8	2.1	9.9	38	993	353
Highland Rim	27,547	79	22	15	1,953	424	1.7	1.6	1.9	3.0	1.4	39	659	272
Total or average	41,313	83	20	25	2,665	619	1.6	1.9	2.7	2.8	3.8	39	772	299
Mountain divisions and western fringe: Total or average	218,260	79	16	21	2,657	599	1.2	1.8	2.5	2.4	3.4	31	698	316
Valley division:														
Central Appalachian Ridges	17,169	168	25	57	5,884	1,250	1.7	3.1	6.3	4.3	26.2	49	1,374	336
Central Appalachian Valleys	15,393	116	43	37	8,774	1,980	2.3	3.5	5.7	7.8	12.7	89	1,955	333
Appalachian Valleys of Southwest Virginia	22,878	85	19	36	5,792	1,169	1.4	2.3	4.5	3.5	9.1	41	1,038	291
Appalachian Valleys of East Tennessee	48,762	77	23	20	4,110	795	1.6	2.3	3.2	2.7	1.1	44	976	298
Southern Appalachian Valleys	17,509	76	24	8	2,308	523	1.7	1.3	1.3	1.2	.2	25	973	217
Total or average	121,711	96	25	28	5,065	1,057	1.7	2.4	3.9	3.6	7.4	48	1,173	295
Eastern fringe:														
Northern Piedmont Plateau	4,979	169	43	76	10,279	2,555	2.9	4.9	7.6	7.6	10.0	69	2,549	360
Central Piedmont Plateau	23,118	88	19	17	3,545	983	1.3	1.7	1.7	2.1	1.0	29	872	293
Southern Piedmont Plateau	15,802	65	22	5	2,749	618	1.4	1.2	.9	1.2	.04	23	1,010	217
Total or average	43,899	89	23	20	4,120	1,065	1.5	1.9	2.2	2.5	1.8	32	1,115	274
Valley division and eastern fringe: Total or average	165,610	94	25	26	4,775	1,060	1.6	2.3	3.4	3.2	5.7	43	1,157	289
All subregions	383,870	86	20	23	3,606	804	1.4	2.0	2.9	2.8	4.4	36	897	305

[1] Excluding 105 farms in 9 independent cities in Virginia.
[2] Excluding woodland pasture.
[3] Over 2 years and 3 months old.
[4] Over 3 months old.

Compiled from the census, 1930 (*50*) by minor civil divisions, except the averages for other cattle, swine, and sheep and lambs which were compiled by counties.

Although table 10 indicates more or less variation in these factors between subregions, wide variations often occur within a subregion. For example, in a minor civil division in Kanawha County, W.Va., there were more dairy farms than farms of any other type in 1930, but in one of the adjoining civil divisions there were more general farms, in five more self-sufficing farms, and in two more abnormal farms than farms of any other type. In the civil division where dairy farms were dominant the value of the products sold, traded, or used by the farmer's family was more than $1,500 per farm on 54 percent of the farms in 1929, while in some of the adjoining civil divisions the value of products exceeded $1,500 on less than 20 percent of the farms.

The following data pertaining to types of farm, income from farming, farm capital, size of farm business, crops grown, and the livestock kept, give a somewhat detailed picture of the most important characteristics of the farm organization. Most of the data are presented by minor civil divisions.[13]

[13] The primary civil divisions of the counties are variously designated as townships, civil districts, magisterial districts, or militia districts, in the several States. There are 1,662 minor civil divisions in the region and 9 independent cities in Virginia. The 105 farms in the independent cities are not included in this section. In 2 of the minor civil divisions there were no farms, and in 5 others, each with only a few farms, the data were combined with other minor civil divisions.

TYPES OF FARMS

Farms may be classified by types in many ways depending on the purpose of the classification. In the 1930 census (*50*) the farms in the region were classified by types, primarily on the basis of the relation of the value of products from a particular source to the value of products from all sources.[14] The types distinguished in this classification were: cash-grain, cotton, crop-specialty, fruit, truck, dairy, animal-specialty, stock-ranch,[15] poultry, general, self-sufficing, and abnormal farms.[16]

[14] Value of products includes the value of crops sold or to be sold; livestock and livestock products sold or traded; forest products sold; and products used by the operator's family, but excludes receipts from boarders, lodgers, etc.

[15] Animal-specialty and stock-ranch farms are combined into one type in this section of the study.

[16] Full descriptions of the several types of farms are given in the 1930 census (*50*). Brief descriptions are as follows: For all except the last 3 of the types above mentioned the classification was determined on the basis of 40 percent or more of the total value of products of the farm coming from a particular source. For example, cash-grain farms included those farms from which the value of the sales of corn, wheat, oats, and other grains, was 40 percent or more of the value of all the products sold, traded, or used by the operator's family and animal-specialty and stock-ranch farms included those from which the value of the sales of beef cattle, sheep, hogs, wool, mohair, and slaughtered animals was 40 percent or more of the value of all farm products.

Farms were classified as general when the value of products sold or traded from any one source was less than 40 percent of the total value of all products from the farm, and as self-sufficing when the value of the products used by the operator's family was 50 percent or more of the total value.

Other farms which reported value of products were designated "abnormal" and were grouped in five subtypes as follows: Institution, or country estate, of which there were 397 farms in the region; boarding and lodging, totaling 335 farms in the region (farms on which the receipts from boarders, lodgers, campers, and similar

TABLE 11.—*Percentage of farms in each type by principal divisions and subregions, 1930*

Division and subregion	Farms[1]	Percentage of farms classed as—											Total
		Self-sufficing	Abnormal	General	Cotton	Crop-specialty	Cash-grain	Fruit	Truck	Animal specialty and stock-ranch	Dairy	Poultry	
	Number	*Percent*	*Percent*	*Percent*	*Percent*	*Percent*	*Percent*	*Percent*	*Percent*	*Percent*	*Percent*	*Percent*	*Percent*
Eastern mountain division: Blue Ridge	68,360	49.4	17.9	19.0	1.0	4.3	0.4	1.7	0.7	3.9	1.1	0.6	100
Western mountain division:													
Allegheny Plateau	25,711	45.0	20.8	20.5	-------	.5	.4	.4	.2	8.7	2.3	1.2	100
Northeastern Cumberland Plateau	51,980	65.8	20.7	8.2	-------	2.2	.2	.2	.2	1.8	.4	.3	100
Northwestern Cumberland Plateau	19,716	56.1	19.6	14.6	1.5	3.6	.6	.1	.1	2.6	.8	.4	100
Total	97,407	58.4	20.5	12.7	.3	2.0	.4	.2	.1	3.8	1.0	.6	100
Mountain divisions: Total	165,767	54.7	19.4	15.3	.6	3.0	.4	.8	.4	3.8	1.0	.6	100
Western fringe:													
Upper Ohio Hills	13,031	42.4	19.4	17.0	-------	3.1	.3	.5	.3	9.6	5.4	2.0	100
Highland Rim	25,730	51.2	11.5	23.8	1.3	4.2	1.5	(2)	(2)	4.7	1.0	.8	100
Total	38,761	48.2	14.1	21.5	.9	3.9	1.1	.2	.1	6.3	2.5	1.2	100
Mountain divisions and western fringe: Total	204,528	53.5	18.4	16.5	.6	3.2	.5	.7	.3	4.3	1.3	.7	100
Valley division:													
Central Appalachian Ridges	16,479	33.4	15.9	27.5	-------	.6	.5	3.1	.1	14.3	2.5	2.1	100
Central Appalachian Valleys	15,031	13.4	17.5	37.9	-------	.1	4.9	6.2	.3	7.4	3.9	8.4	100
Appalachian Valleys of Southwest Virginia	21,771	34.2	15.7	24.5	-------	9.8	1.0	.8	2.0	8.2	2.5	1.3	100
Appalachian Valleys of East Tennessee	45,206	34.2	11.8	30.4	1.5	9.8	1.4	1.4	.8	3.6	3.6	1.5	100
Southern Appalachian Valleys	16,386	5.2	3.5	6.4	80.8	.3	.2	.4	.7	.3	2.0	.2	100
Total	114,873	27.2	12.7	26.4	12.1	5.8	1.5	2.0	.9	6.1	3.0	2.3	100
Eastern fringe:													
Northern Piedmont Plateau	4,803	21.3	17.8	26.5	-------	.1	2.3	6.3	.2	16.8	5.9	2.8	100
Central Piedmont Plateau	21,757	35.4	14.7	18.5	2.4	21.5	.9	1.6	.4	1.4	2.0	1.2	100
Southern Piedmont Plateau	14,980	8.9	3.1	6.5	79.4	(2)	.2	.5	.1	.1	.8	.4	100
Total	41,540	24.2	10.9	15.1	29.9	11.3	.8	1.8	.2	2.7	2.0	1.1	100
Valley division and eastern fringe: Total	156,413	26.4	12.2	23.4	16.8	7.3	1.3	1.9	.7	5.2	2.8	2.0	100
All subregions	360,941	41.7	15.7	19.5	7.7	4.9	.9	1.2	.5	4.7	1.9	1.3	100

[1] Excluding 22,929 farms not classified by type.
[2] Less than 0.1 percent.

Compiled from the census, 1930 (*50*) by minor civil divisons.

The dominant type of farm in each minor civil division in the Southern Appalachians is shown in figure 52, and, since there were more self-sufficing farms in the region than farms of any other type, the percentage of self-sufficing farms in each civil division is indicated in figure 53.

Part-time farms (fig. 55), comprising practically 90 percent of all abnormal farms, and self-sufficing farms are the primarily noncommercial group of farms. The value of products of all the part-time farms and more than 80 percent of the self-sufficing farms was $750 or less. But operators of part-time farms worked off the farm 150 or more days, whereas the operators of the self-sufficing farms may have worked off the farm for any number of days under 150.

From the standpoint of farming many of the part-time farms were much like the self-sufficing farms in that the value of the products used by the family was more than the value of the products sold and, had it not been that the farmer worked off the farm 150 or more days in 1929, the farms would have been classified as self-sufficing.

On the other hand, there was a considerable number of the farms which were classified as self-sufficing, and sometimes those of other types, which might well be called part-time farms even though the farmer worked off the farm less than 150 days. Data in farm-business studies made in the region support the statement that there was a considerable number of farmers who worked off the farm less than 150 days, but whose income from such work—either man, man and team, or man and machine work—was an appreciable part, often more than one-half, of their cash income.

Again, probably many farms in the region were classified by the census as self-sufficing or farms of some other type, which, had the income from work off the farm by the entire family been included, might well have been considered the home of a part-time farm family. Farm-business and family-income studies which have been made in a few localities in the mountain divisions indicate that most of the families living on the farms in these divisions have income other than directly from the farm. For example, of 203 farm families in Laurel County, Ky. (*30*), 22 depended entirely on the farm for their living in 1927; 86 had incomes from other sources amounting to less than $200 per family; 48 had other incomes ranging from $200 to $399 per family; and 47 families each had $400 or more income from sources other than the farm.

Abnormal (mostly part-time) and self-sufficing farms included more than 57 percent of all types in the region in 1930 and more than 74 percent of all types in the mountain divisions.

Some of the general farms (fig. 56) were also much like the self-sufficing farms in that the value of products used by the operator's family was only slightly less than the value of the products sold, or traded; others, however, had fairly large businesses but a diversity of sources of income. The general farms included almost 20 percent of all the farms in the region. About 36

sources represented 50 percent or more of the total value of all products and receipts of the farm); horse-farm, feed-lot, or livestock dealer, including 1,230 farms (farms on which the sales from livestock of these descriptions represented 50 percent or more of the total value of all products of the farm); forest-product, including 3,513 farms (farms on which the value of forest products sold represented 50 percent or more of the total value of all products of the farm); and part-time farms, numbering 51,288 (farms on which the operator spent 150 or more days in work off the farm for pay, or reported an occupation other than farmer, provided the value of products did not exceed $750). There were 22,929 farms which were not classified by type. Either they were not operated in 1929, or the data on the schedule were incomplete.

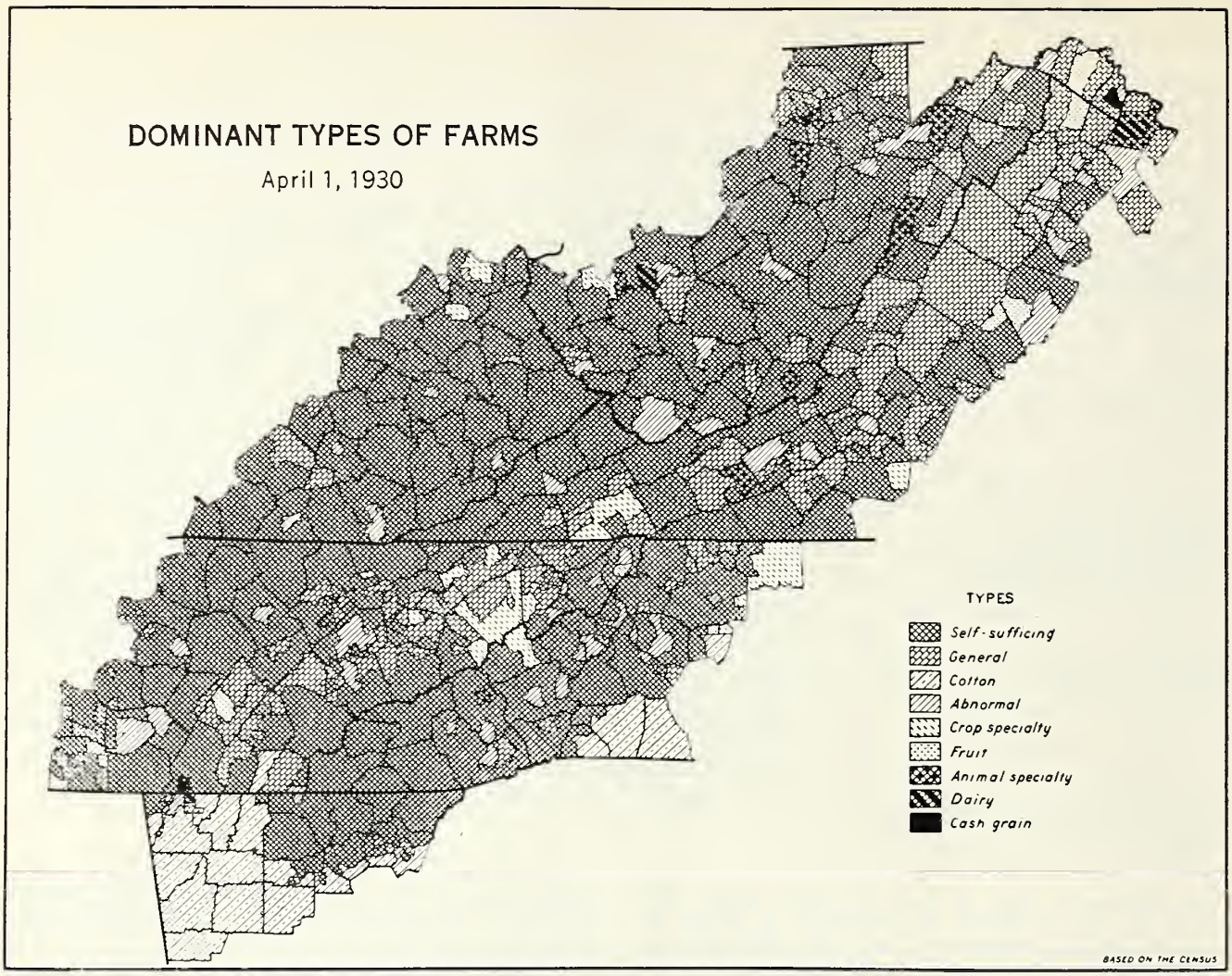


FIGURE 52.—In 1930 there were more self-sufficing farms than farms of any other type in 1,045 of the 1,655 minor civil divisions in the Southern Appalachians. Most of the 1,045 civil divisions were in the mountain divisions and western fringe of the region, where self-sufficing farms outnumbered those of any other type in 5 out of every 6 civil divisions. In the Northeastern Cumberland Plateau, farms of this type were dominant in 90 percent of the civil divisions, while in the Central Appalachian Valleys there were no civil divisions in which the self-sufficing type of farm was dominant. About 70 percent of the 252 minor civil divisions, in which general farms were dominant, were in the valley division and eastern fringe, where general farms outnumbered farms of any other type in 1 out of every 4 civil divisions. General farms were dominant in some civil divisions in each subregion, ranging from less than 3 percent of the civil divisions in the Southern Piedmont Plateau, the Southern Appalachian Valleys, and the Northeastern Cumberland Plateau to almost 90 percent in the Central Appalachian Valleys. More than 90 percent of the 193 minor civil divisions in which cotton farms were dominant were in the Southern Piedmont Plateau and the Southern Appalachian Valleys—the two subregions in the Southern Appalachians in which most of the cotton was grown. About two thirds of the 97 minor civil divisions in which abnormal—mostly part-time—farms were dominant were in the mountain divisions and western fringe, but abnormal farms comprised almost as large a percentage of all farms in the valley division and eastern fringe as in the mountain divisions and western fringe. Minor civil divisions in which abnormal farms were dominant were usually near cities, towns, mining, or other industrial localities. The crop-specialty farms were usually tobacco farms. They were dominant in 47 minor civil divisions most of which were somewhat concentrated in parts of the Appalachian Valleys of Southwest Virginia, the Appalachian Valleys of East Tennessee, the Blue Ridge, and the Central Piedmont Plateau. One or another of the five types above mentioned was dominant in all except 21 of the minor civil divisions. Of these 21 civil divisions, fruit farms were dominant in 8, animal specialty and stock-ranch farms in 7, dairy farms in 4, and cash-grain farms in 2. Self-sufficing farms included more than 40 percent of the total number classified by type in 1930 (table 11). About 60 percent of all the self-sufficing farms (fig. 54) were in the mountain divisions.

percent of the general farms were in the mountain divisions and 43 percent in the valley division. About half the others were in the eastern fringe and the other half in the western fringe. In the region as a whole, more than 75 percent of all the farms that were classified by type in 1930 were self-sufficing, abnormal, or general farms.

Cotton farms (fig. 57), almost 8 percent of all farms, classified by type were confined largely to the Southern Appalachian Valleys and the Southern Piedmont Plateau. In each of these subregions they included about 80 percent of all the farms.

Crop-specialty farms (fig. 58), mostly tobacco farms, included approximately 5 percent of all types. Farms of this type were rather confined to certain parts—more than two-thirds of them being in the Central Piedmont Plateau, the Blue Ridge and the the Appalachian Valleys of East Tennessee, and most of the others in the Appalachian Valleys of Southwest Virginia, the Cumberland Plateau, and the Highland Rim.

Nearly two-thirds of the cash-grain farms (fig. 59), less than 1 percent of all farms, were in the valley division and eastern fringe.

Fruit farms (fig. 60) included about 1.2 percent of the farms in the region. More than one-half of these farms were in the Appalachian Valleys and Ridges, and slightly more than one-fourth were in the Blue Ridge. Truck farms (fig. 61) comprised about 0.5 percent of all farms in the region.

Animal-specialty and stock-ranch farms (fig. 62) comprised almost 5 percent of all the farms. They, too,

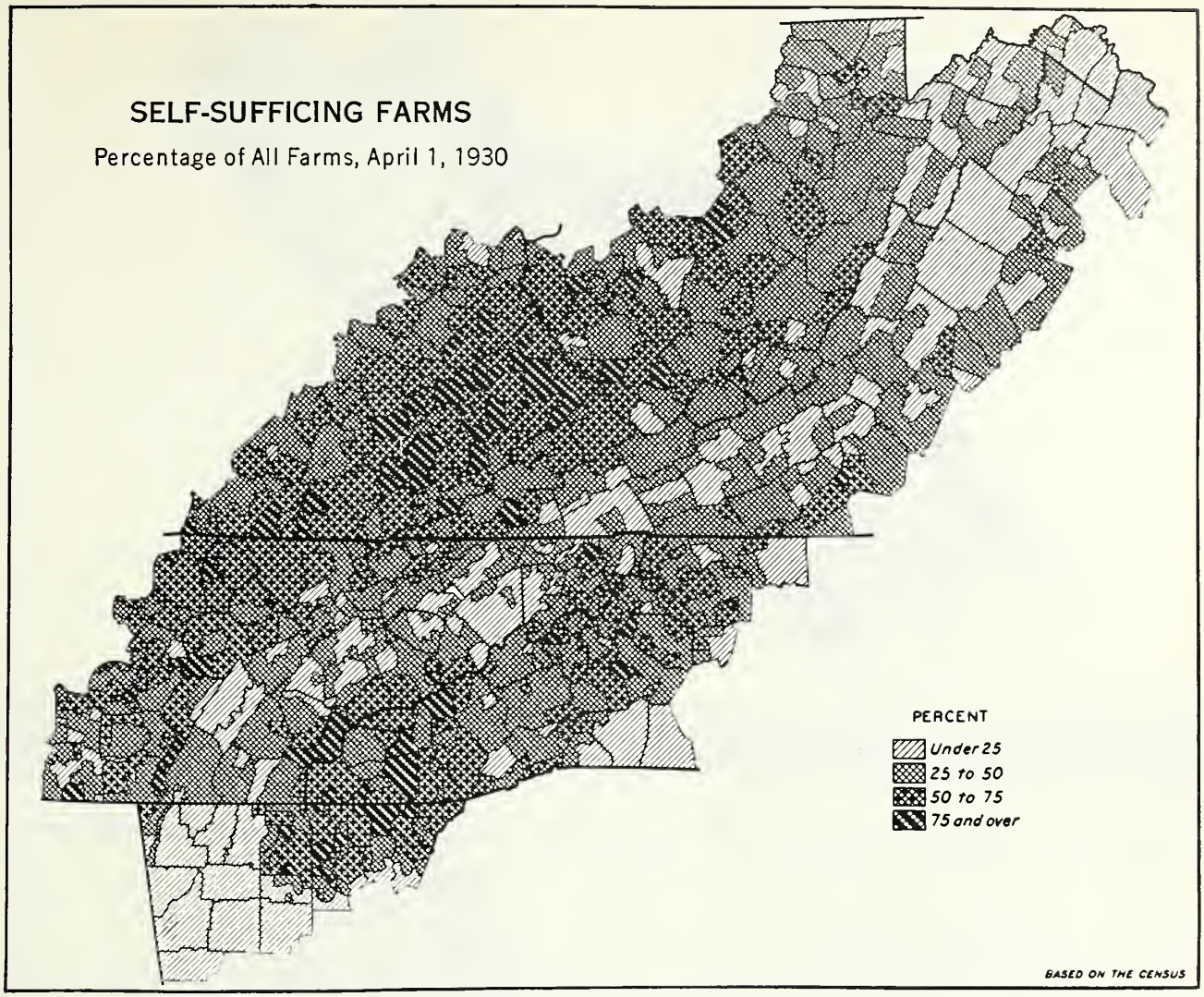


FIGURE 53.—Farms of the self-sufficing type—those on which the value of the farm products used by the operator's family was equal to or greater than the value of the farm products sold or traded—were more numerous in the Southern Appalachians in 1930 than farms of any other type. They included about 40 percent of all the farms in the region and in almost two-thirds of the minor civil divisions they exceeded in number the farms of any other type (fig. 52). But the percentages which self-sufficing farms were of the total number of farms in the several civil divisions ranged from zero to over 90 percent. There were no self-sufficing farms in 19 of the civil divisions—16 in parts of North Carolina and Georgia, where cotton farms were dominant, and 3 in parts of Kentucky and Tennessee, where abnormal farms were dominant. More than 90 percent of all the farms were self-sufficing in 5 civil divisions—4 in Kentucky and 1 in Virginia. In these 5 civil divisions the average value of farm products used by the family in 1929 was $338 and of those sold, $121. Farm expenditures per farm for labor, feed, fertilizer, taxes, and machinery bought were $48. The farm operators in these 5 civil divisions worked off the farm an average of only 14 days during the year. Ninety-four percent of the civil divisions in which 75 percent or more of the farms were self-sufficing were in the mountain divisions and western fringe, while 83 percent of the civil divisions in which less than 25 percent of the farms were self-sufficing were in the valley division and eastern fringe. One-half or more of the farms were self-sufficing in 50 percent of the minor civil divisions in the mountain divisions and western fringe, but in only 9 percent of those in the valley divisions and eastern fringe. Self-sufficing farms comprised at least one-half of all the farms in about 75 percent of the minor civil divisions in the Northeastern Cumberland Plateau as compared with 5 percent of the civil divisions in the Central and Southern Appalachian Valleys.

were more concentrated in some parts than in others. About 30 percent of the animal-specialty and stock-ranch farms were in the Blue Ridge and the Allegheny Plateau and 35 percent in the Central Appalachian Ridges and the Appalachian Valleys of Southwest Virginia and East Tennessee.

Dairy farms comprised almost 2 percent of the total number of farms in 1930 (fig. 63). Fifty percent of the farms of this type were in the Appalachian Valleys and Ridges, 24 percent in the mountain divisions, and 26 percent in the eastern and western fringes. About 23 percent of all the dairy farms in the region were in the Appalachian Valleys of East Tennessee. The distribution of poultry farms (fig. 64), amounting to 1.3 percent of all farms in the region, was similar to that of the dairy farms except for the greater concentration of poultry farms in Rockingham and Shenandoah Counties, Va.

Cotton, crop-specialty, fruit, cash-grain, truck, animal-specialty and stock-ranch, dairy, and poultry farms have a value of products sold from a particular source amounting to at least 40 percent of all products sold, traded, or used. Production on all of these farms is somewhat specialized and the value of products sold constitutes a large part of the value of all products sold, traded, or used by the operator's family. These eight types of farms are in strong contrast to the self-sufficing and abnormal farms, most of which have a low value of production and a low value of products sold.

The general farms represent to some degree a range from farms of the self-sufficing and abnormal types to farms where the sales of products are large but derived from several sources. In summarizing the types of farms in the region it should be noted that the eight types from which gross receipts are largely from the sales of particular products constitute 23.1 percent of

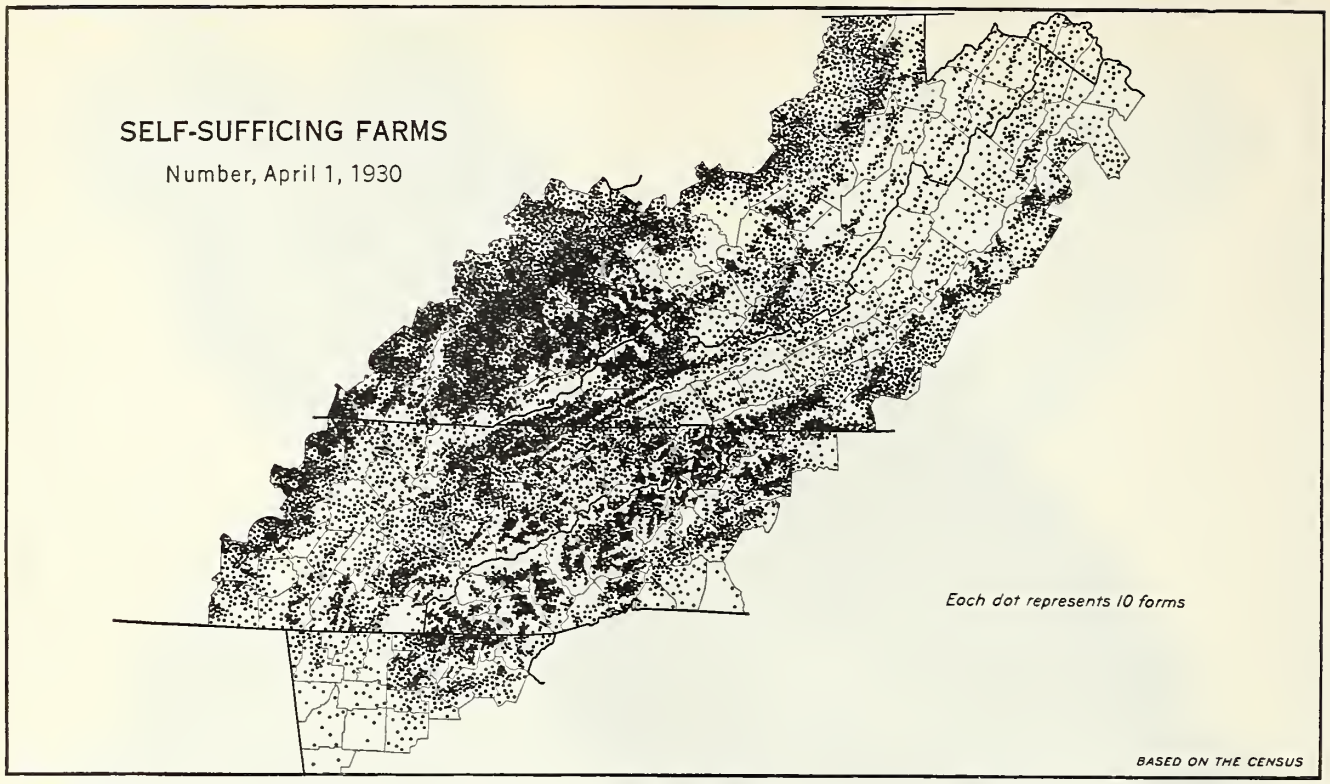


FIGURE 54.—In 1930 self-sufficing farms in the Southern Appalachians numbered 150,659. The gross value of the farm products sold from these farms in 1929 averaged only $141—by far the lowest average for farms of any type—while the value of the products used by the family averaged $323. The total value of the products sold and used by the family was under $600 on about three-fourths of the farms. Almost three-fourths of the self-sufficing farms were in the mountain divisions and western fringe of the region.

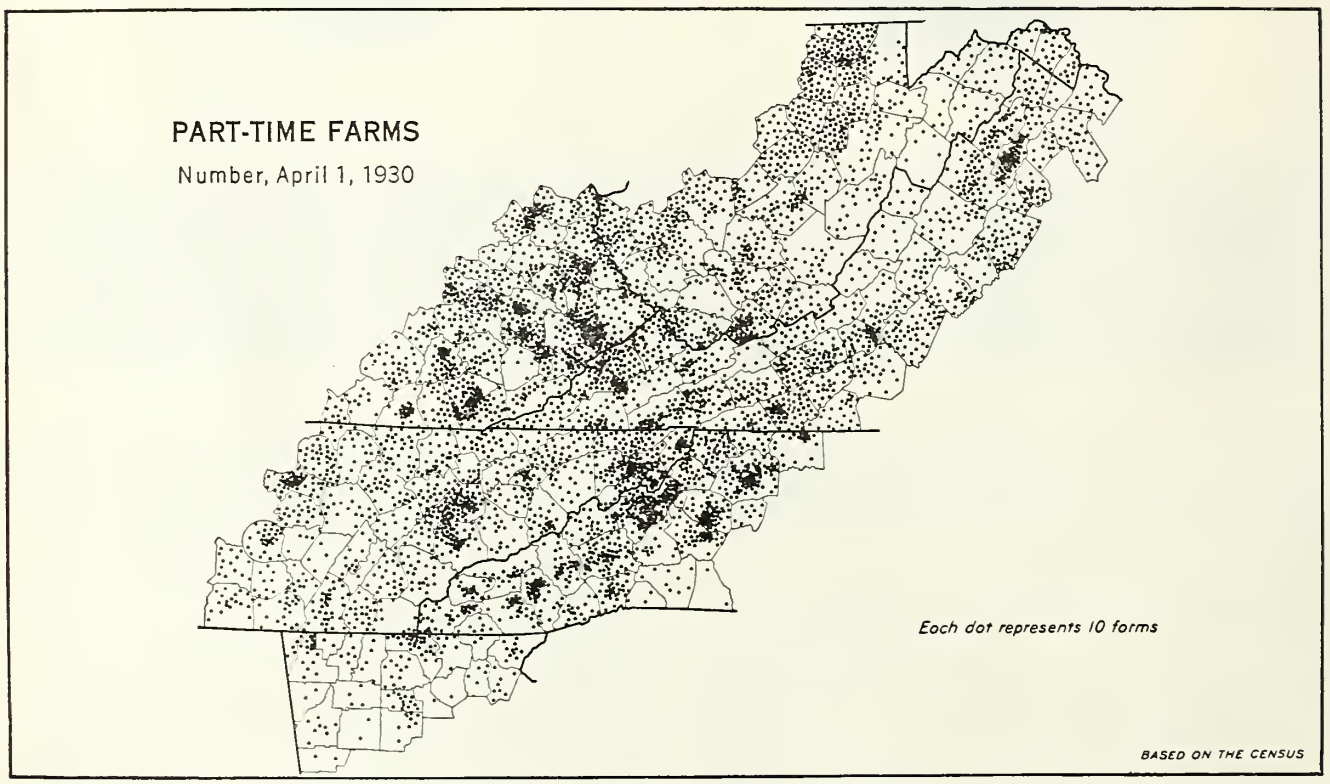


FIGURE 55.—About two-thirds of the 51,288 part-time farms in 1930 were in the mountain divisions and western fringe and one-third in the valley division and eastern fringe. Most of the part-time farms were near cities, towns, mining, or other industrial centers where there was considerable opportunity for work off the farm. With many of the farms so situated, the value of land and buildings was about $50 per acre for the part-time farms, in comparison with $30 per acre for the self-sufficing farms (fig. 54.)

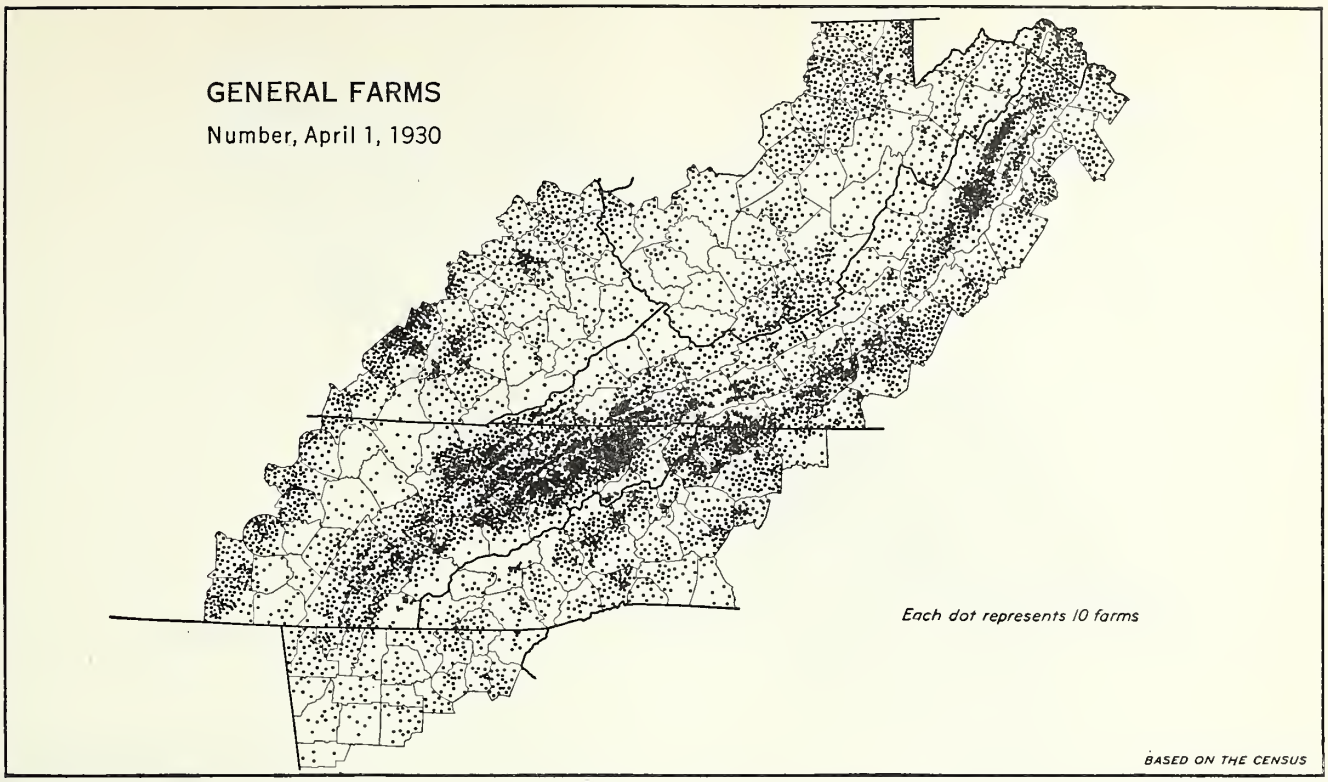


FIGURE 56.—More than one-half of the 70,341 general farms in the region in 1930 were in the valley divisions and eastern fringe, although they were numerous in parts of the Blue Ridge and the Highland Rim. Many of the general farms, especially in the mountain divisions, were much like the self-sufficing farms in that the value of the products sold in 1929 was only slightly in excess of that used by the family, whereas the general farms in the valley division tended to be more commercialized and have larger-sized businesses.

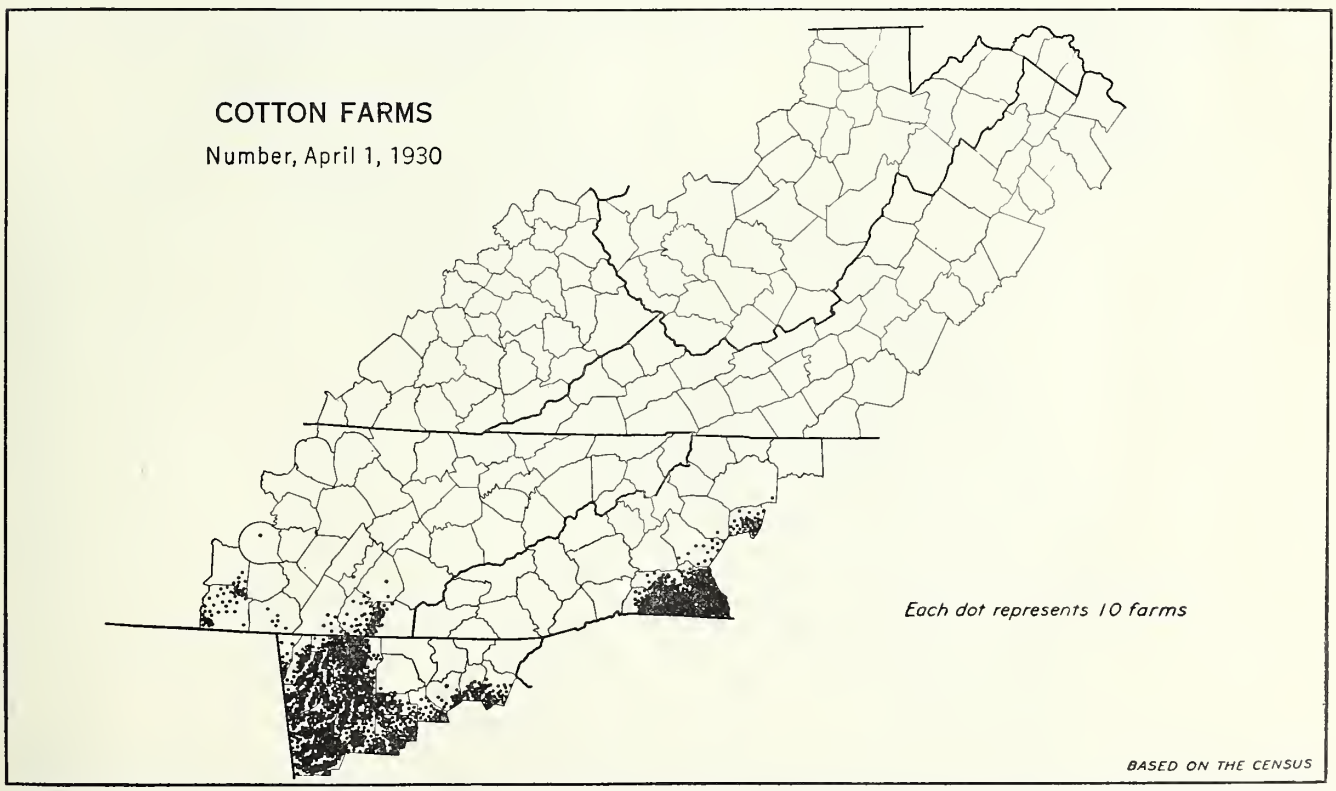


FIGURE 57.—Cotton farms, 27,647 in number in 1930, were all in the southern part of the region and more than 90 percent of them were in the Southern Appalachian Valleys and the Southern Piedmont Plateau. About two-thirds of the cotton farms were operated by tenants, over one-half of whom were croppers—really farm laborers who worked for a share of the crops. About one-fourth of the cotton farmers did not keep a cow, and the value of the products used by the family ($212) was lower than that for any other type of farm.

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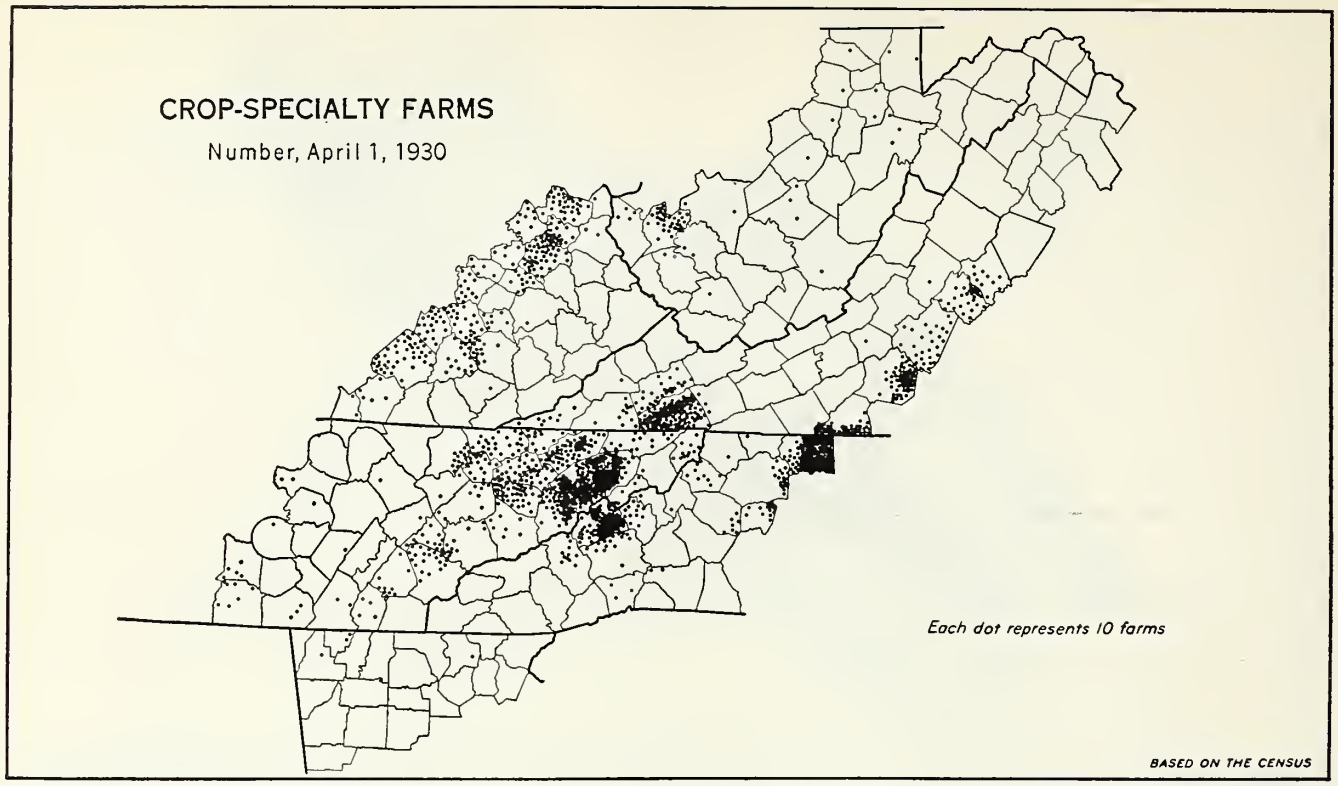

FIGURE 58.—Most of the 17,805 crop-specialty (usually tobacco) farms in 1930 were somewbat grouped in three parts of the region—a central group, flanked by two otber groups on the eastern and western borders of the region, respectively. Almost 95 percent of all the crop-specialty farms were embraced by tbese groups. Ahout half the farms were operated by tenants, and tbe value of products used by the family was almost as low as on tbe cotton farms.

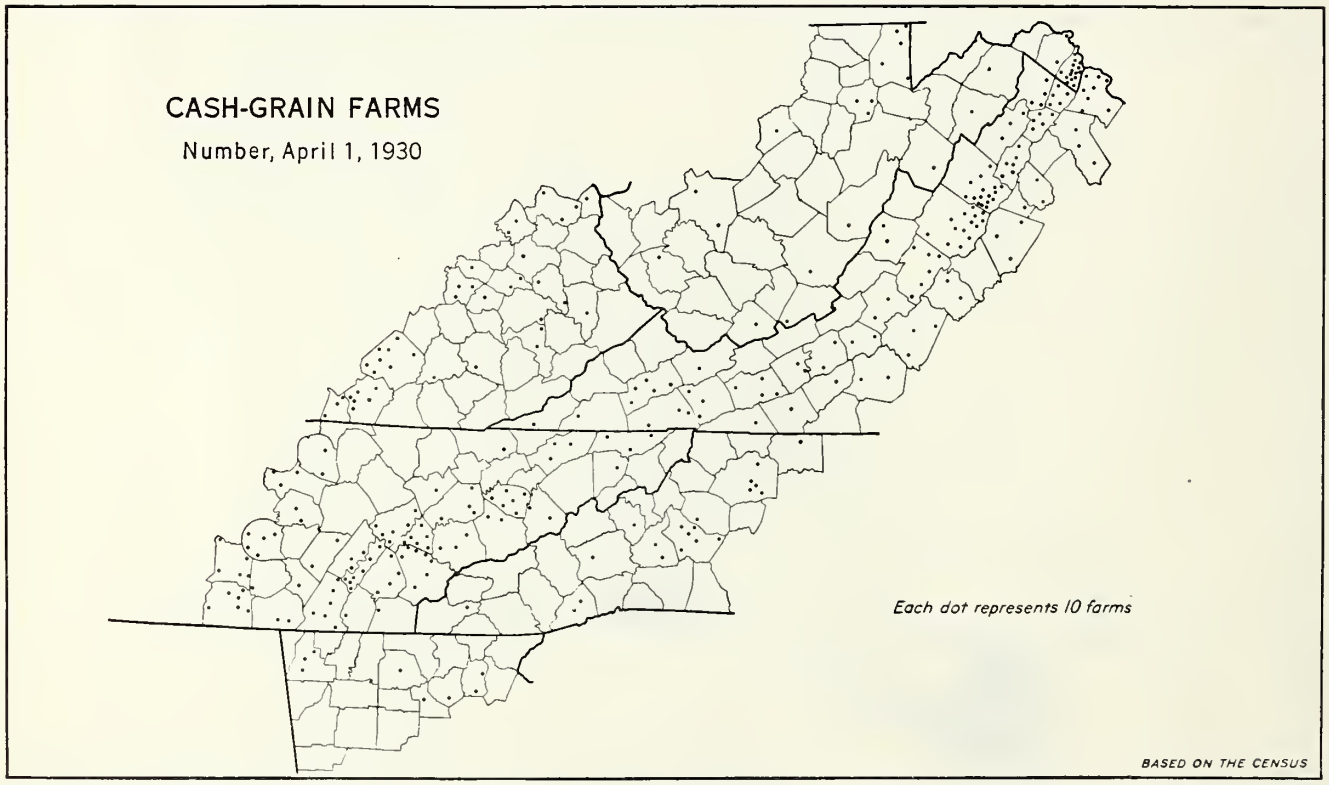

FIGURE 59.—More than one-half of the 3,079 cash-grain farms in the region were in the Appalachian Valleys, largely the Central Appalachian Valleys and the Appalachian Valleys of East Tennessee. Wheat and corn represented the greater part of the grain sales. As on the cotton and crop-specialty farms, the percentage of tenants was relatively high and the average value of products used hy the family was relatively low; but the land in farms and the acreage of crop land harvested per farm was more tban twice tbat on the cotton and crop-specialty farms.

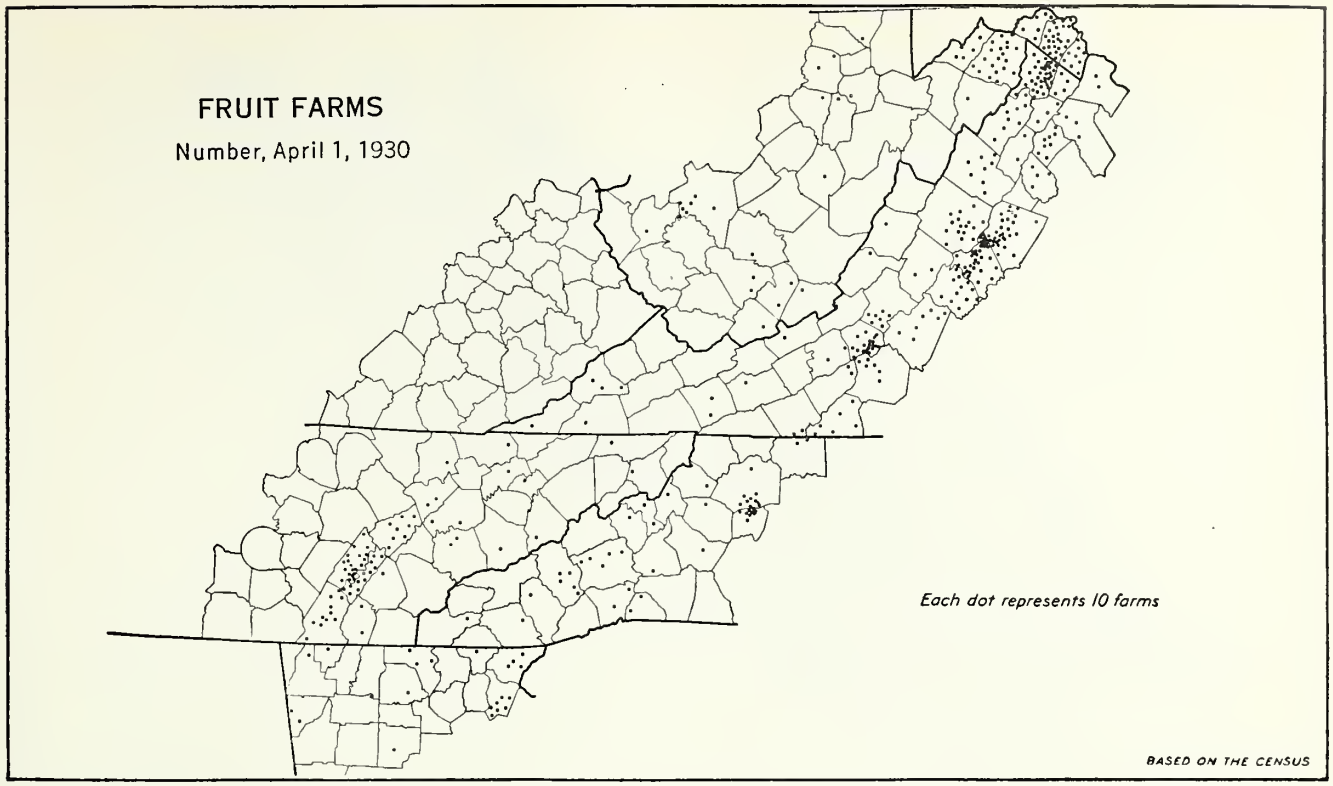

FIGURE 60.—In 1930 there were 4,515 fruit farms in the region. Apples made up the greater part of the fruit production, although peaches were important on some farms. The fruit farms were somewhat grouped in 3 localities in Virginia, and 1 each in North Carolina and Tennessee. In comparison with most other types, fruit farms were larger in land area and in acreage of crop land harvested. In the value of land and buildings, fruit farms exceeded the average of the farms of any other type. More than 11 percent of the fruit farms were operated by hired managers.

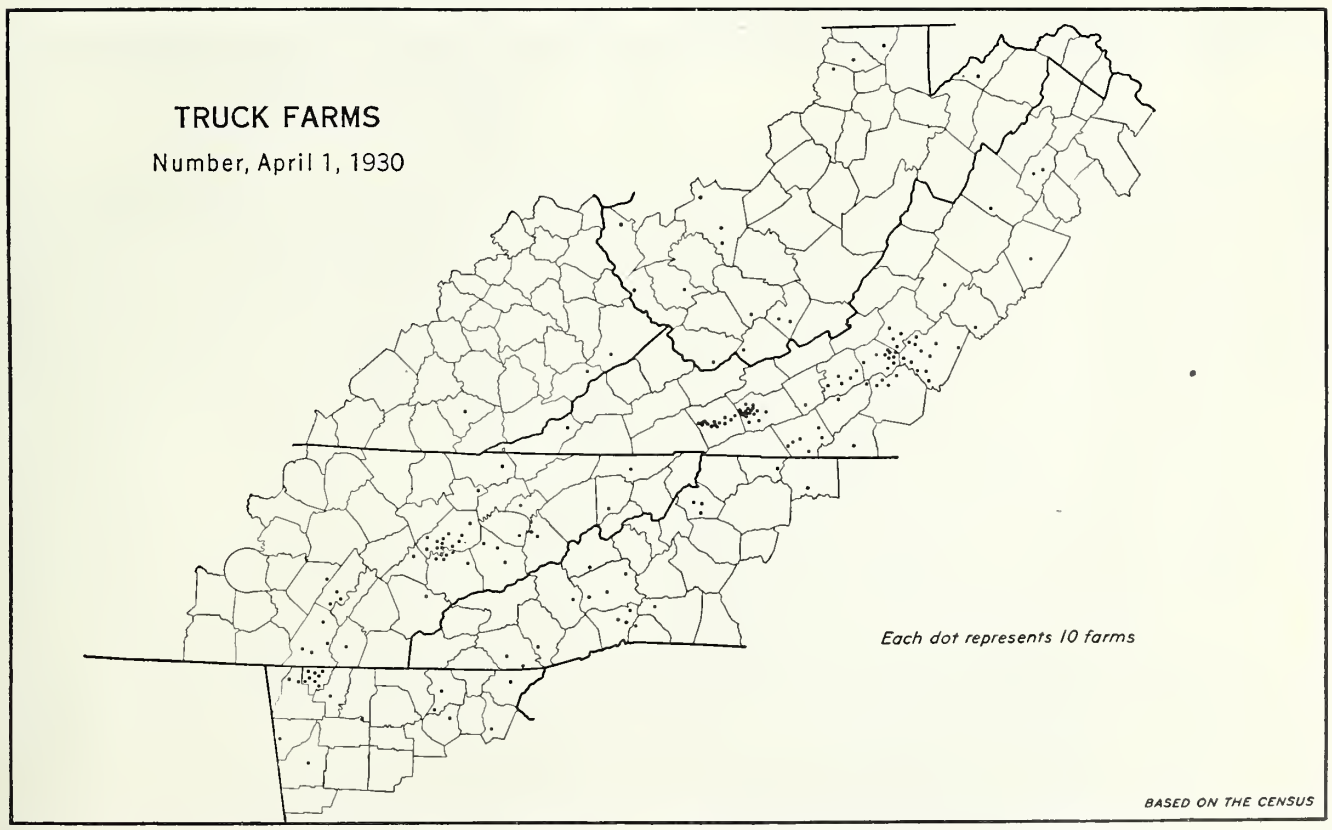

FIGURE 61.—Although about 90 percent of the 1,753 truck farms in 1930 were in the Appalachian Valleys, the Blue Ridge, and the Piedmont Plateau, they were somewhat centralized in 2 localities in Virginia (1 with tomatoes and the other with cabbages the leading truck crop), and 1 each near Knoxville and Chattanooga, Tenn.—with string beans, sweet corn, tomatoes, and watermelons the principal truck crops. A part of these crops is sold as fresh vegetables, and part is canned at the several canning establishments in the region.

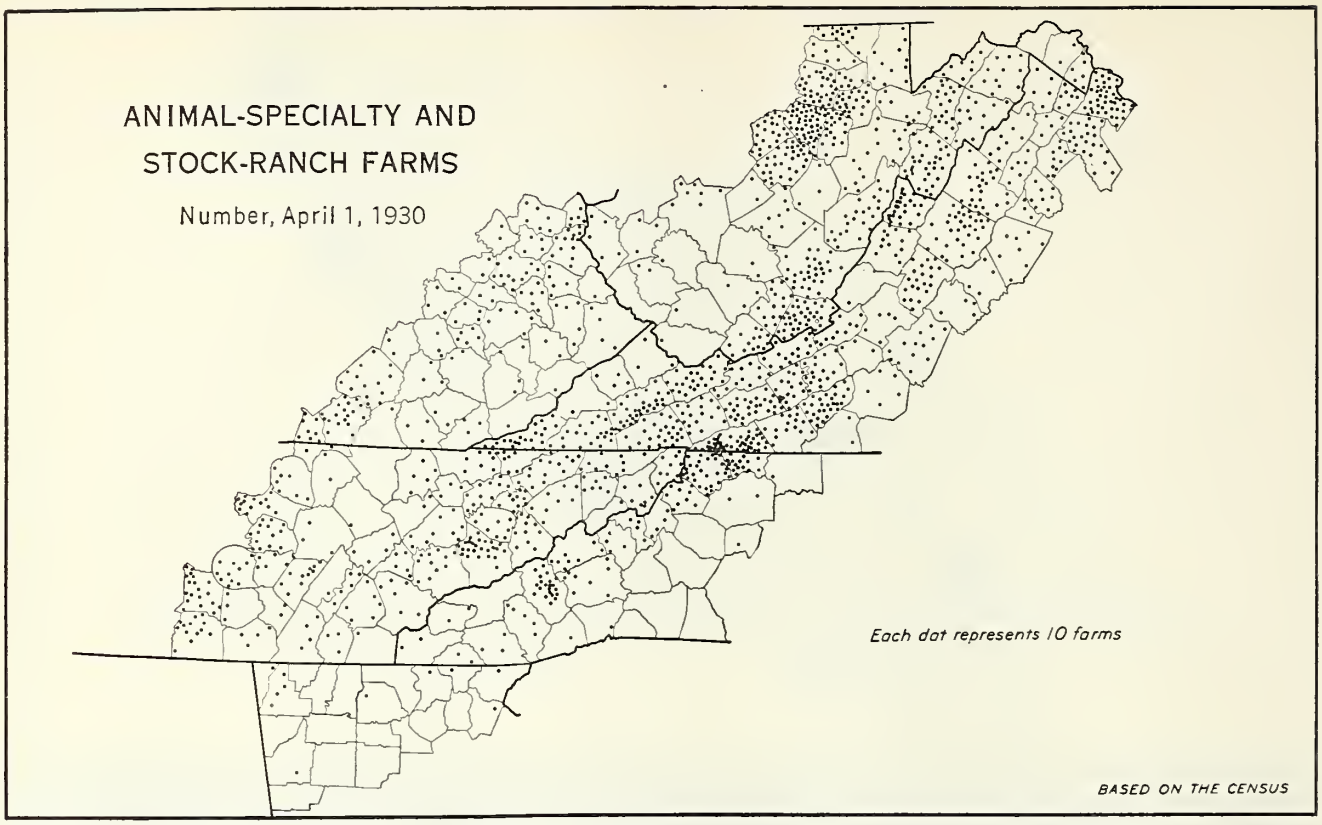

FIGURE 62.—Animal-specialty and stock-ranch farms, or livestock farms excluding dairy and poultry farms, numbered 16,876 in the region in 1930. Of this number 1,704 were stock-ranch farms, on which the chief emphasis was on the production of livestock by grazing. More than three-fourths of the livestock farms were in the Northern Piedmont Plateau, the Blue Ridge, the Appalachian Valleys of Virginia and Tennessee, the Central Appalachian Ridges, and the Allegheny Plateau. There were few livestock farms in the Cumberland Plateau, the Southern Appalachian Valleys, and the Southern Piedmont Plateau.

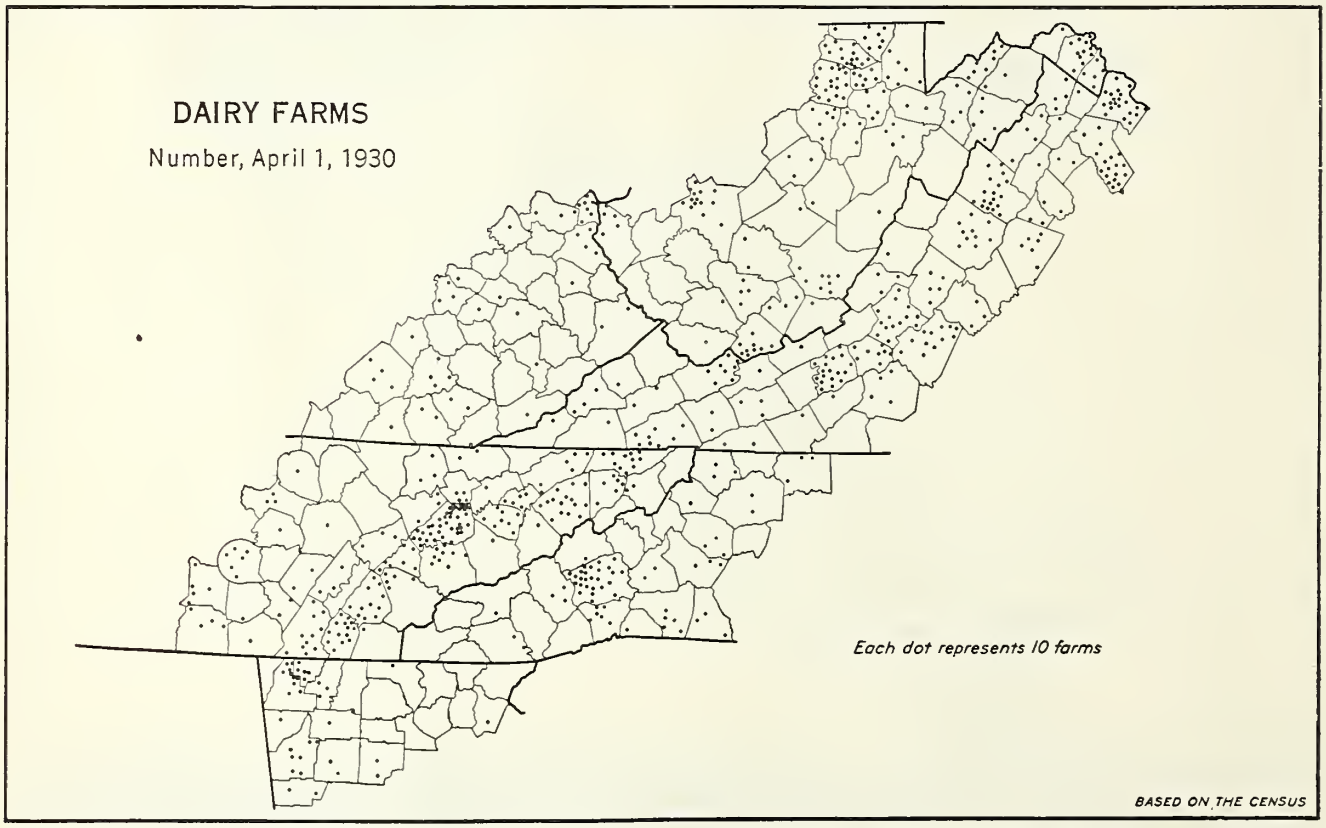

FIGURE 63.—The 6,985 dairy farms in the region in 1930 were somewhat concentrated near the larger cities, such as Roanoke, Knoxville, Chattanooga, Asheville, Bluefield Huntington, and a group of cities including Clarksburg, Fairmont, and Morgantown in the coal fields of West Virginia. About 60 percent of all the dairy farms in the region were in the valley division and eastern fringe, and 23 percent of them were in the Appalachian Valleys of East Tennessee. Farm expenditures for hired labor, feed, and fertilizer on the dairy farms averaged almost $1,000 per farm in 1929.

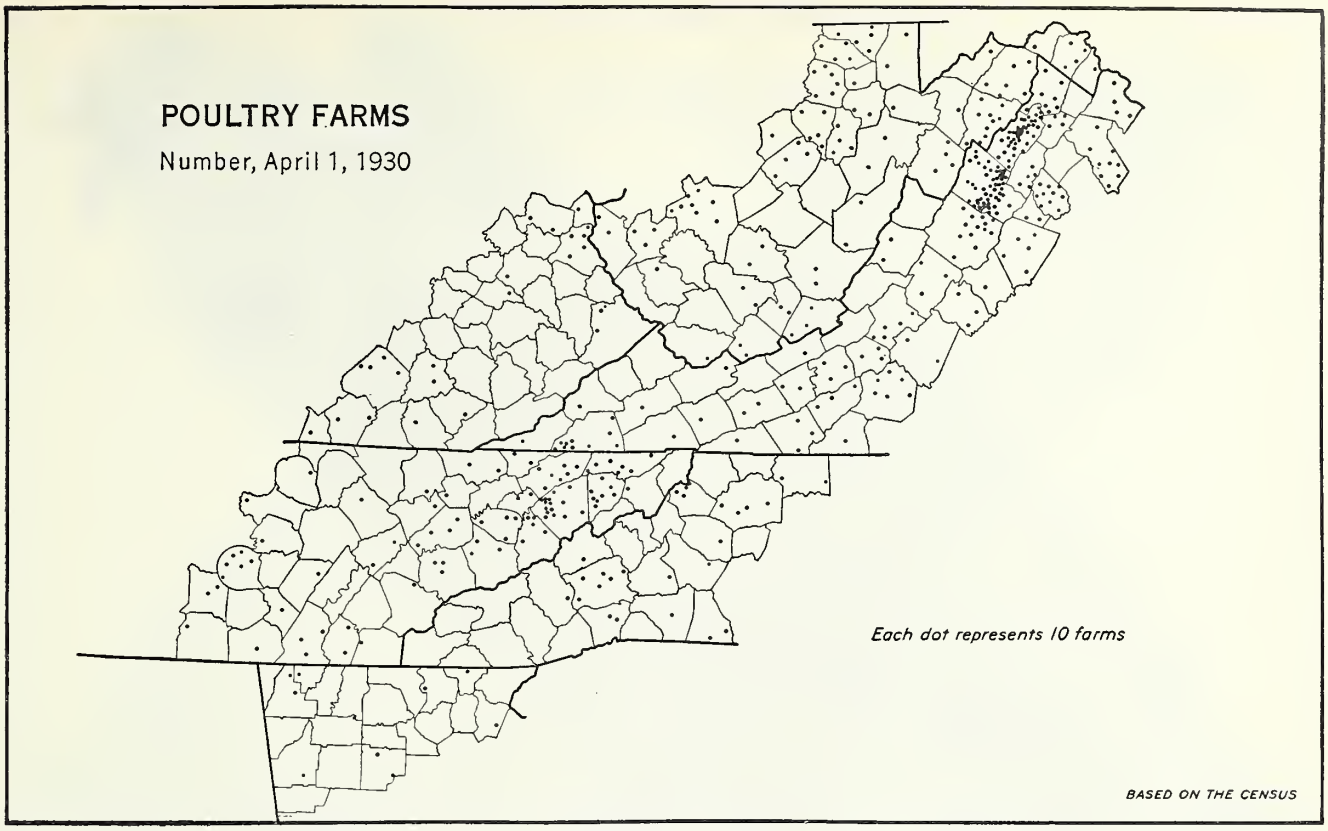

FIGURE 64.—About one-half of the 4,518 poultry farms in the region in 1930 were in the Appalachian Valleys of Virginia and Tennessee. The concentration of farms of this type was especially great in Rockingham and Shenandoah Counties, Va. Poultry farms had an average of 199 chickens per farm Apr. 1, 1930, and an egg production of 2,000 dozen per farm in 1929, in comparison with an average of 34 chickens per farm and 228 dozen of eggs on all other types of farms.

all farms classified by type, whereas self-sufficing and abnormal farms constitute 57.4 percent of all farms classified by type (table 11). The remainder (19.5 percent) of the farms classified by type were general farms.

Although variations in climatic conditions cause a large range in type of farm, the percentage of the total farm output that is produced for home consumption, and, consequently, the type of farm, is greatly influenced by the physical characteristics of the land. For instance, in the mountain divisions 74.1 percent of all farms classified by type in 1930 were self-sufficing or abnormal. Only 10.6 percent were of the eight types dependent largely upon the sale of products from a particular source. The remainder (15.3 percent) were general farms under the census definition but very many probably were much like the self-sufficing and abnormal farms in that the value of products per farm was low. In comparison, in the valley division, only 39.9 percent of the farms were self-sufficing and abnormal while 33.7 percent were of those types from which the sales of particular products were relatively important. The remainder (26.4 percent) were general farms, many of which had a large value of products sold, and, in this respect, were like the cotton, crop-specialty, fruit, and other farms of a commercial character. In the western fringe the types of farms were much like those in the mountain divisions in that 62.3 percent were classed as self-sufficing or abnormal in 1930, while in the eastern fringe the types of farms were more like those in the valley division in that 49.8 percent were of the eight types from which the sales of particular products were relatively important. In the Northeastern Cumberland Plateau, out of a total of nearly 52,000 farms classified by type, only 5.3 percent were of the eight types mentioned above.

INCOMES FROM FARMING

The Southern Appalachians is a region of relatively low incomes from farming. For example, in 1929 the value of the products sold, traded, or used by the operator's family was $897 per farm, while the value for the United States was $1,835 per farm. To illustrate further, data for 3,610 farm-business records taken in the region from 1913 to 1931, show farm receipts of $2,624 per farm, while 108,225 similar records taken in other parts of the United States from 1907 to 1931, show farm receipts of $3,669 per farm. After deducting the farm expenses from the farm receipts, the respective farm incomes were $1,014 and $1,497 per farm.[17] Of the 3,610 farm business records mentioned above 1,562 were from farms in the Appalachian Valleys and in the Northern Piedmont Plateau. The receipts for this group were $4,747, and the farm income was $1,753, per farm compared with farm receipts of $1,005 and farm income of $450 per farm for the group of 2,048 farms in the other parts of the region.

The value of farm products sold, traded, or used by the operator's family was less than $700 per farm in 1929 in the mountain divisions and western fringe while in the valley division and the eastern fringe the

[17] Calculated from data in table 652, Yearbook of the United States Department of Agriculture, 1925; table 526, Yearbook, 1931; table 462, Yearbook, 1933 (*46*); and other farm-business studies not included in these tables. The definition of a farm employed by the census includes various small tracts and large tracts, on which relatively little farming is done, that are not ordinarily included in farm-business studies. Differences in the definition of the word "croppers" as employed in the census and as employed in farm-business studies also contribute to discrepancies in figures drawn from the two sources. These considerations will serve to explain a certain lack of comparability of figures drawn from the two sources.

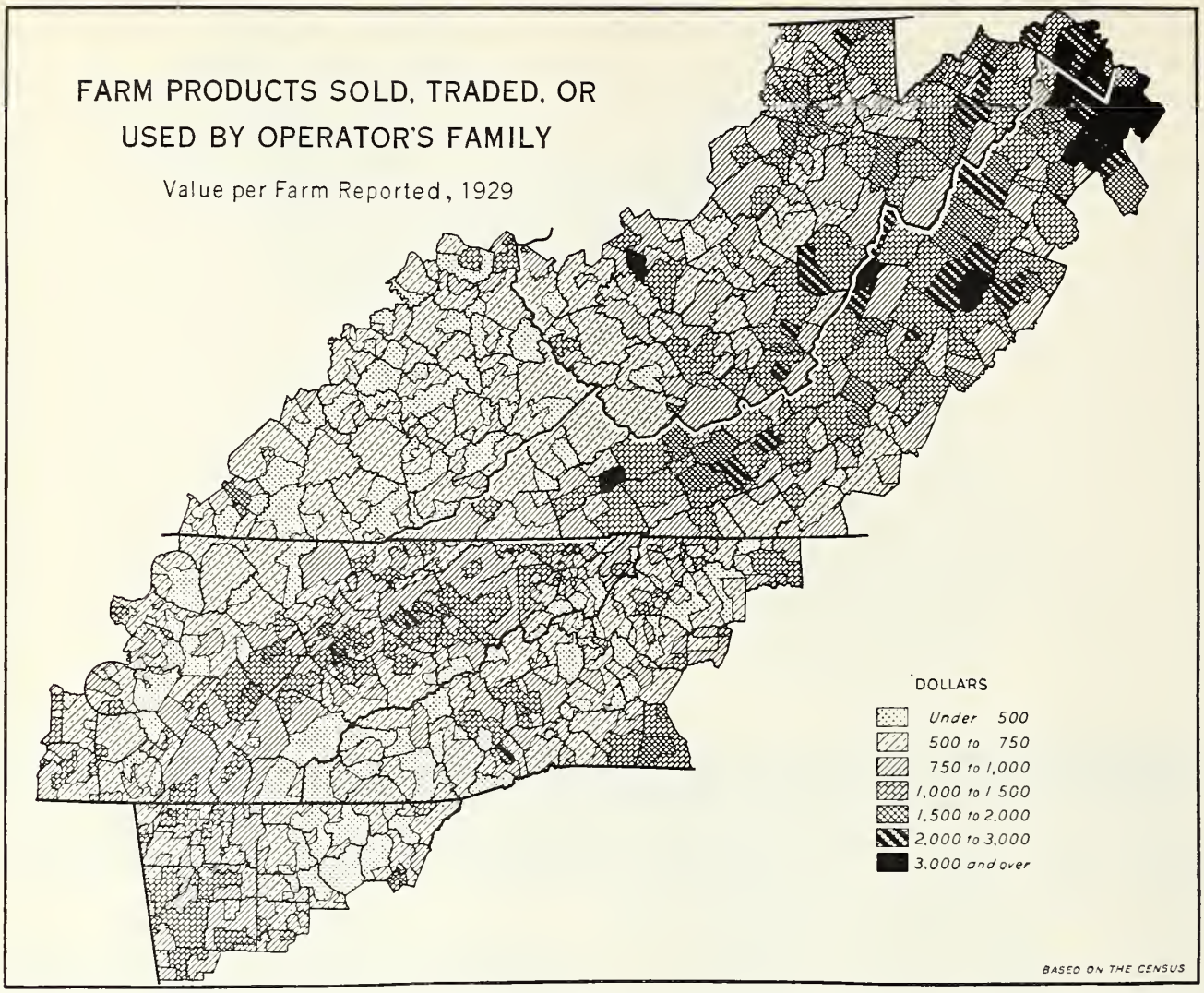

FIGURE 65.—The gross income from farming in the Southern Appalachians, when measured by the value of the products sold, traded, or used by the operator's family, was $897 per farm in 1929. Of this amount, $305 was the value of products used by the family and $592 the value of products sold. The value of all products ranged from less than $500 per farm to $3,000 or more per farm in the several minor civil divisions in the region. Many of the 46,537 farmers in the 277 minor civil divisions in which the value of products was under $500 per farm had little, if any, left from the farm business for purchases of family supplies or other items after paying the farm expenses. The average value of the products sold from these farms in 1929 was $163, and expenditures for feed, fertilizer, hired labor, taxes, and machinery bought were $70, leaving only $93 for other farm expenses, family living purchased, and other expenditures. About 85 percent of these 277 civil divisions were in the mountain divisions and western fringe where self-sufficing and abnormal farms were dominant, while 3 percent, also in the mountain divisions and western fringe, were where farms of some other type were dominant. The value of products was under $500 per farm in 24 percent of the civil divisions in the mountain divisions and western fringe, but in only 5 percent of the civil divisions in the remainder of the region. More specifically, the value of products was under $500 per farm in more than 30 percent of the civil divisions in the Northeastern Cumberland Plateau and the Blue Ridge but was $500 and over in all minor civil divisions in the Central Appalachian Ridges, the Central Appalachian Valleys, and the Northern Piedmont Plateau. On the other hand, there were 120 minor civil divisions in the region in which the value of the products sold and used by the operator's family was $1,500 or more per farm in 1929. The value of the products sold from the 27,528 farms in this group was $1,896 per farm, and the expenditures for the 5 items above mentioned were $683 per farm, leaving $1,213 per farm for other farm expenses, family living purchased, and other expenditures. About 81 percent of these civil divisions were in the valley division and eastern fringe. There were no civil divisions in the Northwestern Cumberland Plateau in which the value of products was as much as $1,500 per farm in 1929, while in 74 percent of those in the Northern Piedmont Plateau and 65 percent of those in the Central Appalachian Valleys, the value of products per farm was $1,500 or more.

value of all products was more than $1,100 per farm [18] (table 10). The low average income in the mountain divisions and western fringe is associated with a high percentage of self-sufficing and abnormal farms, 71.9 percent, in comparison with 38.6 percent in the valley division and western fringe (table 11).

[18] Value of products per farm must not be interpreted as value of products per farm operator, since the value of products sold on farms operated by tenants (29 percent of all operators) and part owners (8 percent of all operators) was either divided between the landlord and the farm operator, or the operator sold the products and paid the landlord a cash rent. Tenant farms were about equally divided between the valley division and eastern fringe and the mountain divisions and western fringe, but about one-third of the farms in the former group and one-fourth of those in the latter group were operated by tenants. Although most of the tenant farms were of the self-sufficing and abnormal types, higher percentages of the cotton, cash-grain, and crop-specialty farms were operated by tenants than were farms of the other types. It should also be borne in mind that from the value of products sold on some farms there is interest to pay on farm indebtedness. This item is not large in the Southern Appalachians in comparison with some other parts of the United States. Information obtained by the census covering 92 percent of the full and part owner-operated farms showed that 79 percent were free from mortgage debt in 1930.

In the region as a whole, the value of products per farm in 1929 was $897, but of this amount $305 was the value of products used by the operator's family and $592 was the value of the products sold or traded. In the mountain divisions and western fringe, the value of products sold or traded was less than $400 per farm, ranging from $217 in the Northeastern Cumberland Plateau to $640 in the Upper Ohio Hills, while in the valley division and eastern fringe it was more than $800 per farm, ranging from $579 in the Central Piedmont Plateau to $2,189 in the Northern Piedmont Plateau.

The value of products sold or traded, however, represents gross and not net receipts. Farm expenditures for feed, fertilizer, cash paid for hired labor,

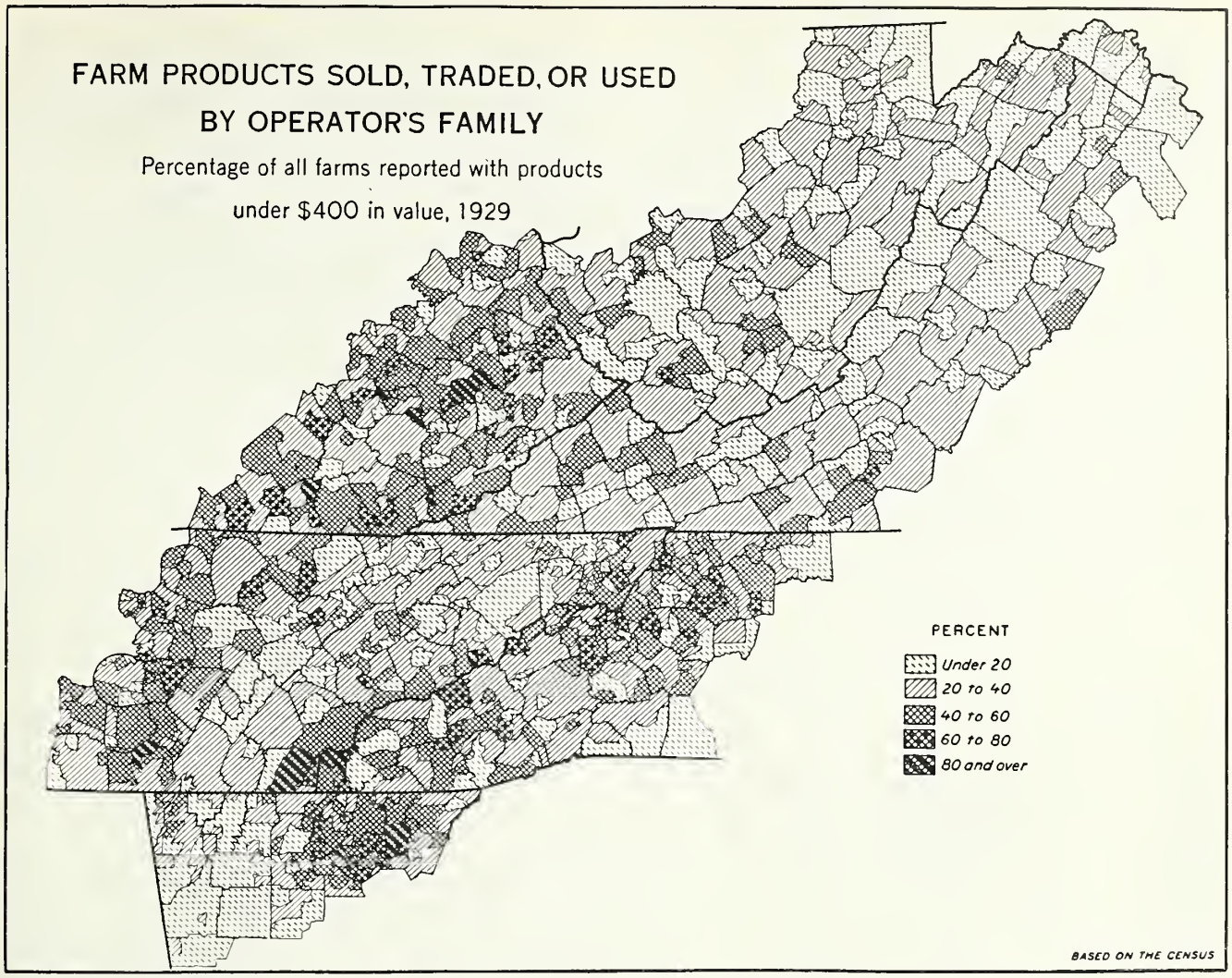

FIGURE 66.—There were 113,325 farms, or about 30 percent of the total number in the Southern Appalachians, with a value of products sold, traded, or used by the operator's family under $400 per farm in 1929. Of course, most of these farms were in the minor civil divisions which were relatively low in average value of products per farm (fig. 65), but there were only 7 of the 1,655 minor civil divisions in the region in which there were no farms reported with a value of products under $400. These 7 divisions were somewhat scattered over the region—2 were civil divisions in which most of the farms were cotton farms; 1 was a civil division in which the farms were relatively large, with almost 100 acres of crop land harvested per farm and in which most of the farms were general, fruit, dairy, and livestock farms; 1, a civil division in which stock-ranch and animal-specialty farms were dominant; and the others, civil divisions in which most of the farms, although not large, were dairy, fruit, truck, and general farms. In the other minor civil divisions in the region, the percentage of farms with value of products under $400 ranged from under 1 percent to over 80 percent. In the 16 minor civil divisions in which 80 percent or more of the farms had a value of products under $400 per farm, the average value of the products sold, traded, or used by the operator's family was $257, of which $160 was the value of the products used by the family, and only $97 the value of products sold. Expenditures for feed, fertilizer, hired labor, taxes, and machinery bought were $51 per farm, leaving $46 from the farm business for other farm expenses, purchases of family supplies, and other expenditures. Practically all of these civil divisions were in the Blue Ridge and the Cumberland Plateau. But there were 487 minor civil divisions, or more than one-fourth of the total number, in which less than 20 percent of the farms had a value of products under $400. The value of products in these divisions was $1,280 per farm, $332 of which was the value of the products used by the operator's family. When the farm expenditures for the five items mentioned above were deducted from the sales of farm products, $659 per farm was left for the other farm expenses, family living, and other expenditures. These minor civil divisions were mostly in the valley division and eastern fringe and in the better farming localities in the mountain divisions and western fringe.

taxes on land, and buildings [19] and implements and machinery bought were reported in the 1930 census (*50*). The expenditures for these items were $186 per farm in the Southern Appalachians, compared with $547 per farm in the United States. Other items of farm expense—such as repairs and depreciation of buildings, horseshoeing, veterinary fees, seeds, plants, trees bought, spray materials, threshing, baling, fuel and oil for farm work, and insurance—were not reported in the 1930 Census of Agriculture. However, some light on the probable total expenses in 1929, may be had from the farm business studies made in the region from 1913 to 1931.

[19] The tax rate for land and buildings in the region, calculated on the basis of the ratio of taxes on land and buildings to the value of land and buildings for the farms operated by full owners, as reported by the census, averaged $0.96 per $100 valuation. This rate was used to compute total taxes on land and buildings in the region.

In these studies the expenditures for feed, fertilizer, labor, farm taxes, and implements and machinery bought, were 52 percent of the total expenses. Should this ratio be applied to the expenditures for the five items reported in the census ($186), the probable total farm expenses in 1929 would have been $358 per farm. Should the $358 be deducted from the value of products sold or traded, the return for the use of the capital and the farmer's labor would have been $234 per farm.

Assuming that the farm capital, $4,229 per farm, should have earned 5 percent, and this amount be deducted from the $234 above, $23 would have remained for the operator's labor, excluding the value of products used by his family. By adding to the $23 the value of products used by the family ($305) and 10 percent of the value of the farmer's dwelling

(10 percent of $804), the sum is $408. The method used in arriving at the $234, $23, and $408 above is approximately comparable with that used in calculating "farm income," "labor income," and "operator's earnings" in farm-business analyses.

In approximately one-sixth of the civil divisions the total value of products was less than $500 per farm and in only about one civil division in 14 did the value exceed $1,500. In the former group the value of products sold or traded was only $163 per farm, from which $70 were expended for feed, fertilizer, hired labor, taxes, and purchases of machinery. In the latter group the value of products sold was $1,896, from which $683 were expended for the five items mentioned above.

The value per farm of products sold, traded, or used by the operator's family in 1929 is indicated by minor civil divisions in figure 65. The percentage of farms with value of products under $400 is indicated by minor civil divisions in figure 66, and the percentage with value of products amounting to $1,500 or more, in figure 67. The percentage of farms of each type grouped by value of products is shown in table 12.

TABLE 12.—*Percentage of farms of each type by value of product groups, 1929*

Type of farm	Farms [1]	Percentage of farms with value of products—			
		Under $600	$600–$999	$1,000–$1,499	$1,500 and over
	Number	*Percent*	*Percent*	*Percent*	*Percent*
Self-sufficing	150,659	[2] 74.5	23.2	2.3	
Abnormal [3]	56,763	[4] 78.3	14.8	[5] 6.9	
General	70,341	25.9	34.9	23.2	16.0
Cotton	27,647	29.4	34.2	21.6	14.8
Crop-specialty	17,805	30.6	33.9	21.7	13.8
Cash-grain	3,079	29.9	25.1	17.8	27.2
Fruit	4,515	10.8	14.8	17.0	[6] 57.4
Truck	1,753	20.6	23.2	21.2	35.0
Animal-specialty and stock-ranch	16,876		[7] 45.0		[8] 55.0
Dairy	6,985	6.6	14.2	18.0	[9] 61.2
Poultry	4,518	26.4	26.1	18.2	29.3

[1] Excluding the 22,929 farms not classified by type.
[2] Of the self-sufficing farms, 18.7 percent had a value of products under $250; 27.5 percent, a value from $250 to $400; and 28.3 percent, a value from $400 to $600.
[3] Of the abnormal farms, 90 percent were subclassified as part-time farms.
[4] Of the abnormal farms, 22.9 percent had a value of products under $250; 28 percent, a value from $250 to $400; and 27.4 percent, a value from $400 to $600.
[5] Includes farms with value of products of $1,000 and over.
[6] Of the fruit farms, 18.6 percent had a value of products from $1,500 to $2,500; 13.7 percent, a value from $2,500 to $4,000; and 25.1 percent a value of $4,000 and over.
[7] Includes farms with value of products of $1,499 and under.
[8] Of the animal-specialty and stock-ranch farms, 23.3 percent had a value of products from $1,500 to $2,500; 15.1 percent a value from $2,500 to $4,000; and 16.6 percent, a value of $4,000 and over.
[9] Of the dairy farms, 22.4 percent had a value of products from $1,500 to $2,500; 16.9 percent, from $2,500 to $4,000; and 21.9 percent, a value of $4,000 and over.

Compiled from the census, 1930, (*50*) by minor civil divisions.

Many farm families in the region had incomes other than from the farm. Various kinds of work off the farm by the farm operator, which averaged 53 days per farm in 1929 (fig. 68); outside earnings by other members of the family from sources such as teaching, work in factories, mines, etc.; and pensions, interest, and dividends, were some of the more important means by which the family income was increased above that which was obtained from the farm. For example, in a farm business and family income study of 203 families living on farms in Laurel County, Ky. (*30*), only 22 families depended entirely on the farm for their living in 1927. Eighty-six of the families had incomes from other sources amounting to less than $200 per family but 48 families had other incomes ranging from $200 to $400, and 47 families had incomes from other sources amounting to $400 or more.

FARM CAPITAL AND SIZE OF BUSINESS

Farms in the Southern Appalachians, in comparison with those in the United States, are small in size and low in value of farm capital. In 1930 the value of land, buildings, machinery, and livestock in the region was $4,229 per farm, and the farms averaged 86 acres in size compared with a value of $9,103 and an average of 157 acres per farm in the United States.

In the Southern Appalachians, the value of land and buildings, which was about 85 percent of the value of land, buildings, implements, machinery, and domestic animals in 1930 ranged from about $2,000 per farm for self-sufficing farms to over $10,000 per farm for fruit, dairy, animal-specialty, and stock-ranch farms (table 13). In the Northwestern Cumberland Plateau, where farms averaged 76 acres in size, the value of land and buildings was about $1,600 per farm, whereas in the Northern Piedmont Plateau, where farms averaged 169 acres in size, and in the Central Appalachian Valleys, where farms averaged 116 acres in size, the value of land and buildings was approximately $10,000 and $9,000 per farm, respectively (table 10). In 68 of the minor civil divisions the value of land and buildings per farm was under $1,000 and in 541 minor civil divisions under $2,000. On the other hand, land and buildings averaged $10,000 or more per farm in 51 minor civil divisions, and $5,000 or more in 295 minor civil divisions (fig. 69).

The size of the farm business is an important factor affecting the income from farming. Often, measures other than land area, such as acres of orchard, number of cows, and number of days of productive man labor, have been used to express the size of the farm business. The appropriate measure depends to some extent upon the type of farming practiced in the given locality. In each of the many localities of the Southern Appalachians there probably is some one measure better adapted than others to measuring the size of business. Since, in the region as a whole, farms range in size from under 3 acres to over 10,000 acres, the acreage in farms provides a convenient measure of the size of farm business.

About 19 percent of the farms in 1930 were under 20 acres in size; 26 percent, from 20 to 50 acres; 27 percent, from 50 to 100 acres; 17 percent, from 100 to 175 acres; and 11 percent, 175 acres and over. As shown in table 10, the range in average size of farms in the several subregions was from less than 80 acres in the Blue Ridge, Cumberland Plateau, Appalachian Valleys of East Tennessee, Southern Appalachian Valleys, and the Highland Rim to more than 150 acres in the Central Appalachian Ridges and the Northern Piedmont Plateau; also, as shown in table 13, self-sufficing and abnormal farms averaged less than 70 acres in size, while fruit, cash-grain, and animal-specialty and stock-ranch farms averaged 150 acres or more in size.

Comparison of incomes per acre on farms of about the same size but in different subregions or of different types shows interesting variations. For example, in the Blue Ridge, the Cumberland Plateau, and the Highland Rim, where the average size of farm was between 70 and 80 acres, the value of products was only about $8 per acre; while in the Appalachian Valleys of East Tennessee, the Southern Appalachian Valleys, and the Southern Piedmont Plateau, where the average size of farm was about the same as in the former group of subregions, the value of products was

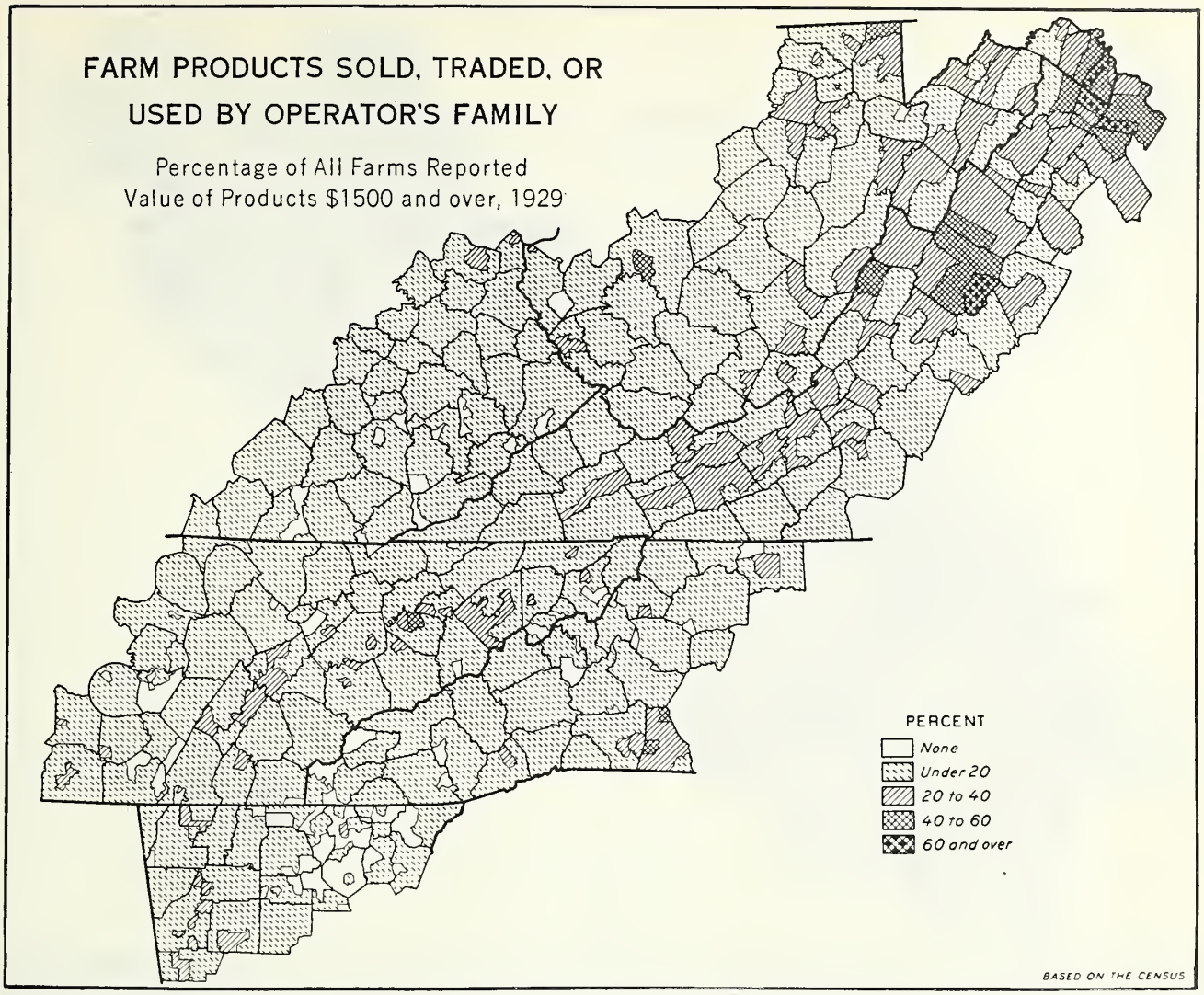

FIGURE 67.—There were only 39,465 farms, or slightly more than 10 percent of the total number in the Southern Appalachians, which returned $1,500 or more in the value of products sold, traded, or used by the operator's family in 1929. Most of these farms were in the valley division and eastern fringe but about 31 percent of them were in the mountain divisions and western fringe. However, in 119 of the 1,655 minor civil divisions in the region there were no farms with value of products amounting to as much as $1,500. These 119 minor civil divisions were mostly in the southern part of the Blue Ridge, although several of them were scattered over the Cumberland Plateau. Including these 119 minor civil divisions there were 1,455 civil divisions, or 88 percent of the total number in the region in which less than 20 percent of the farms had a value of products as high as $1,500. Most of the minor civil divisions in which 20 percent or more of the farms had a value of products amounting to $1,500 and over were in the Appalachian Valleys in Virginia, the Northern Piedmont Plateau, and the Central Appalachian Ridges. These were the subregions in the Southern Appalachians which were highest in value of products per farm; above the averages of the region in size of farm, acres of crop land harvested, and in number of cattle, hogs, sheep, and chickens per farm; and above average in percentages of fruit, dairy, animal-specialty and stock-ranch, poultry, and general farms (tables 10 and 11). The outstanding minor civil divisions, in respect to the percentages of farms which had a value of products amounting to $1,500 and over, were 6 divisions in the Central Appalachian Valleys and the Northern Piedmont Plateau, in each of which the value of products was $1,500 or more on over 60 percent of the farms.

TABLE 13.—*Average size of farm, value of land and buildings, and number of livestock, 1930, and value of products, 1929, by type of farm*

Type of farm	Farms [1]	Acreage per farm of—			Value per farm of—		Number per farm of—				Value per farm of—	
		Land in farms	Crop land harvested	Pasture land [2]	Land and buildings	Operator's dwelling	Horses and mules [3]	Cows and heifers [3]	Other cattle	Swine [4]	All farm products	Farm products used by family
	Number	*Acres*	*Acres*	*Acres*	*Dollars*	*Dollars*	*Number*	*Number*	*Number*	*Number*	*Dollars*	*Dollars*
Self-sufficing	150,659	67	13	16	2,029	480	1.2	1.5	1.4	1.5	464	323
Abnormal	56,763	57	10	15	3,100	891	.8	1.2	1.3	1.1	677	271
General	70,341	113	29	32	4,799	999	2.0	2.9	4.2	2.8	1,024	328
Cotton	27,647	69	26	5	2,466	496	1.6	1.1	.9	.9	977	212
Crop-specialty	17,805	75	22	17	3,157	594	1.4	1.7	2.0	1.4	960	244
Cash-grain	3,079	150	57	36	8,605	1,420	2.4	2.2	4.2	3.9	1,249	252
Fruit	4,515	161	55	32	12,645	1,944	2.2	2.5	3.6	3.2	4,170	324
Truck	1,753	79	25	18	5,718	1,038	1.5	1.8	2.7	2.0	1,505	278
Animal-specialty and stock-ranch	16,876	258	48	115	11,814	1,784	3.0	5.1	18.6	6.1	2,743	358
Dairy	6,985	141	39	56	10,644	1,986	2.4	11.6	10.7	3.3	3,063	363
Poultry	4,518	74	19	24	4,854	1,365	1.3	2.2	2.9	2.0	1,473	279

[1] Excluding the 22,929 farms not classified by type.
[2] Excluding woodland pasture.
[3] Over 2 years and 3 months old.
[4] Over 3 months old.

Compiled from the Census, 1930 (*50*).

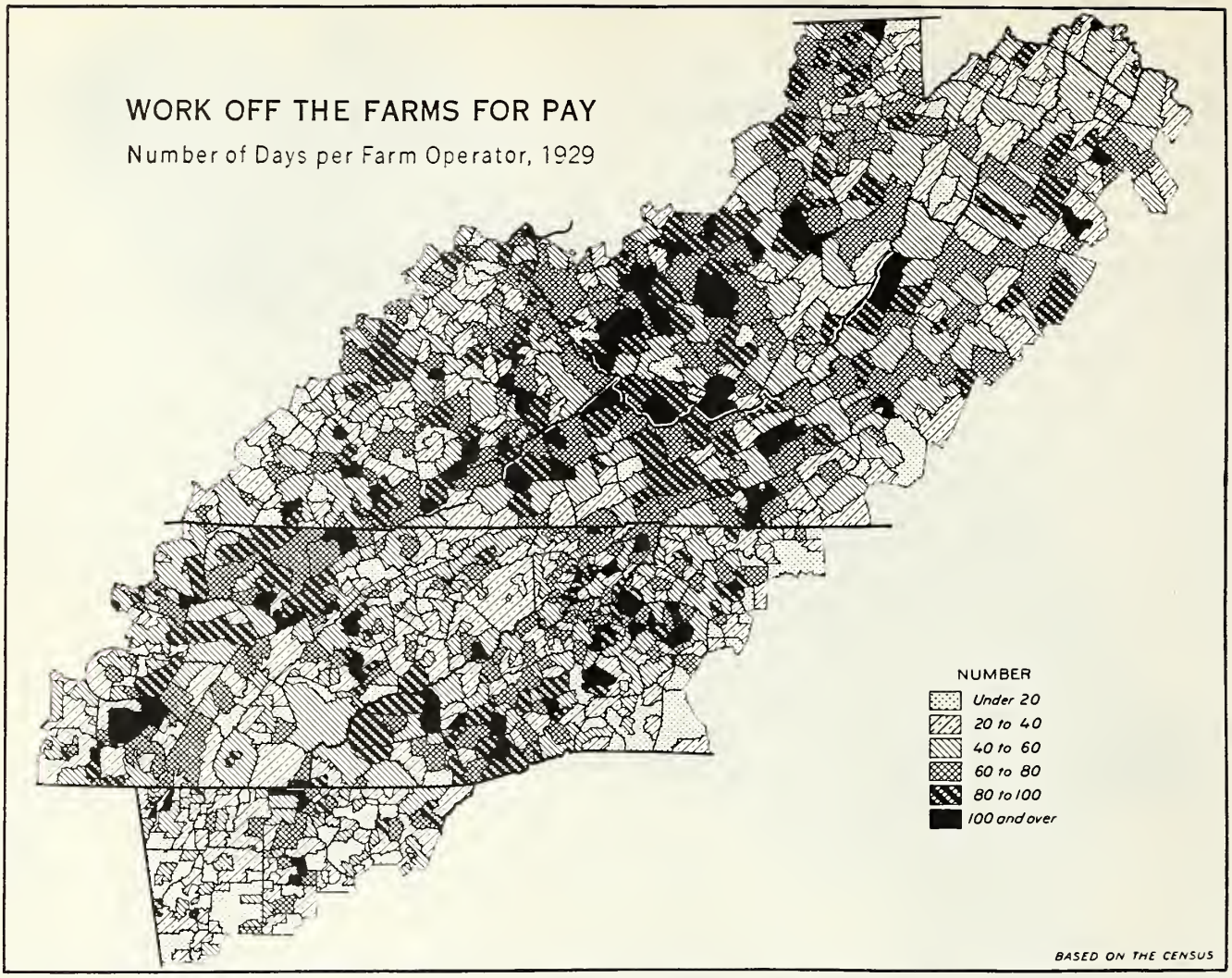

FIGURE 68.—Many of the farmers in the Southern Appalachians work off the farm part of the time. In some instances, farming is the main occupation, and work off the farm is a means of obtaining additional income. In other instances, a business other than farming is the chief occupation, and the farm is used primarily as a home for the family and the source of more or less of the family's food supply. Farm operators in the region averaged 53 days' work off the farm for pay in 1929. Some farmers did not work off the farm, but for the many who did, the range in number of days work off the farm was from only a few days to 150 days or more. Farms on which the farm operator worked off the farm 150 or more days were classified as part-time farms (fig. 55). In 206 minor civil divisions the operators worked off the farm an average of less than 20 days. These divisions were in all of the States, but the larger number were in the Southern Appalachian Valleys in Georgia and in the Piedmont Plateau in Georgia and North Carolina, or in those areas where there was a large percentage of cotton or tobacco farms. In 102 minor civil divisions the operators worked off the farm an average of 100 or more days. These divisions also were in all of the States and correspond closely with the divisions in which part-time farms were numerous. The net cash income from farming, after the farm expenses had been paid, was under $100 and sometimes under $50 on many farms in the region. Income from work off the farm by the farm operator is therefore very important to the well being of such farm families, even though the work be only for 100, 50, or even 25 days.

more than 1½ times as much per acre. Similarly, the value of products was less than $7 per acre for the self-sufficing farms but was 2½ to 3 times as much for the truck and poultry farms, which were of about the same average size as the self-sufficing farms. That is, among farms of approximately the same size, there is a wide variation in value of products per acre associated with differences in physical characteristics and differences in type of farming practice (p. 42). The influence of cities on type of farming is also reflected in a higher value of products per farm among farms in the same size group (fig. 70).

Taking farms by size groups for the region as a whole, however, the value of products per farm increases with the size of the farms. In the minor civil divisions with farms averaging less than 40 acres in size (fig. 70), the average value of products was $745, of which amount $455 was the value of products sold and $290 the value of products used by the operator's family; in the divisions with farms averaging from 40 to 80 acres per farm, the value of products was $758, of which $461 was the value of products sold and $297 the value of products used by the operator's family; in those with farms averaging from 80 to 120 acres, the value of products was $881, of which $575 was the value of products sold and $306 the value of products used by operator's family; in those with farms averaging from 120 to 160 acres, the value of products was $1,416, of which $1,086 was the value of products sold and $330 the value of products used by operator's family; and in those minor civil divisions with farms averaging 160 acres and over, the value of products

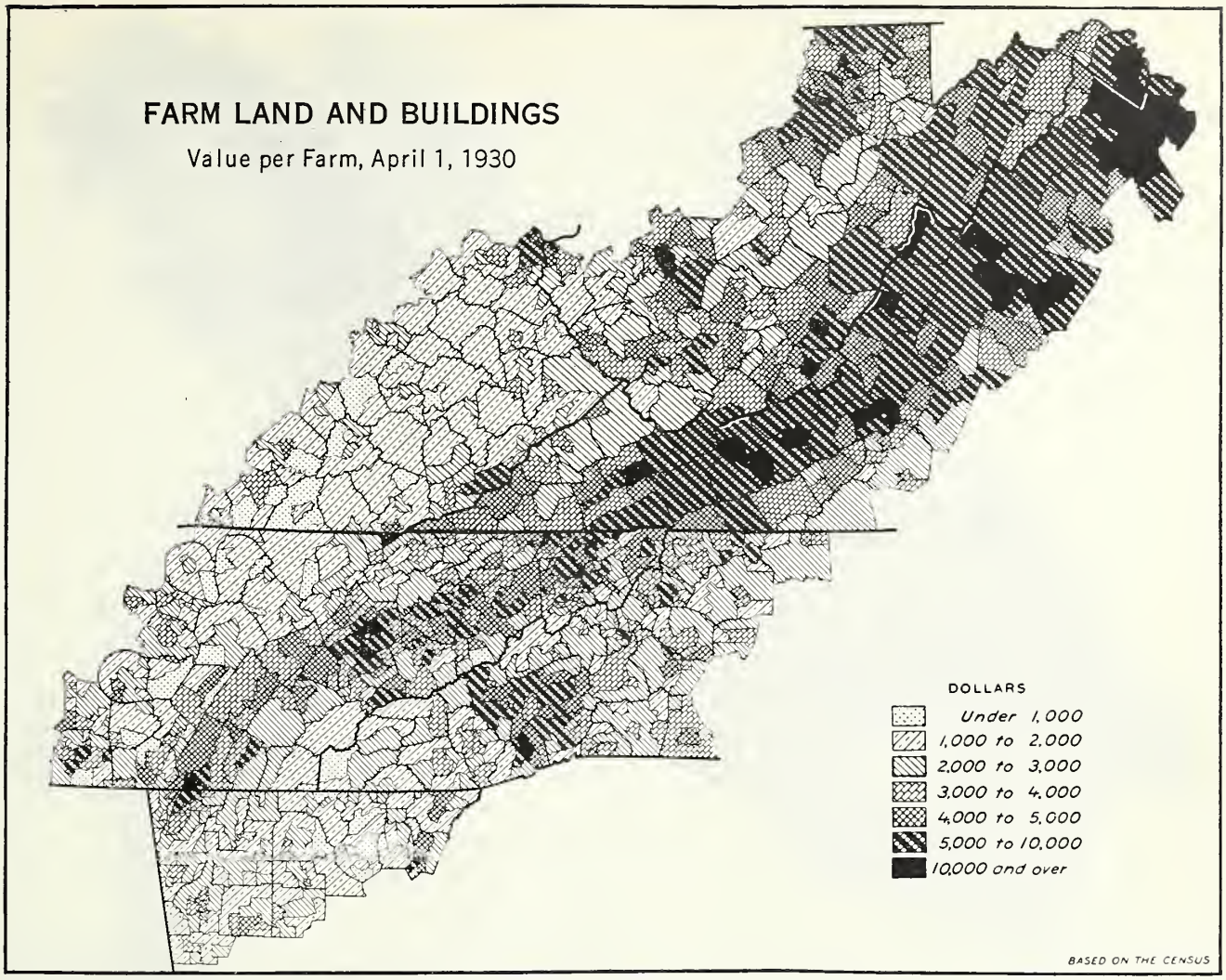

FIGURE 69.—The value of land and buildings in the Southern Appalachians was $3,606 per farm in 1930 in comparison with $7,614 per farm in the United States; that of land, excluding buildings was $2,436 per farm in the Southern Appalachians, and $5,555 per farm in the United States. The value per acre of land and buildings in the Southern Appalachians was $42, and of land alone $28, while in the United States the values were $49 and $35, respectively. However, in the Southern Appalachians there were 68 minor civil divisions in which the average value of land and buildings was less than $1,000 per farm in 1930, or about $12 per acre for land and buildings, and $8 per acre for land alone. Most of these civil divisions were in those parts of Kentucky and Tennessee which lie in the Cumberland Plateau, and in the southern part of the Blue Ridge. The farms in these 68 civil divisions, although averaging 72 acres in size had only 13 acres of crop land harvested per farm in 1929. The average value of products sold or traded for the 10,133 farms in these civil divisions was $173, and for products used by the family, $263. The operators of these farms worked off the farm an average of 53 days in 1929. In most of the minor civil divisions in the Appalachian Valleys in Virginia, the Northern Piedmont Plateau, and the Central Appalachian Ridges, the value of land and buildings was over $5,000 per farm. Two groups of civil divisions outside these subregions—one in the Upper Ohio Hills and Allegheny Plateau in West Virginia, and one in the Blue Ridge in North Carolina—also had an average value of land and buildings in excess of $5,000. This statement also applies to some minor civil divisions in the Appalachian Valleys of East Tennessee. The value of land and buildings was under $5,000 per farm in many of the civil divisions in the valleys of East Tennessee, partly because the farms in this subregion were smaller than farms in the Appalachian Valleys of Virginia. In 51 minor civil divisions the value of land and buildings was over $10,000 per farm, or about $95 per acre for land and buildings, and $62 per acre for land alone. Most of these civil divisions were in the Appalachian Valleys of Virginia and the Northern Piedmont Plateau.

was $1,763 per farm, of which $1,424 was the value of products sold and $339 the value of products used by the operator's family.

Physical limitations often restrict the acreage of land in a farm that may be used for crops and open pasture. Regardless of the size of farms, in most parts of the mountain divisions the acreage of crop land per farm is small compared with the acreage per farm in the valley division (fig. 71). In general, this is also true for pasture land (figs. 72 and 73). Most of the remainder of the land in farms is woodland, the acreage per farm (fig. 74) depending upon the size of farms and the adaptability of the land for crops and pasture. It is apparent from figures 71–74 that the acreage of crop land, open pasture (pasture land exclusive of woodland used for pasture), plowable pasture, and woodland are combined in quite different proportions in different parts of the region. This has led both to a diversity in types of farm and to differences in size of business that are not accounted for by the total acreage in a farm.

In a large number of minor civil divisions, especially in the Cumberland Plateaus, the Blue Ridge in North Carolina and Georgia, the Central and Southern Piedmont Plateaus, and the Southern Appalachian Valleys, there were less than 10 acres of open pasture land per farm. In such civil divisions few livestock were kept. In the region as a whole there was an average of about 6 horses and mules, 21 cattle, and 21 sheep and lambs for each 100 acres of open pasture.

The minor civil divisions with 30 or more acres of open pasture land were confined largely to the northern part of the region, and more especially to the Upper Ohio Hills, the Allegheny Plateau, the Central Appalachian Ridges, the Appalachian Valleys in Virginia, and the Northern Piedmont Plateau. In many of the

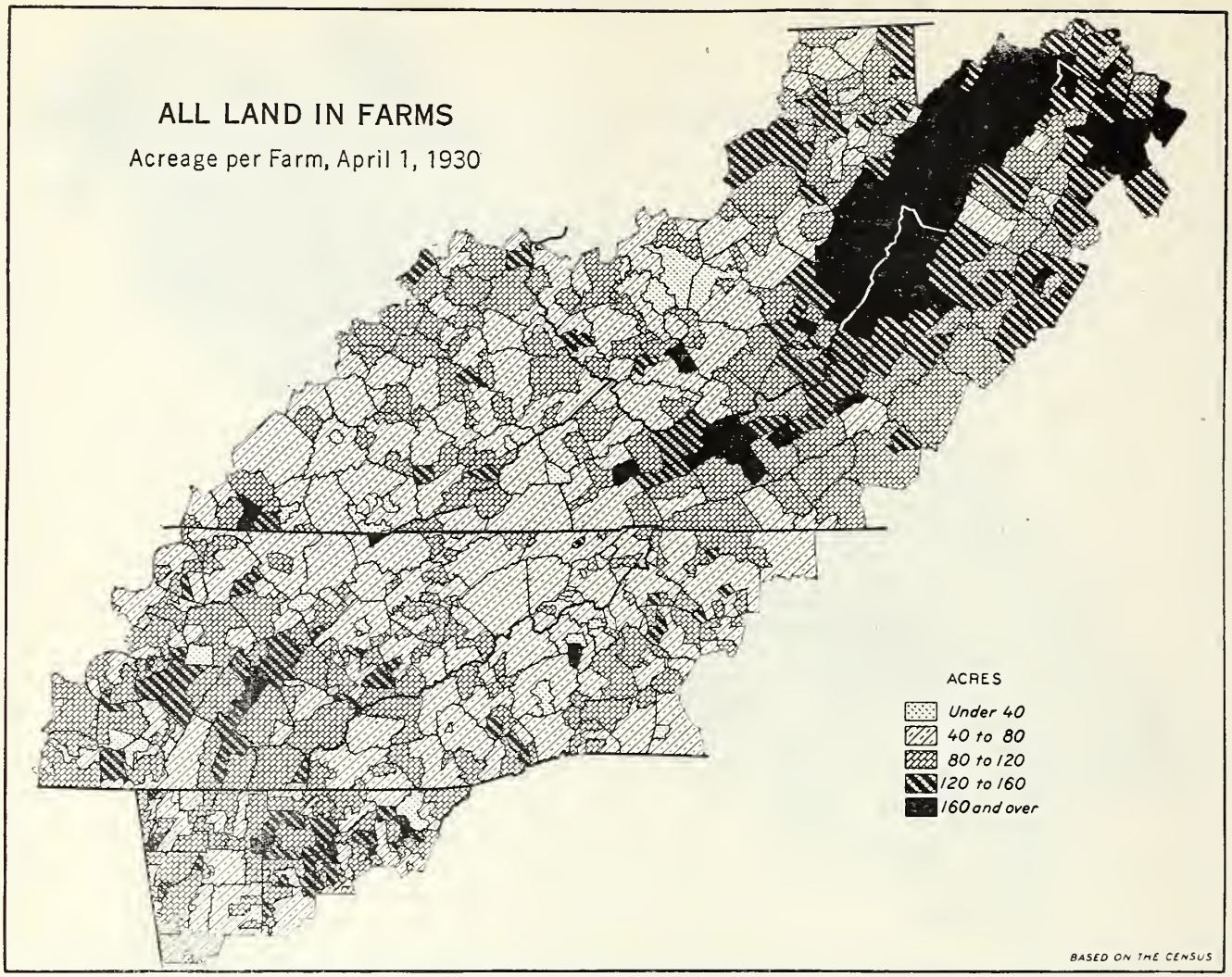

FIGURE 70.—The average size of farms in the Southern Appalachians in 1930 was 86 acres in comparison with 157 acres in the United States. But the range in size of farm in the region was from less than 3 acres to more than 10,000 acres. Although there were 1,123 farms of less than 3 acres, and 10 farms of 10,000 acres or more, over one half of all the farms ranged from 20 to 100 acres in size. In the 43 minor civil divisions with farms averaging less than 40 acres in size, those that were near, or that included, cities had a value of products of $1,455 per farm, of which $1,219 was the value of products sold and $236 the value of products used by the family; in those farther removed from cities the average value of products was only $489 per farm, of which $179 was the value of products sold and $310 the value of products used by the family. In the former group of civil divisions 37 percent of the farms were classed as self-sufficing or abnormal, and 63 percent were rather intensive farms of the more commercial types, as dairy, poultry, fruit, and truck farms; while in the group of minor civil divisions farther removed from cities 89 percent of the farms were either self-sufficing or abnormal. The largest group of contiguous minor civil divisions in which the farms averaged 160 or more acres in size was in the Central Appalachian Ridges of Virginia and West Virginia. In the 85 civil divisions with farms averaging 160 or more acres, the value of products was $1,763 per farm, of which $339 was the value of the products used by the family.

minor civil divisions in these subregions there were more than 40 acres of open pasture land per farm and in 15 civil divisions there were over 100 acres per farm.

Many minor civil divisions with 40 or more acres of pasture land per farm, excluding woodland pasture, (fig. 72) had a very much smaller acreage of plowable pasture because of the "other" or nonplowable pasture embraced in the pasture acreage. Some of the minor civil divisions in the Allegheny Plateau and in the Central Appalachian Ridges, the only two subregions in which there was more nonplowable than plowable pasture land, averaged 40 acres or more of open pasture land per farm but less than 10 acres of plowable pasture land. The percentage of all open pasture land that was plowable was highest in the Northern Piedmont Plateau, although the percentages were relatively high in the Cumberland Plateau, the Highland Rim, and Appalachian Valleys of East Tennessee. In 98 minor civil divisions in the region the plowable pasture land was less than 25 percent of the total open pasture land, while in 380 minor civil divisions plowable pasture exceeded 90 percent of the open pasture land.

Most of the 70 minor civil divisions with less than 10 acres of woodland per farm were in the Northeastern Cumberland Plateau, the Allegheny Plateau, and in more or less scattered localities over the southern part of the region. A total of 541 civil divisions, or almost one-third of all civil divisions in the region, on the other hand, had 40 or more acres of woodland per farm, and 56 of these divisions averaged more than 100 acres per farm. The largest contiguous group of minor civil divisions averaging 40 or more acres of woodland per farm was in the Allegheny Plateau and the Central Appalachian Ridges.

CROP AND LIVESTOCK ORGANIZATION

Some of the farms in the Southern Appalachians are organized primarily for the production of products for family use, but most of them, including the self-sufficing and abnormal farms, produce more or less products for sale, the value ranging from only a few dollars to several thousand dollars. In producing products for sale, regardless of the volume sold, some farmers depend largely on one or more crops, some on one or more classes of livestock or livestock products, and

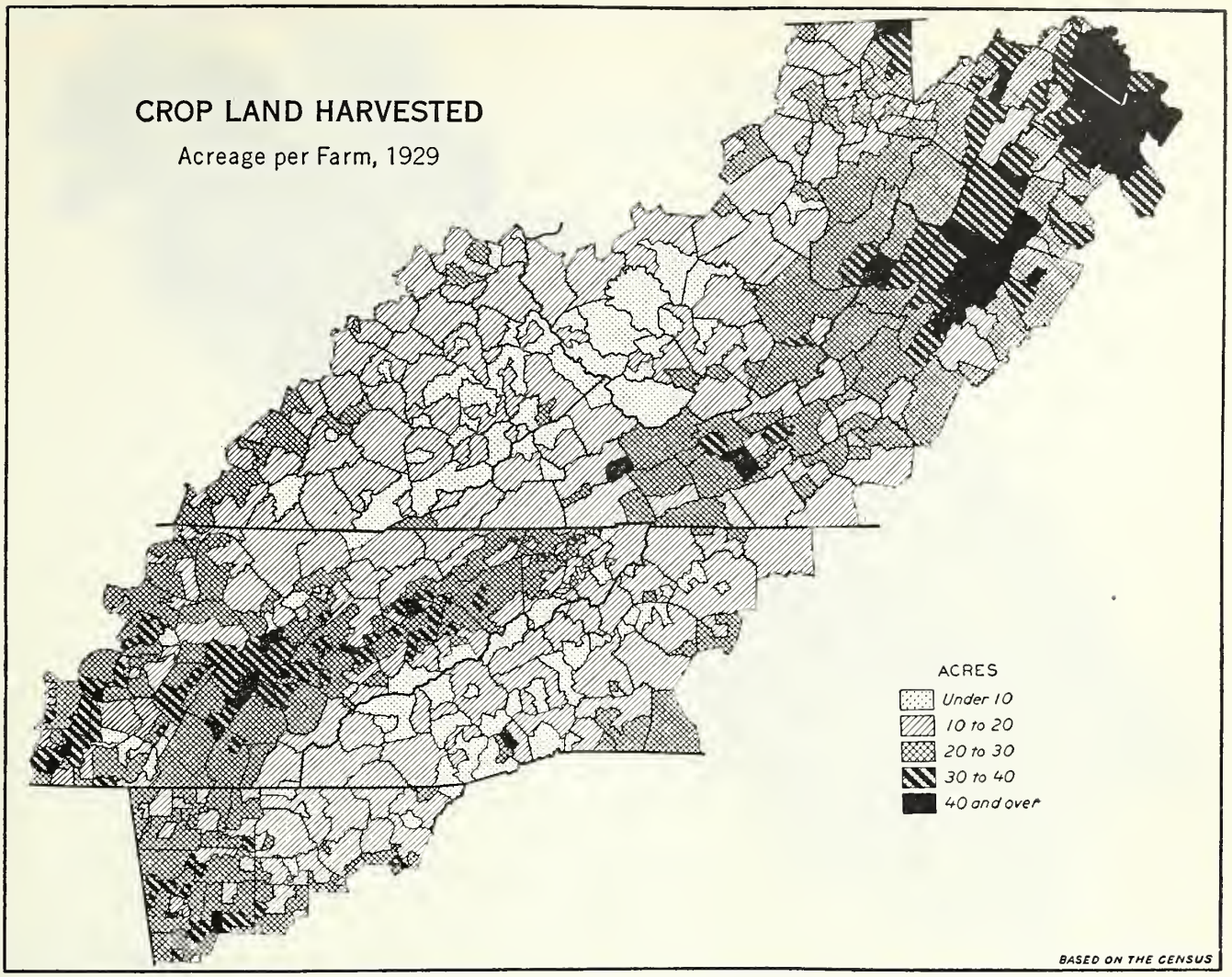

FIGURE 71.—Crop land harvested in 1929 averaged 20 acres per farm, or about 23 percent of the acreage in farms in the region. Comparable figures for the United States were 57 acres per farm, or about 36 percent of the acreage in farms. In the mountain divisions and western fringe there were less than 16 acres of crop land harvested per farm in 1929, while in the valley division and eastern fringe there were almost 25 acres. The range in acreage of crop land harvested in the several subregions was from less than 12 acres per farm in the Northeastern Cumberland Plateau to more than 43 acres per farm in the Central Appalachian Valleys and the Northern Piedmont Plateau. In approximately one-half of the minor civil divisions an average of 10 to 20 acres of crop land were harvested per farm in 1929; and in more than one-fourth of the civil divisions the average was from 20 to 30 acres per farm. There were 183 minor civil divisions in the region in which the acreage of crop land harvested in 1929 was less than 10 acres per farm. These divisions were mostly in the Northeastern Cumberland Plateau, and in that part of the Blue Ridge which is in North Carolina and Tennessee. Farms in the civil divisions averaging less than 10 acres of crop land had an average value of products amounting to $543 per farm, of which $328 was the value of products used by the operator's family. On the other hand, in 57 minor civil divisions in the region the acreage of crop land harvested in 1929 was 40 or more acres per farm. These divisions, with few exceptions, were in the Central Appalachian Valleys and the Northern Piedmont Plateau. The value of products in the 57 civil divisions was $2,617 per farm, of which the value used by the family was $349. Small acreages of crop land devoted almost entirely to corn, small grain, or hay, and especially when the soil is not very productive, are not conducive to a high value of products per farm.

others on both crops and livestock or livestock products. The relation of the value of the crop sales to that of the sales of livestock and livestock products (fig. 75) reveals a dominance of cash-crop farming in the Southern Appalachian Valleys and Southern Piedmont Plateau; of livestock farming in the Allegheny Plateau and Central Appalachian Ridges; and of cash crop and livestock farming in certain parts of the Appalachian Valleys (excluding the Southern Appalachian Valleys), the Blue Ridge, the Highland Rim, and Cumberland Plateau.

Corn was the principal field crop grown in the region in 1929, both from the standpoint of acreage and of the number of farms on which it was grown. The grain is used for food for the family, as well as for feed for the livestock, and the fodder is used for roughage. Some of the land is not well adapted to its production, but apparently corn is considered the best field crop to grow. The yield in 1929 ranged from 15 bushels per acre in the Southern Appalachian Valleys and the Southern Piedmont Plateau to almost twice as many bushels per acre in the Allegheny Plateau, the Central Appalachian Ridges, the Appalachian Valleys in Virginia, the Northern Piedmont Plateau, and the Upper Ohio Hills. Although corn was the most important field crop, less than 100 bushels were produced per farm in 25 of the 205 counties in 1929. Most of the 25 counties were in the mountain divisions and western fringe where incomes were low and the acreage of corn per farm was small, but some of them also were in the Central Appalachian Ridges where there was considerable grazing of beef cattle and sheep and the growing season was short (fig. 3), and in the southern parts of the region where cotton farms were dominant and the yield of corn was only about 15 bushels per acre. The acreage of corn per farm for all farms in each minor civil division is indicated in figure 76.

Small grains were grown on only about one-third of the farms and on about 15 percent of the crop land harvested in 1929 (fig. 77). The greater part of the

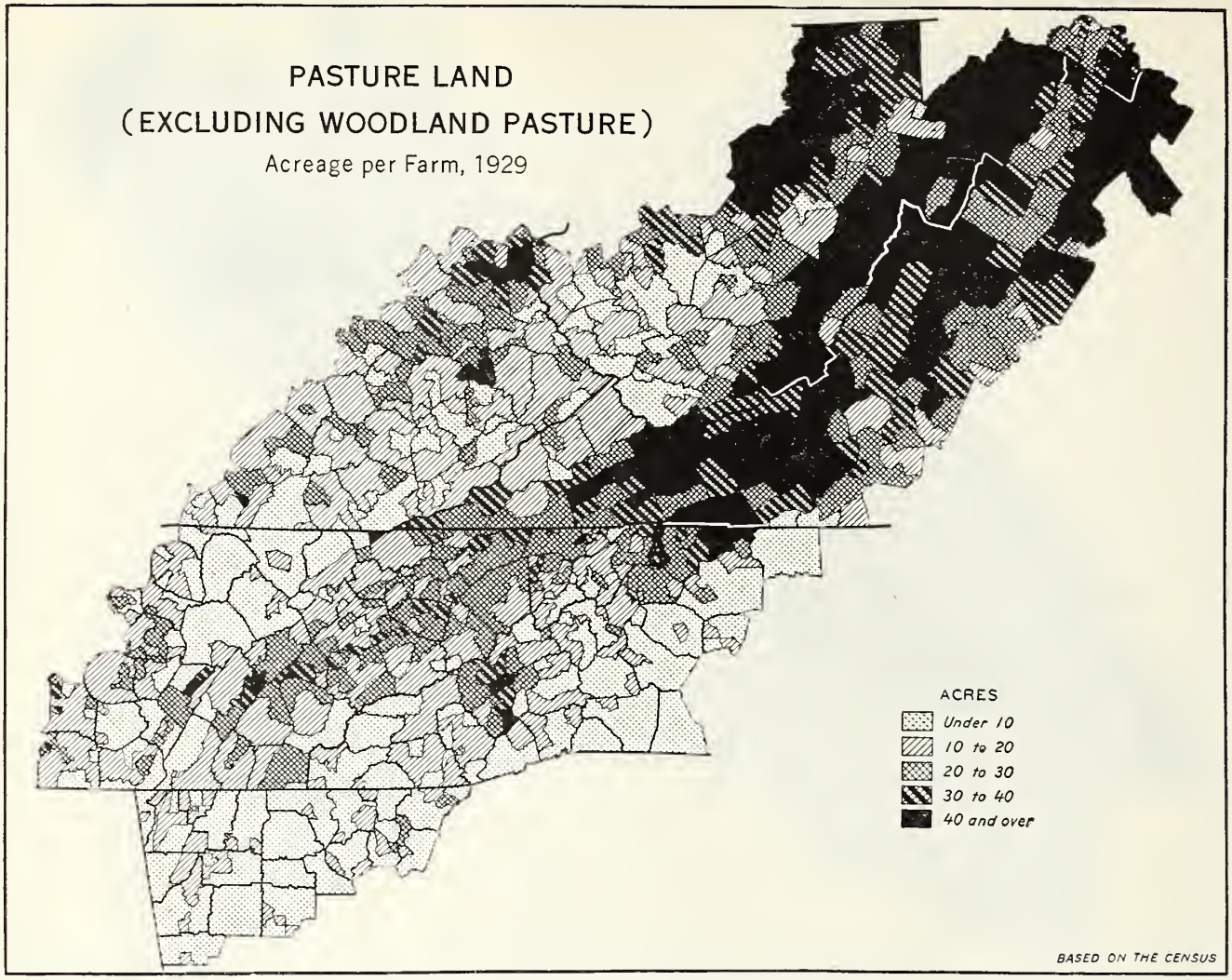

FIGURE 72.—Open pasture land (pasture land exclusive of woodland used for pasture) averaged 23 acres per farm in the Southern Appalachians in 1929, or a little more than one-fourth of the total land area per farm. Woodland pasture comprised an additional 8 acres per farm. In the mountain divisions and western fringe open pasture land averaged about 20 acres per farm, and in the valley divisions and eastern fringe about 25 acres per farm. However, in the Allegheny Plateau there were about 38 acres of open pasture land per farm and in the Upper Ohio Hills, 46 acres; while in the Southern Appalachian Valleys there were about 8 acres of open pasture land per farm, and in the Southern Piedmont Plateau only 5 acres per farm. With the exception of the Allegheny Plateau and Upper Ohio Hills, the acreage of open pasture land was relatively low in the mountain divisions and western fringe, and with the exception of the Southern Appalachian Valleys and Southern Piedmont Plateau, that in the valley division and eastern fringe was relatively high.

acreage of small grain was in wheat, although in 1929 no wheat was grown in almost one-third of the minor civil divisions. About four-fifths of the divisions in which no wheat was grown were in the mountain division and western fringe and, with few exceptions, all the others were in the southern part of the valley division and eastern fringe where cotton farms were dominant. On the other hand, in about one-tenth of the minor civil divisions there were 5 or more acres of wheat per farm. Ninety percent of these divisions were in the northern part of the valley division and eastern fringe. In the other minor civil divisions in the region, wheat was grown mainly for the use of the family, and averaged only 1.3 acres per farm.

Although the acreage of oats was less than one-half that of wheat, oats were grown in nine-tenths of the minor civil divisions. About three-fourths of the civil divisions in which no oats were grown were in the mountain divisions and western fringe, largely in the Blue Ridge and the Cumberland Plateau; most of the others were in the Southern Appalachian Valleys and the Southern Piedmont Plateau. In only about 1 minor civil division in 20 was there 2.5 acres or more of oats per farm. About three-fourths of these divisions were in the mountain divisions and western fringe, largely in the Cumberland and Allegheny Plateaus, and most of the others were in the Central Appalachian Ridges.

No rye was reported grown in about 40 percent of the minor civil divisions, mostly in the mountain divisions and western fringe. In only about 1 percent of the civil divisions, practically all of which were in the Blue Ridge, the Central Appalachian Ridges, and the Northern Piedmont Plateau, was there an average of 2.5 acres or more of rye per farm. Nearly all of the acreage of barley was in the Appalachian Valleys in Virginia and East Tennessee. Only 10 minor civil divisions had 1 acre or more of barley per farm.

Buckwheat, although grown in only a few parts of the region, was an important source of income on some farms. For the slightly over 11,000 farmers who reported the production of buckwheat in 1929, the acre-

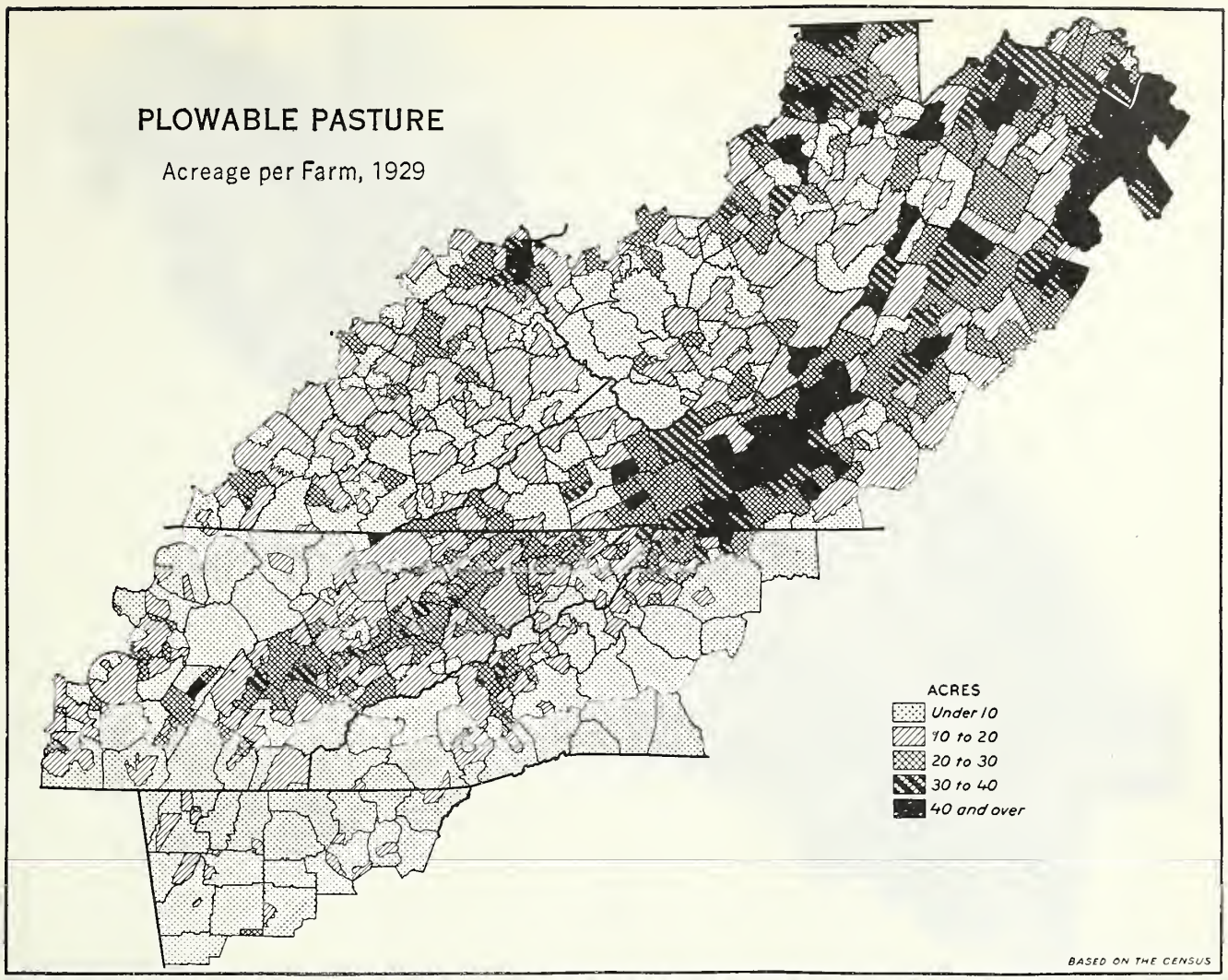

FIGURE 73.—In 1929, about two-thirds of the pasture land in the region, excluding woodland used for pasture, was classified as plowable pasture land; that is, it could have been plowed and used for crops without clearing, draining, or irrigating, and thus was immediately available for cultivated crops. In the region as a whole, plowable pasture land averaged 16 acres per farm, ranging from none on some farms to 1,000 acres or more on others.

age was 4 acres per farm and the production about 60 bushels per farm. The greater part of the buckwheat was grown in the Highland Rim in Pulaski County, Ky.; in the northern part of the Allegheny Plateau; in the northern part of the Central Appalachian Ridges; and in the Blue Ridge in the southern part of Virginia and the northern part of North Carolina.

The acreage of tame hay was second only to that of corn (fig. 78). Although grown on only about 40 percent of the farms, tame hay occupied one-fourth of the crop land harvested in 1929. In more than one-fifth of the minor civil divisions, largely in the Cumberland Plateau, the Blue Ridge, the Southern Appalachian Valleys, and the Southern Piedmont Plateau, less than 1 acre of tame hay was harvested per farm. On farms where no tame hay was produced, corn fodder (or stover), straw, wild hay, or sorghum were the only home-grown roughage feeds. Wild hay was reported for about 9,000 farms in 1929, and sorghums cut for silage, hay, or fodder, for almost 13,000 farms. Most of the farms growing either wild hay or sorghum were in Kentucky, Tennessee, North Carolina, and Georgia.

Corn, the small grains, and tame hays were grown on 80 percent of the crop land harvested in the region in 1929. The crops grown on the remaining 20 percent of the crop land harvested were either not common to the entire region or were of minor, if any, importance as sources of cash income. One or more of these crops, however, was an important source of income on most of the farms in certain parts of the region, such as cotton in the Southern Appalachian Valleys and the Southern Piedmont Plateau, and as fruits and vegetables grown for sale on farms in various parts of the region.

About 27,000 farms were classified as cotton farms in 1929 (fig. 57). More or less cotton was also grown on about 9,000 other farms, but the value of the sales of the cotton and cottonseed was either less than 40 percent of the value of all products or at least one-half the value of products produced on the farm was consumed by the family; hence, the farm was classed as self-sufficing.

Tobacco was grown on more than three times as many farms as were classified as crop-specialty farms in 1929 (fig. 58), but only about 1 farm in 7 in the region produced any tobacco. Although tobacco occupied less than 1 acre on many farms, the receipts from tobacco were frequently an important part of the cash sales, especially on the farms with a small-sized

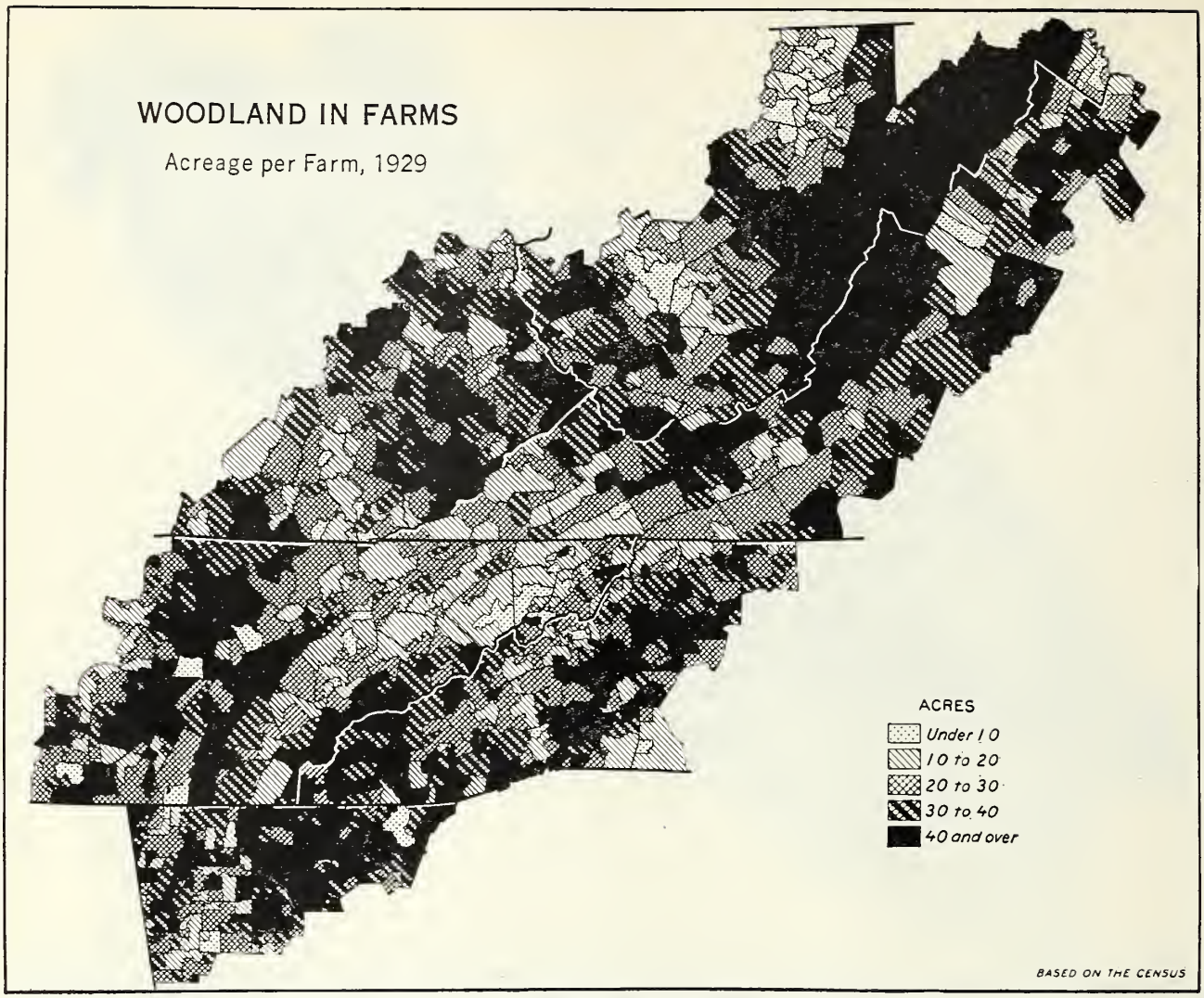

FIGURE 74.—Almost 40 percent of the land in farms in the Southern Appalachians in 1929 was woodland. Out of an average of 33 acres per farm, 25 acres was woodland not pastured, and 8 acres woodland used for pasture. The woodland on farms is of value not only as a source of income from the sale of forest products, but also as a source of supply of fuel for the farm family, of building and fencing materials for the farm, and the woodland pasture is of considerable importance to the livestock enterprise on some farms. The value of the forest products cut on farms for home use and for sale in 1929 was $57 per farm, or almost $1.75 per acre for all woodland in farms. The value of the forest products sold was $28 per farm.

business. For example, in a farm-business study of 203 farms in Laurel County, Ky., in 1927 (*30*), where farms were a little above the average of all farms in the Northwestern Cumberland Plateau in value of products in 1929, one-fourth of the farmers raised some tobacco—usually less than an acre—but the value of the sales of tobacco from these farms was $135 per farm, which was about one-fourth of the gross value of the sales of all products and more than one-half of the net value of the sales of all products. However, no tobacco was was reported grown in almost one-fifth of the counties in 1929 and less than 10,000 pounds were grown in almost three-fifths of the counties. Only 18 counties produced 1,000,000 pounds or more.

Potatoes were produced on a greater number of the farms in 1929 than any other crop except corn. However, there was an average of less than one-half acre of potatoes raised per farm, and on many of the farms all or the greater part of the production was used by the operator's family. Potatoes were grown on practically four-fifths and sweetpotatoes and yams on practically one-fifth of the acreage in potatoes. The former were grown on about 60 percent of the farms and the latter on about 30 percent of the farms. There probably was a considerable number of farms from which the sales of potatoes added an appreciable amount to the value of the sales of farm products. Almost one-half of the farmers in the study of Laurel County, Ky. (*30*), for instance, sold a few bushels of potatoes, some not more than 5 or 10 bushels and others 50 bushels or more, but the average value of the sales was $30 per farm.

Almost 60,000 acres of vegetables were harvested for sale in the region in 1929. The value of the vegetables was $89 per acre. Although there were only 1,753 farms from which the value of the sales of truck crops was 40 percent or more of the value of all products, and thus were classed as truck farms (fig. 61), there were several times as many farms on which one or more truck crops were grown for sale as a minor farm enterprise (table14). Where markets were available the production of one or more truck crops for sale, even on less than an acre of land, was an important source of cash receipts, especially on the low-income farms. Again referring to

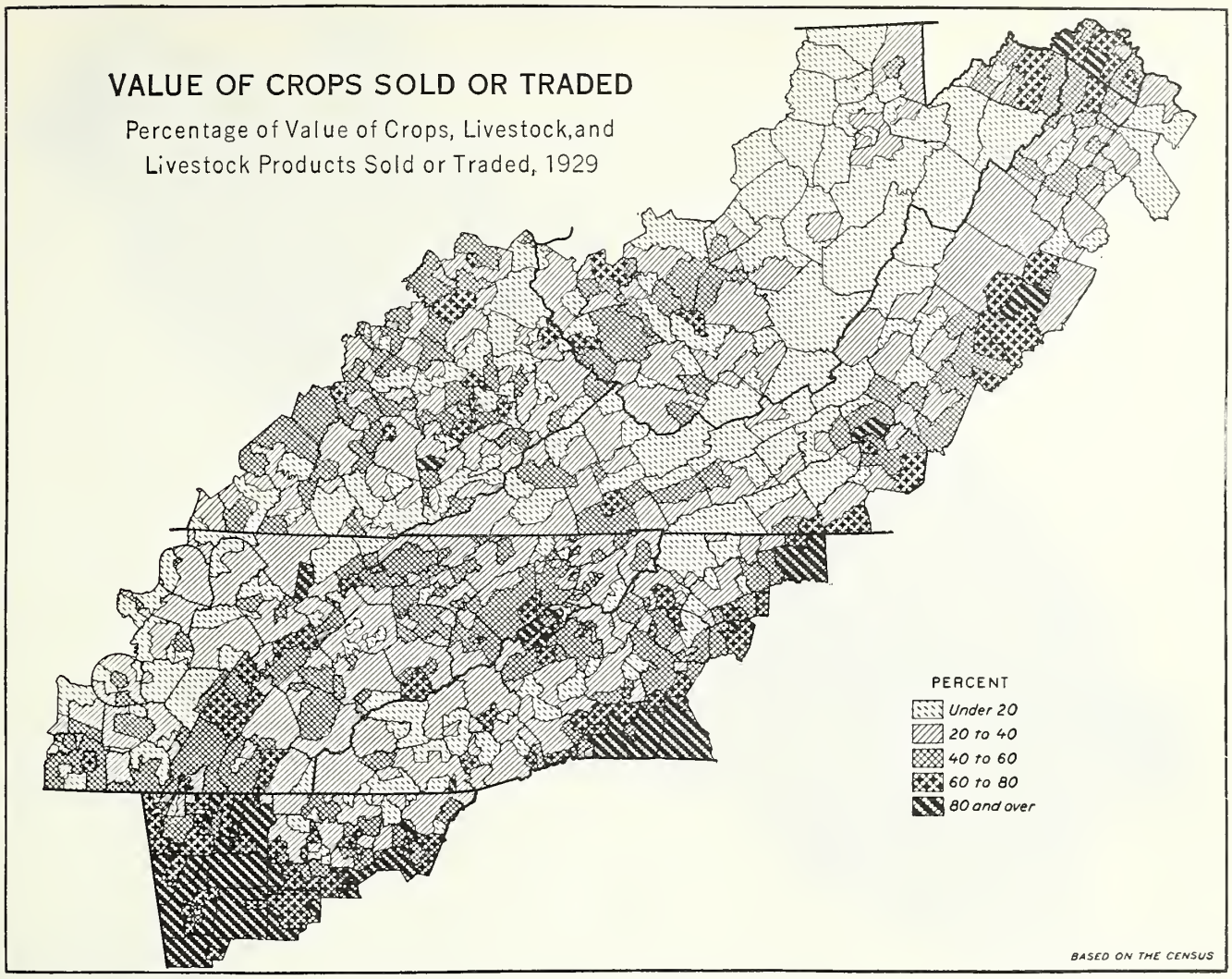

FIGURE 75.—Some of the farms in the region in 1930 were organized primarily for the production of one or more crops as the major source of income, such as the cotton crop-specialty, fruit, cash-grain and truck farms; some, for the production of one or more classes of livestock or livestock products as the major source of income, such as the animal-specialty, dairy and poultry farms; and others were so organized that appreciable parts of the income were from both crops and livestock or livestock products. The heavier shadings locate the minor civil divisions in which the value of the products sold was mostly from crops; the lighter shadings locate those minor civil divisions in which the value of the products sold was mostly from livestock or livestock products; and the medium-light or dark shadings locate those minor civil divisions in which the value of products sold was about equally divided between the sales of crops and the sales of livestock or livestock products. Naturally, the minor civil divisions in which cotton, crop-specialty, fruit, and cash-grain farms were dominant (fig. 52), had high percentages of the value of products sold from the sales of crops, and the civil divisions in which animal-specialty, dairy, and poultry farms were dominant had low percentages of the value of products sold from the sales of crops. Many of the civil divisions in which general farms were dominant had about an equal division between the value of products sold from the sales of crops and the sales of livestock and livestock products. The civil divisions in which self-sufficing or abnormal farms were dominant—more than two-thirds of all the minor civil divisions ranged from a low (under 20 percent) to a high (80 percent and over) percentage of the total value of products sold from the sales of crops, although for all of the farms in these two types the ratio of the value of crops sold to that of livestock and livestock products sold was about 1 to 3.

the study of Laurel County, Ky., in 1927 (*30*), about one-third of the 203 farmers included sold some truck crops, averaging $50 per farm.

TABLE 14.—*Acreage and value per acre of truck crops grown for sale, 1929*

Crop	Farms reporting	Acreage	Value of products per acre
	Number	*Acres*	*Dollars*
Tomatoes	19,989	17,954	73
Beans (snap or string)	22,358	12,958	82
Cabbages	15,364	8,065	152
Sweet corn	6,662	6,429	54
Watermelons	5,119	5,066	74
Peas (green)	2,812	1,483	65
Cantaloups and muskmelons	1,597	1,065	91
Other truck crops		5,533	127

Compiled from the census, 1930 (*50*).

Over half a million acres were in orchard fruits, vineyards, planted nut trees, and small fruits in the Southern Appalachians in 1929, or an average of 1.4 acres per farm. Although the value of the sales of fruits and nuts made up 40 percent or more of the value of all products on only 4,515 farms in the region, and thus were classed as fruit farms (fig. 60), more or less fruit was produced on many other farms. For example, apple trees were reported for more than two-thirds of the farms in 1929 (table 15). The production of fruit in the family orchards, in contrast to the primarily commercial fruit orchards, was often sufficient to enable the farmers to sell some fruit, and thus add a few dollars and, on some farms, a few hundred dollars to the value of the products sold from the farm. The year of the Laurel County study (*30*), 1927, was a poor year for tree fruits in the

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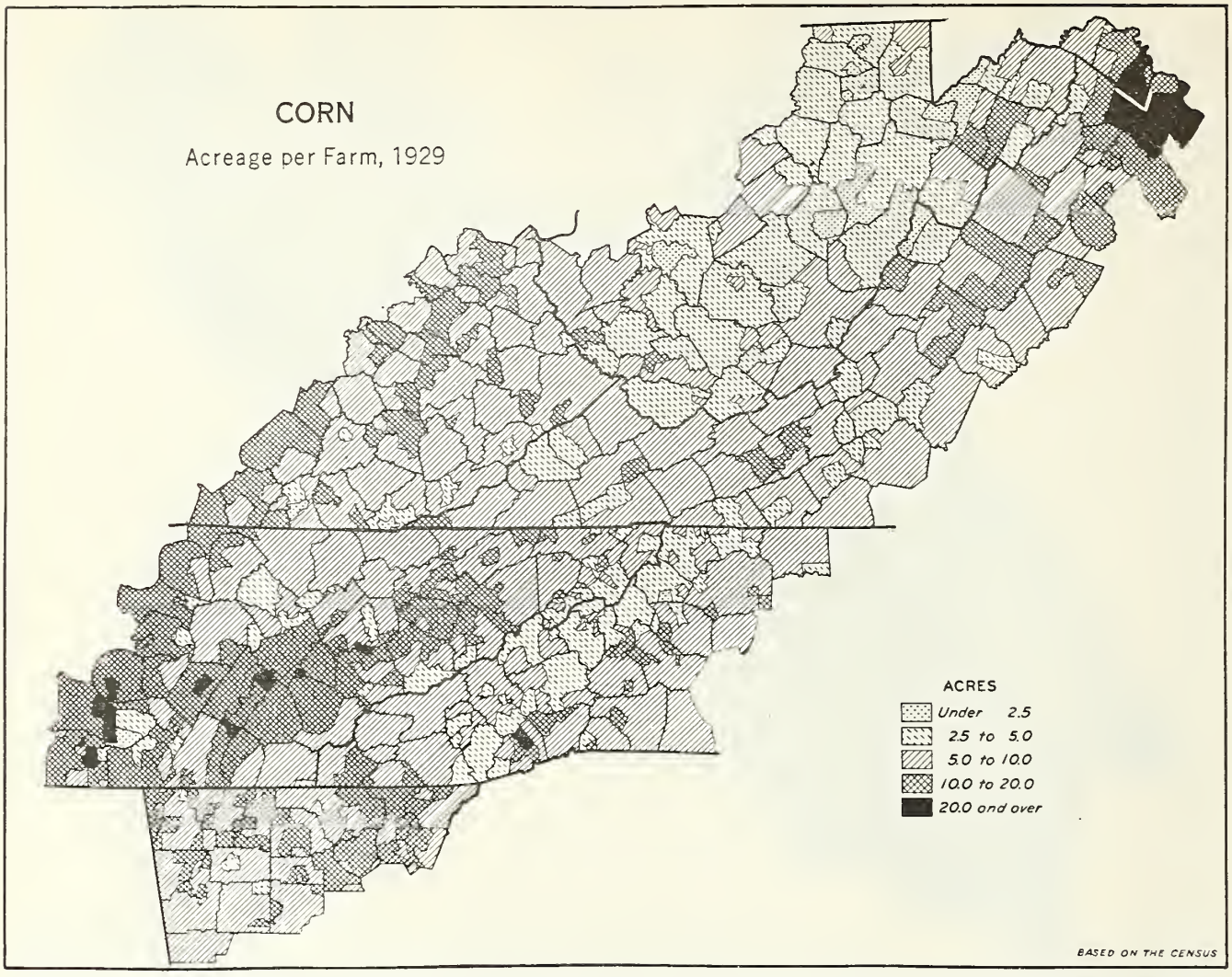

FIGURE 76.—Corn was grown on 85 percent of the farms in the Southern Appalachians in 1929, and, in point of acreage, it was the most important crop. The average was 8 acres per farm which was 40 percent of the crop land harvested per farm, although less than 10 percent of the acreage per farm. Almost 95 percent of the acreage in corn was harvested for grain and 2 percent for silage, the former yielding 22 bushels per acre and the latter 8.1 tons. In 27 minor civil divisions there was less than 2.5 acres of corn per farm. The 2 largest groups of contiguous minor civil divisions with less than 2.5 acres per farm were in West Virginia. One included 6 civil divisions in Grant, Mineral, and Tucker Counties; the other 3 civil divisions in Randolph and Webster Counties. The remaining 18 civil divisions, with less than 2.5 acres of corn per farm, were more or less scattered, one or more in each State. Twenty-four of the twenty-seven civil divisions were in the mountain divisions and western fringe, and 3 in the valley divisions and eastern fringe. In 30 minor civil divisions there were 20 or more acres of corn per farm. A group of 13 of these civil divisions was in Loudoun, Fauquier, and Clarke Counties, Va., and in Jefferson County, W.Va. Most of the other civil divisions were in the Appalachian Valleys of East Tennessee and in those parts of the Northwestern Cumberland Plateau and Highland Rim in Tennessee. Nineteen of these thirty civil divisions were in the valley division and eastern fringe and 11 in the mountain divisions and western fringe. The largest number of civil divisions with 2.5 to 5 acres of corn per farm were in West Virginia and in the Blue Ridge in North Carolina and Tennessee.

locality and fruits of any kind (mostly small fruits) were sold from only 6 of the 203 farms. The value of the sales of fruits from the 6 farms was $31 per farm.

Sorgo (sweet sorghum) for sirup was produced on 1 farm in 13, usually for family use, but in some instances as a source of cash income. In Virginia and West Virginia the production was less important than in the other States, especially in parts of the Highland Rim, the Cumberland Plateau, the Southern Appalachian Valleys, the Southern Piedmont Plateau, and the Blue Ridge. In the study of Laurel County, Ky. (*30*), 12 of the 203 farmers received income from the sales of sorgo sirup, averaging $28 per farm. The production of maple sirup and sugar was confined largely to less than 1,000 farms in a half dozen counties in the Central Appalachian Ridges.

Corn, the small grains, hay, and cotton occupied 85 percent of the crop land harvested in the Southern

TABLE 15.—*Number of trees, vines, or acres of the more importan fruits, and quantity harvested, 1929*

Fruit	Farms reporting	Trees, vines, or acreage	Percentage of bearing age	Quantity harvested
	Number	*Number*	*Percent*	
Apples	267, 124	[1] 20, 120, 066	80	[2] 20, 262, 178
Peaches	164, 514	[1] 7, 425, 475	73	[2] 2, 603, 491
Cherries	96, 676	[1] 799, 161	71	[2] 242, 823
Pears	90, 569	[1] 440, 564	83	[2] 441, 205
Plums and prunes	63, 438	[1] 390, 229	79	[2] 96, 579
Grapes	92, 609	[3] 892, 536	76	[4] 5, 651, 927
Strawberries	19, 094	[5] 10, 331	.....	[6] 12, 360, 162
Blackberries and dewberries	15, 958	[5] 5, 293	.....	[6] 1, 884, 175
Raspberries	7, 178	[5] 1, 800	.....	[6] 1, 127, 675

[1] Trees.
[2] Bushels.
[3] Vines.
[4] Pounds.
[5] Acres.
[6] Quarts.

Compiled from the census, 1930 (*50*).

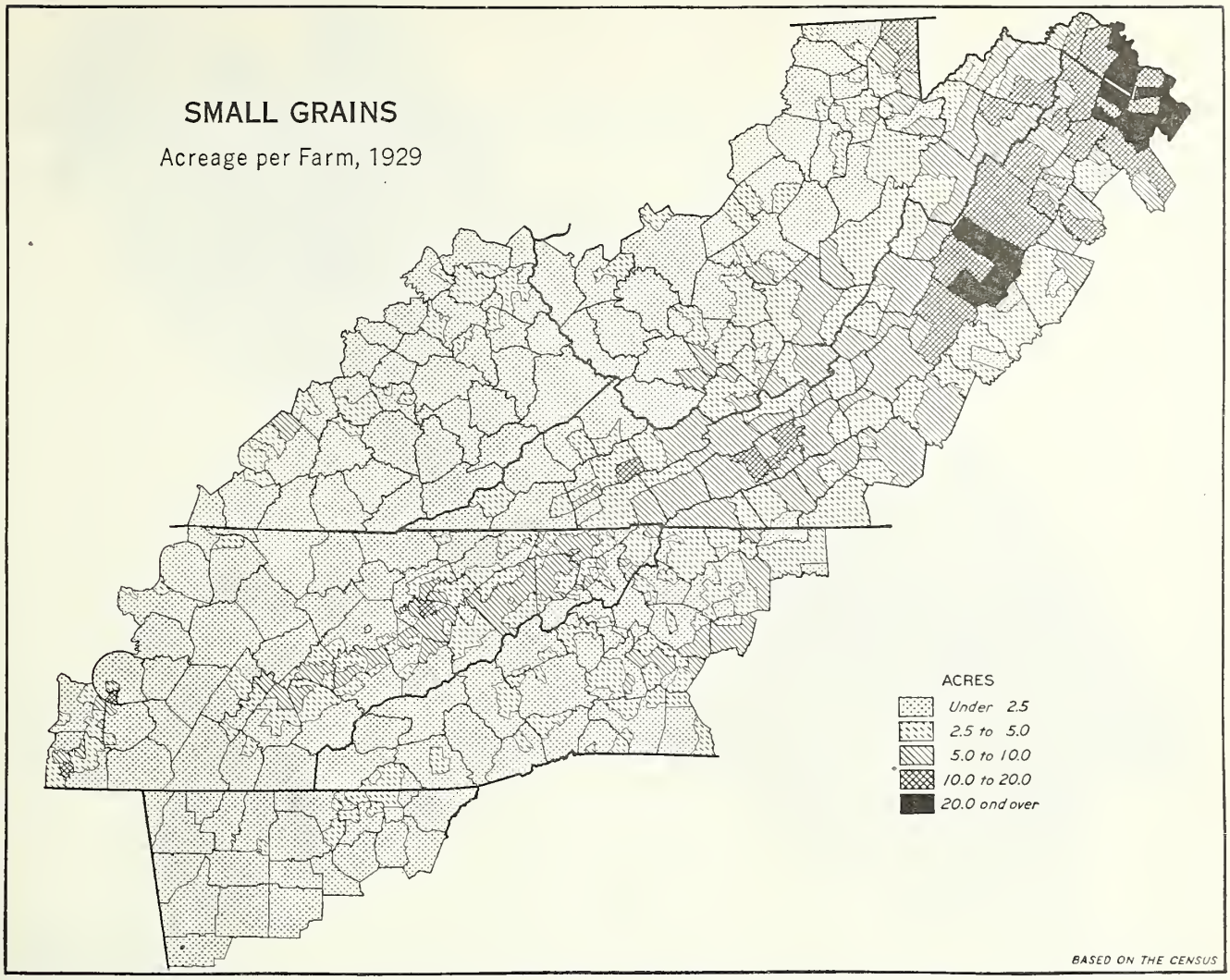

FIGURE 77.—The acreage of crops grown for small grains was 3 acres per farm in 1929. Of this acreage about 60 percent was in wheat, 27 percent in oats (about two-thirds of which were fed unthreshed), 7 percent in rye, and 6 percent in the other small grains. The yields per acre in 1929 were: wheat, 12 bushels; oats, 21 bushels; rye, 8 bushels; buckwheat, 15 bushels; and barley, 23 bushels. Wheat was grown on 66,706 of the 383,870 farms; oats threshed, on 22,680 farms; oats fed unthreshed, on 49,709 farms; rye, on 19,226 farms; buckwheat, on 11,176 farms; and barley, on 4,032 farms. No doubt there was an appreciable number of the farms on which more than one of the several small grains were grown. In view of this duplication there is reason to believe that small grains were grown on not more than one-third of the farms in 1929. In approximately two-thirds of the minor civil divisions there was less than 2.5 acres of small grains per farm. Most of these civil divisions were scattered throughout the mountain divisions and western fringe (except the northern part of the Blue Ridge, and in the Southern Appalachian Valleys and the Southern Piedmont Plateau. Most of the minor civil divisions with 10 or more acres of small grain per farm were in the Central Appalachian Ridges, the Central Appalachian Valleys, and the Northern Piedmont Plateau. In only 19 civil divisions were there more than 20 acres of small grains per farm. These divisions were in the extreme northeastern part of the region and in Augusta County, Va.

Appalachians in 1929. The greater part of the remaining 15 percent, averaging 3 acres per farm, was occupied by the other crops named in the preceding paragraphs—tobacco, vegetables grown for sale, potatoes, fruits, and sorgo grown for sirup. These crops usually have relatively high values per acre but, except for the two first mentioned, they were produced on many of the farms primarily for family use rather than as a source of cash income.

On farms where soils are suitable and markets are available, one or more of these crops may be advantageously produced in limited quantities as sources of cash income. Small acreages devoted to the production for sale of one or more of these high-value-per-acre crops, especially on farms with low incomes and with limited acreages of crop land, often have had an important bearing on the cash income from the farm and the amount of money available for family-living expenditures. Although a satisfactory market may not be available for this class of crops in parts of the region, or for all farms in a given part of the region, data from farm-business studies here and there indicate that the farmers who grew for sale one or more of the crops with a high value per acre had higher incomes from their farms than those who did not. By way of illustration, in the study of Laurel County, Ky., (*30*) the net cash sales of farm products after the cash expenditures were deducted were $39 per farm on those farms from which none of these high-value-per-acre crops were sold, $218 per farm on those from which $50 to $100 worth of these crops were sold, and $428 per farm on those from which the sales of these crops amounted to $200 or more (table 16).

Several other crops were produced in the region, but on a very limited number of farms, and often only in certain parts. Most of the production of these crops was for farm or home use, although the sales of such products were of considerable importance on a few

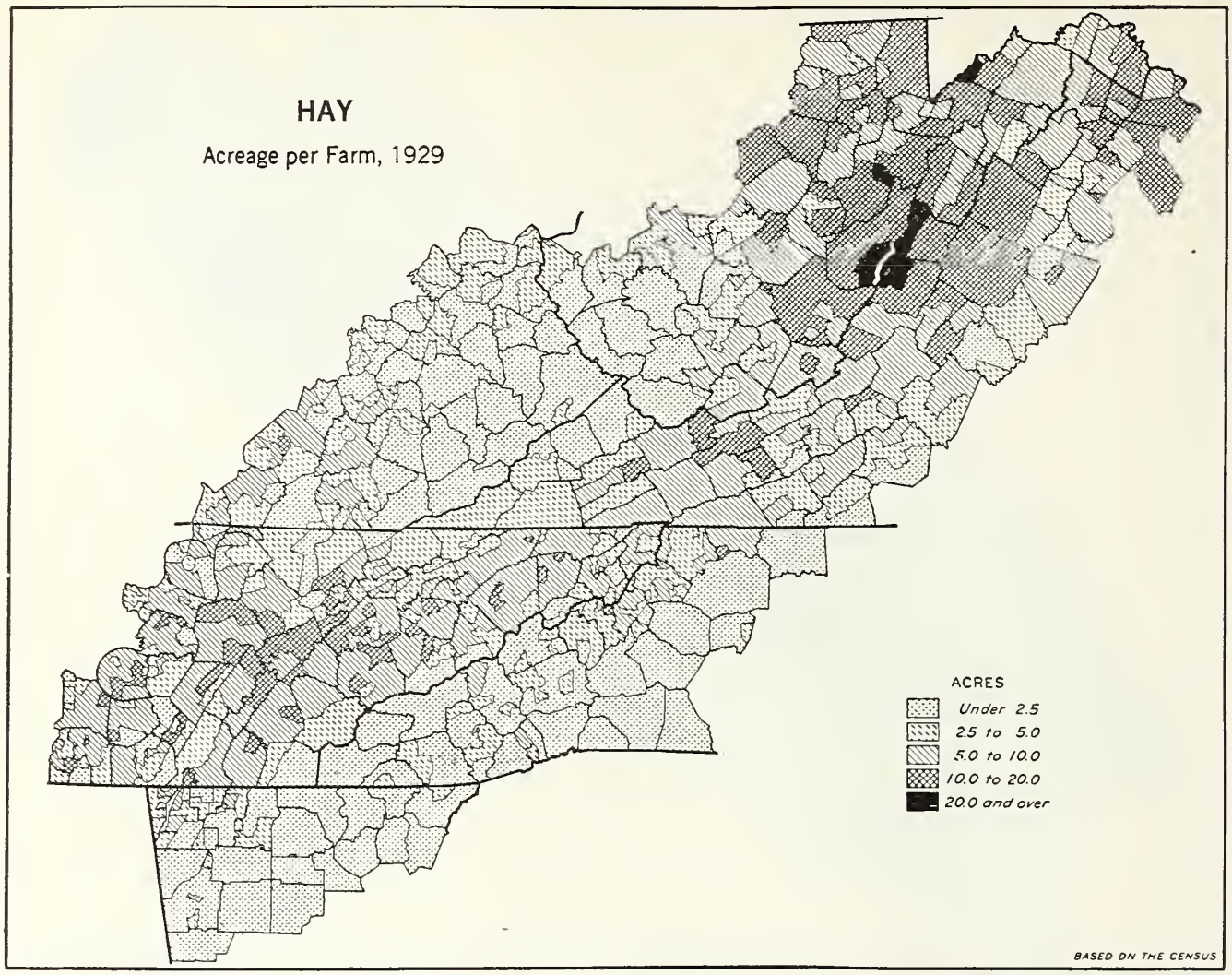

FIGURE 78.—An average of 5 acres of hay crops of all kinds, except wild grasses and sorghum, were harvested per farm in the region in 1929. The average yield was slightly over 1 ton per acre. About 54 percent of the hay acreage was timothy and (or) timothy and clover mixed, reported for 98,954 farms, and yielding 1.1 tons per acre; 25 percent was other tame grasses, reported for 51,372 farms, and yielding 0.9 ton per acre; 16 percent was legume crops—including red, alsike, mammoth, sweet, crimson, and Japanese clover, alfalfa and annual legumes—the clovers yielding 1.2 tons per acre, alfalfa 1.8 tons, and annual legumes 1.1 tons; and 2 percent was small grains, reported for 9,191 farms, and yielding 0.9 tons per acre. The number of farms on which hay of any kind was harvested in 1929 probably did not exceed 150,000, or less than 40 percent of the total number. In about 40 percent of the minor civil divisions there was less than 2.5 acres in hay per farm. Most of these civil divisions were in the mountain divisions and western fringe, especially in those parts of the Cumberland Plateau in Kentucky and West Virginia and in the southern part of the Blue Ridge, and in the Southern Appalachian Valleys, and the Southern Piedmont Plateau. In parts of the mountain divisions and western fringe, especially in the Upper Ohio Hills, the Highland Rim, and the Cumberland Plateau in Tennessee, and in parts of the valley division and eastern fringe, especially in the Central Appalachian Ridges and the Appalachian Valleys of East Tennessee, the acreages of hay exceeded those of small grains (fig. 77). On the other hand, in some of the minor civil divisions in the extreme northeastern part of the region there was less land in hay than in the small grains. In only 5 minor civil divisions in the region were there 20 or more acres of hay per farm in 1929. These divisions were in 2 subregions, the Central Appalachian Ridges and the Allegheny Plateau.

farms. Among these crops were clover seed (all kinds), produced on less than 3,000 farms, mostly in a few counties in the Central Appalachian Valleys and Ridges, in the Appalachian Valleys of East Tennessee, and in Franklin County, Tenn.; timothy seed, produced on about 200 farms, mostly in the Virginias; other grass seeds, produced on about 200 farms, practically all in Virginia; broomcorn, produced on about 200 farms, mostly in Tennessee and North Carolina; pop corn, produced on almost 400 farms, mostly in Kentucky, West Virginia, and Tennessee; and peanuts, produced on about 2,500 farms, mostly in North Carolina, Tennessee, and Georgia.

The average number of work stock (horses and mules over 2 years and 3 months old), cows, sows and gilts, ewes, and chickens per farm for all farms in each minor civil division is indicated in figures 79 to 83, inclusive. Figure 52 shows those minor civil divisions in which dairy farms and animal-specialty and stock-ranch farms were dominant, and figures 62 to 64, inclusive,

TABLE 16.—*Value of products per farm in relation to sales of intensive crops,*[1] *203 farms, Laurel County, Ky., 1927*

Value of sales of intensive crops per farm	Farms	Value of products per farm			Net sales per farm after deducting cash farm expenditures	Sales of intensive crops
		Used by the operator's family	Sold or traded	Total		
	Number	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*
None	71	287	310	597	39	0
Under $50	57	336	348	684	114	18
$50–$99	30	316	408	724	218	70
$100–$199	25	352	623	975	371	138
$200 and over	20	360	765	1,125	428	335

[1] Includes tobacco, potatoes, sweetpotatoes, yams, fruits, vegetables, and sorgo-sirup.

Compiled from farm-business-analysis survey (*30*).

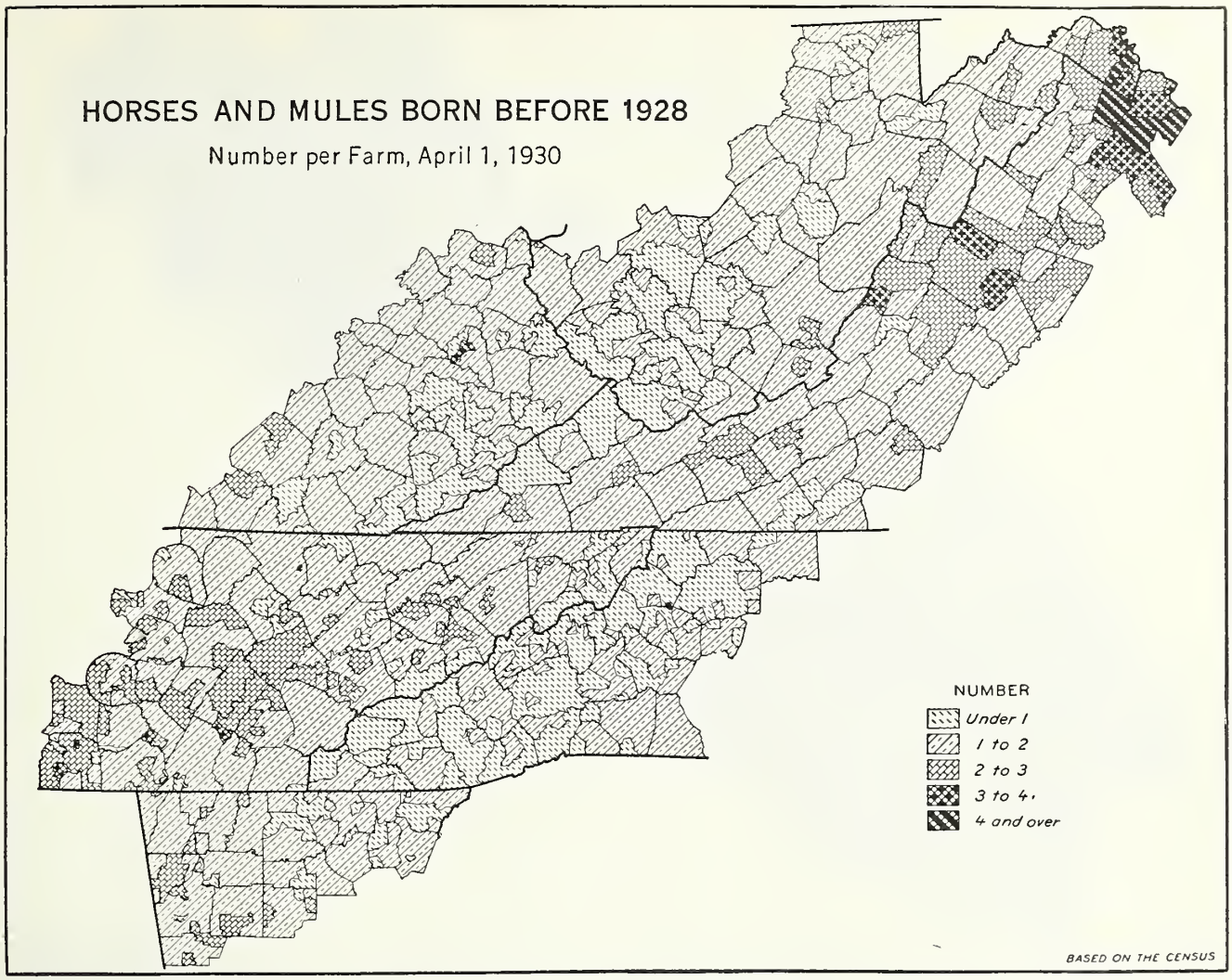

FIGURE 79.—On April 1, 1930, there were 540,548 horses and mules over 2 years and 3 months old on the farms in the region. However, on almost one-third of the farms most of which were self-sufficing, abnormal, or general farms, no horses or mules were reported. The average number of horses and mules was 1.2 per farm in the mountain divisions and western fringe and 1.6 in the valley division and eastern fringe. Although the greater part of the farm power is furnished by horses and mules, motor trucks were reported for 6 percent of the farms in 1930; tractors, for 3 percent; stationary gas engines, for 3 percent; and electric motors for farm use, for less than 1 percent of the farms. Automobiles, used more or less in connection with the farm business, were reported for 32 percent of the farms. In the entire region there was an average of about 72 horses and mules, 1.5 tractors and 3.4 motor trucks for each 1,000 acres of crop land harvested in 1929, in comparison with 49 horses and mules, 2.6 tractors and 2.5 motor trucks per 1,000 acres of crop land harvested in the United States. Most of the 345 minor civil divisions averaging less than 1 horse and mule per farm were in the Northeastern Cumberland Plateau and the southern part of the Blue Ridge, which probably means that on many of the farms in these parts there was neither a horse nor a mule. Only 32 of these civil divisions were in the valley division and eastern fringe. In about seven-eighths of the minor civil divisions there were less than 2 horses and mules per farm. About two-thirds of these civil divisions were in the mountain divisions and western fringe. Most of the civil divisions with 2 to 3 horses and mules per farm were in the valley division and eastern fringe and in the Highland Rim. In only nine of the minor civil divisions, all in the extreme northern part of the region, were there 4 or more horses and mules per farm.

indicate the number of dairy, animal-specialty and stock-ranch, and poultry farms in each minor civil division. The average number of the several kinds of livestock are given by subregions in table 10 and by types of farm in table 13.

On more than 65,000 farms no cows were milked in 1929, indicating that many of the families may not have had an adequate supply of milk for family use. There were also many farms on which only 1 or 2 cows were kept. On farms with only 1 or 2 cows not only are the family needs for dairy products usually met but there is frequently a small cash income from the sale of surplus dairy products. For example, in the farm-business study of 203 farms in Laurel County, Ky., in 1927 (*30*) dairy products were sold on almost one-half of the 69 farms with 1 cow each, the sales usually being less than $25 and often less than $10, and dairy products were sold on almost two-thirds of the 61 farms with 2 cows each, the sales usually exceeding $25 in value. A similar study of 228 farms in Knott County, Ky. in 1929,[20] where the value of products per farm was lower than in Laurel County, showed that dairy products were sold from only 11 of the 154 farms with 1 cow each, and from only 5 of the 54 farms with 2 cows each.

Other cattle—that is, cattle other than cows and heifers kept mainly for milk production—were probably on three-fourths of the farms, April 1, 1930. In the Central Appalachian Ridges and the Northern Piedmont Plateau there was an average of more than 6 other cattle per farm, and in the Appalachian Valleys

[20] See footnote 8, p. 13.

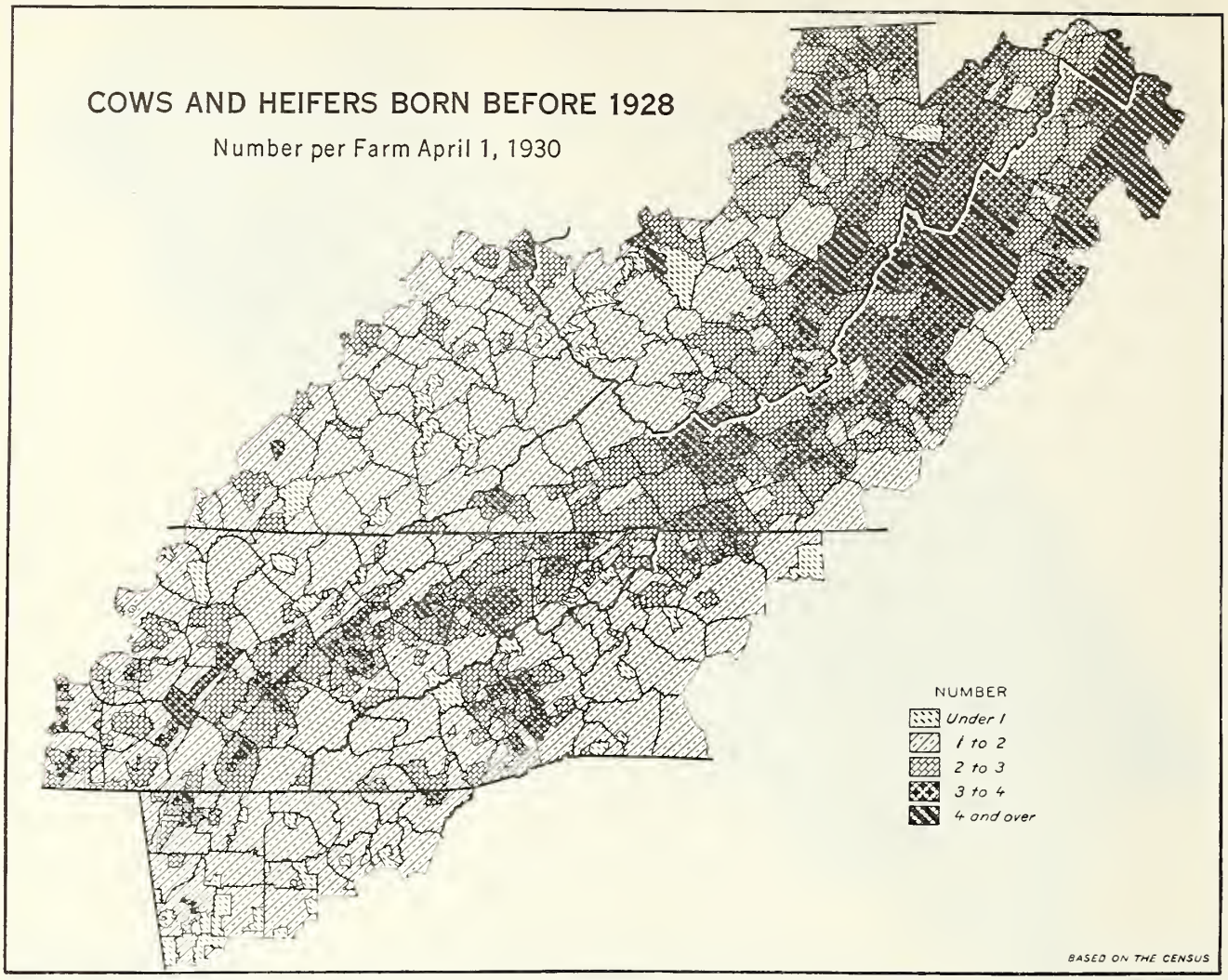

FIGURE 80.—Cows and heifers born before 1928 represented 41 percent of all cattle on farms in the region April 1, 1930. The average number was 2 per farm. Over 90 per cent of the 766,573 cows and heifers were kept mainly for milk production, and less than 10 percent mainly for beef production. Cows and heifers were reported milked on about 83 percent of the farms in 1929, and the annual production per cow was 426 gallons. On April 1, 1930, cows were being milked daily on 70 percent of the farms. On the same date more than 20 percent of the farms had no cows kept mainly for milk production. Most of the farms without cows kept mainly for milk production were of the self-sufficing, or abnormal types, but no cows or heifers of this class were reported for more than 20 percent of the cotton, fruit, cash-grain, or truck farms. There were 90 minor civil divisions in which there was less than 1 cow per farm. More than one-half of these civil divisions were in the mountain divisions and western fringe where self-sufficing and abnormal farms were dominant, and most of the others were in the Southern Appalachian Valleys and in the Central and Southern Piedmont Plateau, where cotton and crop-specialty farms were dominant. In 63 minor civil divisions there were 4 or more cows and heifers per farm. About one-half of these were in Virginia and one-third in West Virginia. Minor civil divisions in the mountain divisions and western fringe embraced 67 percent of those civil divisions with less than 2 cows per farm, 49 percent of those with 2 to 4 cows per farm, and only 21 percent of those with 4 or more cows per farm.

of Virginia and the Upper Ohio Hills the average number ranged from 4 to 6. These are among the subregions with the largest acreages of pasture land per farm. There were less than 2 other cattle per farm in the Northeastern Cumberland Plateau, the Southern Appalachian Valleys, the Central and Southern Piedmont Plateau, and the Highland Rim, which were among the subregions with smallest acreages of pasture land per farm.

The greater part of the swine production in the Southern Appalachians (fig. 81) was for meat for family use, particularly in most parts of the mountain divisions. Production on a limited commercial basis was practiced on some of the farms, mainly in the valley division and eastern fringe, particularly in the Central Appalachian Valleys and the Northern Piedmont Plateau, where there was an average of 7 swine per farm on April 1, 1930. The size of the swine enterprise on many farms in the mountain divisions may be illustrated from a farm business study in 1929 of 228 farms in Knott County, Ky.[21] On 54 percent of these farms pork was produced for family use only; on an additional 10 percent of the farms, a little pork was sold from the hogs butchered for family use; and on 22 percent of the farms pork was produced for family use and some pigs or hogs, usually less than $50 in value, were sold. No swine were kept on the remaining 14 percent of the farms.

The production of sheep, lambs, and wool entered into the farm organization of only 12 percent of the farms in the Southern Appalachians. The Central Appalachian Ridges formed the only subregion in which sheep and/or lambs were reported for more than one-half of the farms, April 1, 1930. The average number of head, per farm with sheep, was 50. In the Allegheny Plateau, the Central Appalachian Valleys

[21] See footnote 8, p. 13.

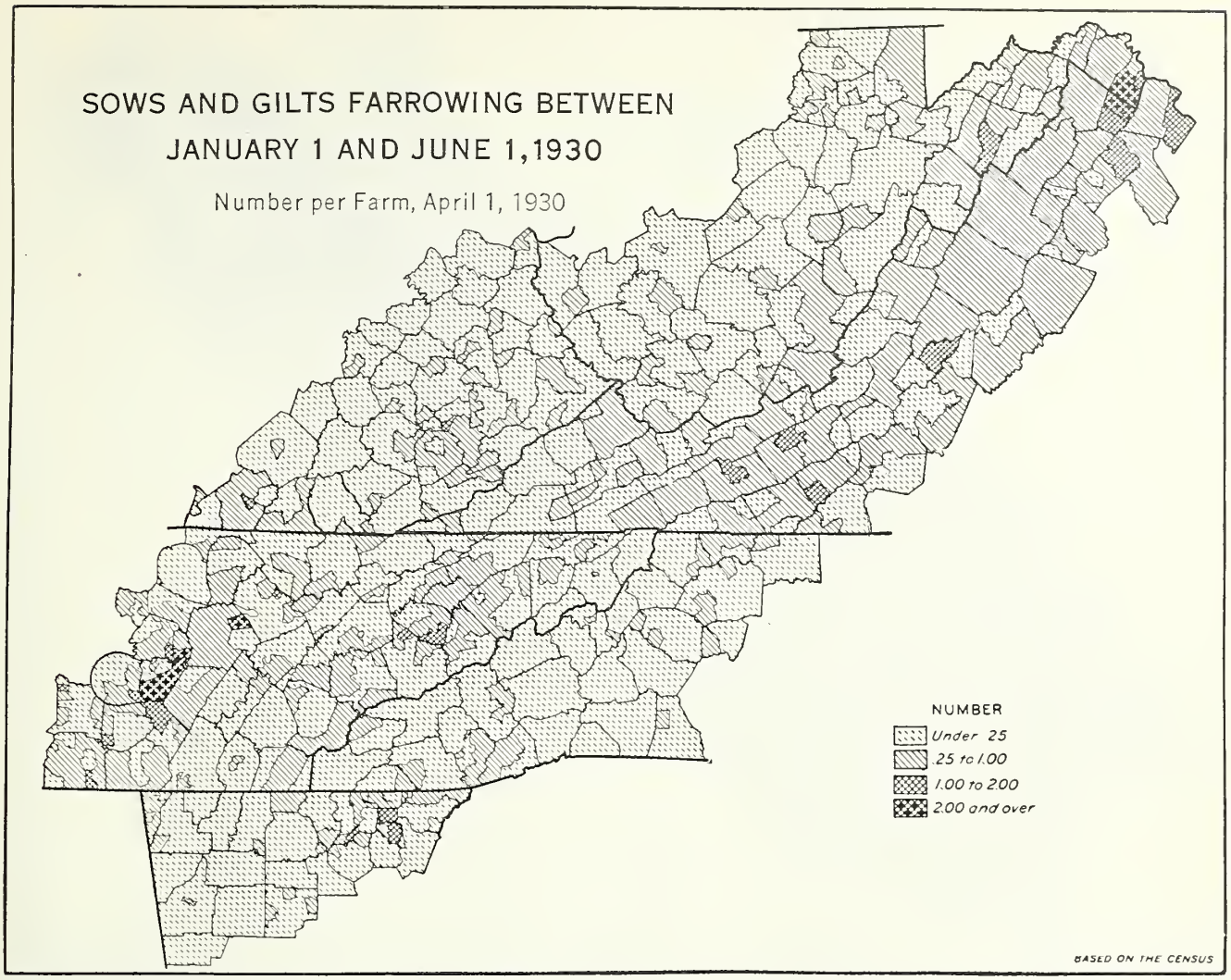

FIGURE 81.—Of the 1,063,988 swine on farms in the Southern Appalachians April 1, 1930, about 8 percent were sows and gilts bred to farrow between January 1 and June 1, 1930. Sows and gilts were reported on about 1 farm in 8, the number per farm averaging 1.6 head for farms with this class of livestock. In 1,161 minor civil divisions there were 269,866 farms but only 30,548 sows and gilts. This represents approximately 1 sow and gilt for every 9 farms in contrast to 2 sows and gilts for every 9 farms in the region as a whole. Approximately 63 percent of the 1,161 minor civil divisions were in the mountain divisions and western fringe. The remainder were largely in the Southern Appalachian Valleys, the Appalachian Valleys of East Tennessee, and the Southern and Central Piedmont Plateau. In 54 of these civil divisions, of which 60 percent were in the mountain divisions and western fringe, there were no sows or gilts. There were only 36 minor civil divisions in the entire region where the number of sows and gilts exceeded the number of farms. These civil divisions were equally divided between the mountain divisions and western fringe (principally in the Northwestern Cumberland Plateau) and the valley division and eastern fringe (principally in the Central Appalachian Valleys). The 9 minor civil divisions averaging 2 or more sows and gilts per farm were in Jefferson County, W.Va., Clarke County, Va., and in Van Buren, Cumberland, and White Counties, Tenn.

and the Upper Ohio Hills, sheep and lambs were reported for about one-fourth of the farms, the number averaging 40 head per farm. More than one-half of all the sheep in the Southern Appalachians were on about one-third of the farms in the four subregions mentioned. In the Blue Ridge, the Northwestern Cumberland Plateau, the Appalachian Valleys of Southwest Virginia, and the Northern Piedmont Plateau, sheep and lambs were reported for about one-eighth of the farms, the number averaging 35 head per farm. Sheep and lambs were reported on less than 10 percent of the farms in the other subregions, and in the two subregions where cotton farms were dominant less than 1 percent of the farms had any sheep or lambs.

The poultry enterprise, although quite small on many of the farms, was often a source of income—either in cash or in trade at the store. Of the 203 farms in the study of Laurel County, Ky., in 1927 (*30*), less than $25 worth of poultry and eggs were sold from about one-fourth of the farms; from $25 to $50 worth from one-fourth of the farms; from $50 to $100 worth from one-fourth of the farms; and $100 or more from one-seventh of the farms. There were 13 farms in the study from which no poultry or eggs were sold.

SUMMARY OF FARM ORGANIZATION AND MANAGEMENT SURVEY

The small, strictly mountain farms usually return little more than a bare living for the farm families, which often number six or more persons per household. Only small acreages are in cultivation on the slopes, often so steep or rough that hand cultivation is practiced (p. 14). Of the field crops, corn occupies the greater part, and frequently all, of the acreage. Usually small gardens and a few fruit trees are found on these farms, and truck "patches" (in which beans, potatoes, etc., are grown to supplement the garden products) are

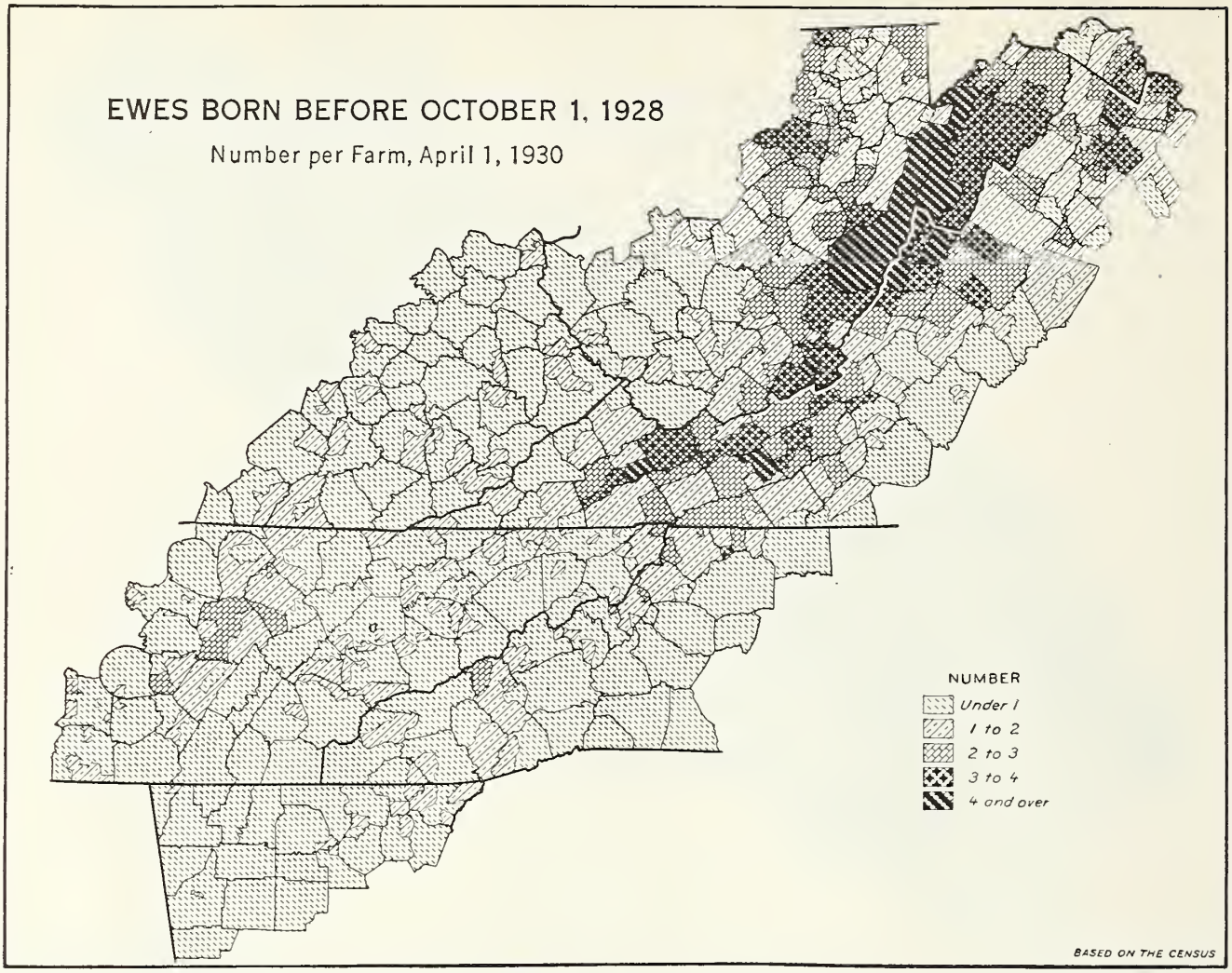

FIGURE 82.—Sheep were reported on only 46,676 farms in the Southern Appalachians on April 1, 1930. The total number of sheep and lambs was 1,703,258, or about 40 head per farm reported with sheep. A little less than one-half of all sheep and lambs were ewes 1.5 or more years old; most of the others were lambs under 6 months old. The weight of the wool (unwashed) shorn in 1929 was 4.8 pounds per sheep. Sheep were confined mostly to specific parts of the region—more so than any other class of livestock. More than one-half of all the sheep and lambs were in 28 counties, each with over 20,000 head, and about five-sixths of the total number were in 53 counties, each with over 10,000 head. With the exception of 4 counties in North Carolina, all of the counties with over 20,000 sheep and lambs were in West Virginia and Virginia, and largely in the Allegheny Plateau and the Central Appalachian Ridges. On the other hand, there were 55 counties, each with less than 1,000 sheep and lambs. In 9 of these counties (all in North Carolina and Georgia) there were less than 100 sheep and lambs in each county. The 55 counties had only 1.5 percent of all the sheep and lambs in the region. In 1,107 of the 1,655 minor civil divisions there was less than 1 ewe per farm; in 368 civil divisions, an average of 1 to 5 ewes; in 106 civil divisions, an average of 5 to 10 ewes; in 57 civil divisions, an average of 10 to 20 ewes; and in only 17 civil divisions, an average of 20 or more ewes per farm. About 60 percent of the civil divisions with 10 or more ewes per farm were in the Allegheny Plateau and the Central Appalachian Ridges.

not uncommon. A horse or mule, a cow, from 1 to 3 pigs, and a few chickens often not exceeding 25 in number, is the livestock combination common to many of the farms, although frequently there are farms without a horse, a cow, or pigs. The pasture furnished by these farms is often scant, and purchases of small quantities of feed are not uncommon.

Some small farms in the mountains have a few acres of bottom land along the larger mountain streams, or land on somewhat level plateaus, which permit of comparatively easy cultivation. Farms of this class often have larger acreages and frequently more diversity of field crops, and, as a rule, carry a little more livestock than do the small, strictly mountain farms. The better situated mountain farms, however, except for the comparatively few on which rather intensive farming is practiced, do not afford a farm business sufficiently large to maintain a fairly good standard of living for the families thereon.

To maintain a fairly good standard of living on the small mountain farm, even with a few acres of land comparatively easy to cultivate, is next to impossible without an appreciable amount of income from other sources. Earnings from work off the farm by the farm operator and other members of the family in many instances increase the family income in limited amounts. Usually these earnings are less than $100 a year, but in not a few instances they amount to $500 or more. Probably more than half of the mountain farms are under 50 acres in size, and the farm families on possibly less than half of these farms receive income from work off the farm.

The medium-sized mountain farms, somewhat fewer in number than the small mountain farms, usually had a few more acres of crops than did the small farms. Often some hay was harvested from part of the crop land, and sometimes a small grain occupied part of the crop acreage. Two horses or mules, 2 or 3 cows, and

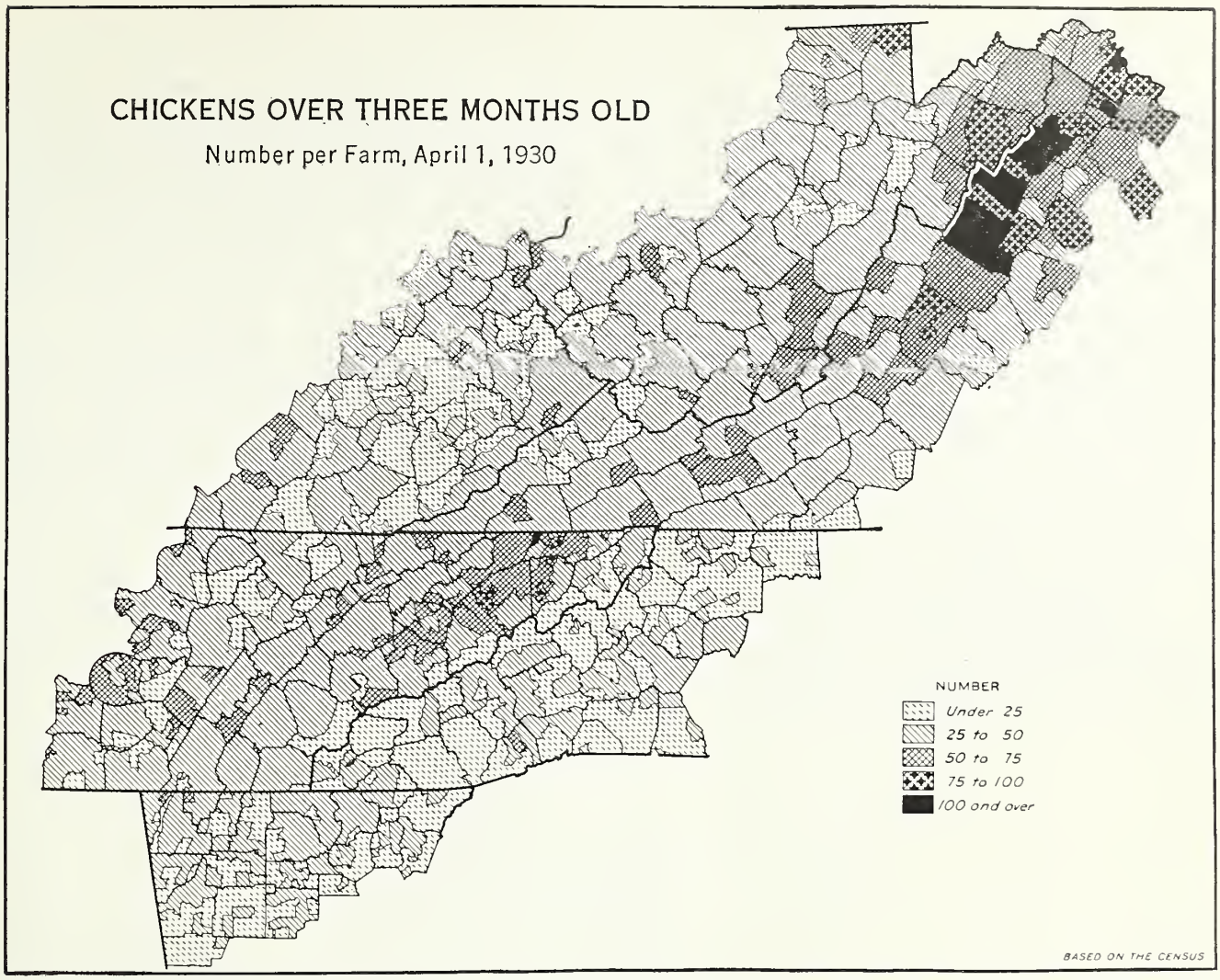

FIGURE 83.—The flocks of chickens on many of the farms in the Southern Appalachians, Apr. 1, 1930, were relatively small, averaging 36 chickens over 3 months old per farm in comparison with 60 per farm in the United States. On most of the farms chickens were carried as a minor enterprise, often only to supply the farmer's family with eggs and fowl, but frequently also that there might be a surplus to sell or to trade at the store. Of the 348,280 farms for which chickens were reported, eggs were reported sold on 271,959 and chickens were reported sold on 228,306. In 1929 the total egg production was 95,443,874 dozens, of which 65,118,451 dozens were sold at an average price of 30 cents per dozen. On 340,458 farms, 25,894,966 chickens were raised in 1929 and the number sold was 11,581,487, at an average price of 86 cents each. Baby chicks numbering 3,465,713 were bought for 18,474 farms in 1929. In 473 minor civil divisions there were less than 25 chickens per farm. Seventy-one percent of these civil divisions were in the mountain divisions and western fringe, largely in the Northeastern Cumberland Plateau and the Blue Ridge; the remainder were largely in the Southern Appalachian Valleys and the Southern Piedmont Plateau. In more than one-half of all the minor civil divisions an average of between 25 and 50 chickens over 3 months old were on farms at the time of the census. Sixty-three percent of these civil divisions were in the mountain divisions and western fringe, largely in the Blue Ridge, Northeastern Cumberland Plateau, and Highland Rim; the remainder were largely in the Appalachian Valleys of East Tennessee, Appalachian Valleys of Southwestern Virginia, and Central Appalachian Ridges. There were only 233 minor civil divisions in the region averaging 50 or more chickens over 3 months old per farm, and the average in most of these civil divisions was from 50 to 75. About 75 percent of these 233 civil divisions were in the valley division and eastern fringe, largely in the Central Appalachian Valleys and those of East Tennessee. Of the 14 civil divisions with 100 or more chickens per farm, 13 were in the Central Appalachian Valleys and 1 in the Appalachian Valleys of East Tennessee. Poultry, other than chickens, raised on farms in the region in 1929 were: 764,802 turkeys on 47,884 farms; 178,300 ducks on 22,248 farms; and 74,922 geese on 12,109 farms.

frequently a few young cattle, were reported in 1929 on the medium-sized mountain farms, and on an occasional farm a few pigs or hogs were sold. But many families living on the medium-sized farms in the mountains were only a little better off than those on the small farms, particularly on those farms where the only land that could be used for crops was steep or broken, and the land afforded but little pasture.

On the other hand, as with the small mountain farms, a small percentage of the medium-sized farms in the mountains were more favorably situated than most of the others. In some instances several acres of bottom land or nearly level plateau land were available for the production of crops. On farms with a considerable acreage of this land larger types of machinery can be used and one man can care for more acres of crops than on the less favorably situated farms. Then, too, on some farms the land was better adapted to pasture grasses than on others, and therefore would permit more grazing. On a few farms, one or more of such enterprises as the production of tobacco, vegetables, fruit, dairy, or poultry products, were important sources of income. The size and quality of the business on several of the medium-sized farms on which these crops were grown were such as would ordinarily return an income sufficient for a fairly good family living. But on the greater percentage of the medium-sized mountain farms, either the size of the business is too small, or the quality of the business is too poor, or both, to reasonably expect an income from the farm alone sufficiently large to provide a fairly good family living.

The large farms in the mountains, much fewer in number than either the small or the medium-sized mountain farms, usually had at least 2 horses or mules, 2 or more cows, and several other cattle. They sometimes had 1 or more brood sows, but usually less than 50 chickens. Sheep were found on comparatively few of the farms. Unless there were a few acres of land suitable for the production of such intensive crops as tobacco, truck, or fruit, or there were several acres of land comparatively easy to cultivate, or a considerable acreage well adapted to pasturage, the net cash income from the large mountain farms seldom exceeded a few hundred dollars. However, some of the large farms in the mountains were situated under more favorable conditions than others. When operated in accordance with improved farm practices, the large farms that were well situated often returned net cash incomes of several hundred dollars and not infrequently of a few thousand dollars.

In some parts of the region there were large mountain farms, situated under relatively favorable conditions, with land well adapted to the production of pasture grasses. Some of these farms were several hundred acres in size and had 50, 75, 100 or more beef cattle, or their animal-unit equivalent in sheep. In some instances sufficient tillable land was available for the production of grain to permit some animals to be finished on grain, but more often they were carried through the winter on roughage, including some grain, and were finished on grass the following summer or fall. Most of the farms of this description were in parts of the mountains in West Virginia, Virginia, North Carolina, and Tennessee. A few orchards—usually apple—of 100 or more acres have been developed in some of the mountainous parts, more especially in portions of the Blue Ridge in the Virginias and North Carolina. On some of the large, favorably-situated mountain farms, especially those in close proximity to a city, dairying has been developed. On some of these farms 25 or more cows were being kept in 1930. Usually on such farms considerable feed is bought.

Favorably situated large mountain farms of the type mentioned in the preceding paragraph, and those of other types comparable in size of business, are "few and far between", and the aggregate number in the Southern Appalachians cannot be very large. There were less than 7,000 farms of 260 acres and over in the Blue Ridge and the Allegheny and Cumberland Plateaus in 1930, and less than 2,000 of these were farms of 500 acres and over.

If the farms included in the few farm-business studies made in the Southern Applachians can be accepted as a fair sample, not more than 1 in 4 of the farms of 260 acres and over had a beef-cattle, orchard, or dairy enterprise comparable in size to that referred to in the second paragraph above.

MARKETS, TRANSPORTATION, MANUFACTURES, AND OCCUPATIONS

By H. B. Price, *head, Department of Markets and Rural Finance, University of Kentucky*

MARKETS AND MARKET AREAS [22]

The high degree of self-sufficiency of much of the agriculture within the Southern Appalachians provides the economic setting for an agricultural marketing system that is relatively decentralized and that serves, largely through small markets, consumers within the region. The chief exceptions to this generalization are tobacco and cotton which require processing, and such products as peaches, apples, and other products grown in the Appalachian Valleys of Tennessee and Virginia where conditions are favorable to the development of a commercialized agriculture. In these subregions production of many products is sufficiently large to support a comprehensive farm-marketing organization which functions in the shipment of commodities in large volume out of the region.

Although there is a considerable slaughter, especially of cattle, by butchers and small-scale packing establishments for local consumption, there is also a rather large trade with other regions. Feeder and stocker cattle, for example, in addition to being bought by feeders in the cattle-feeding areas are shipped to Cincinnati, Pittsburgh, and other markets in the eastern Corn Belt and good slaughter cattle are marketed in the important slaughtering and consuming centers of the North and East. Exceptionally good outlets for feeder and stocker cattle are provided by such small livestock auction markets as Lexington, Danville, and Mount Sterling in nearby central Kentucky where an important cattle-feeding industry has developed. Spring lambs are marketed almost exclusively at Pittsburgh, Baltimore, Jersey City, and other northern and eastern markets.

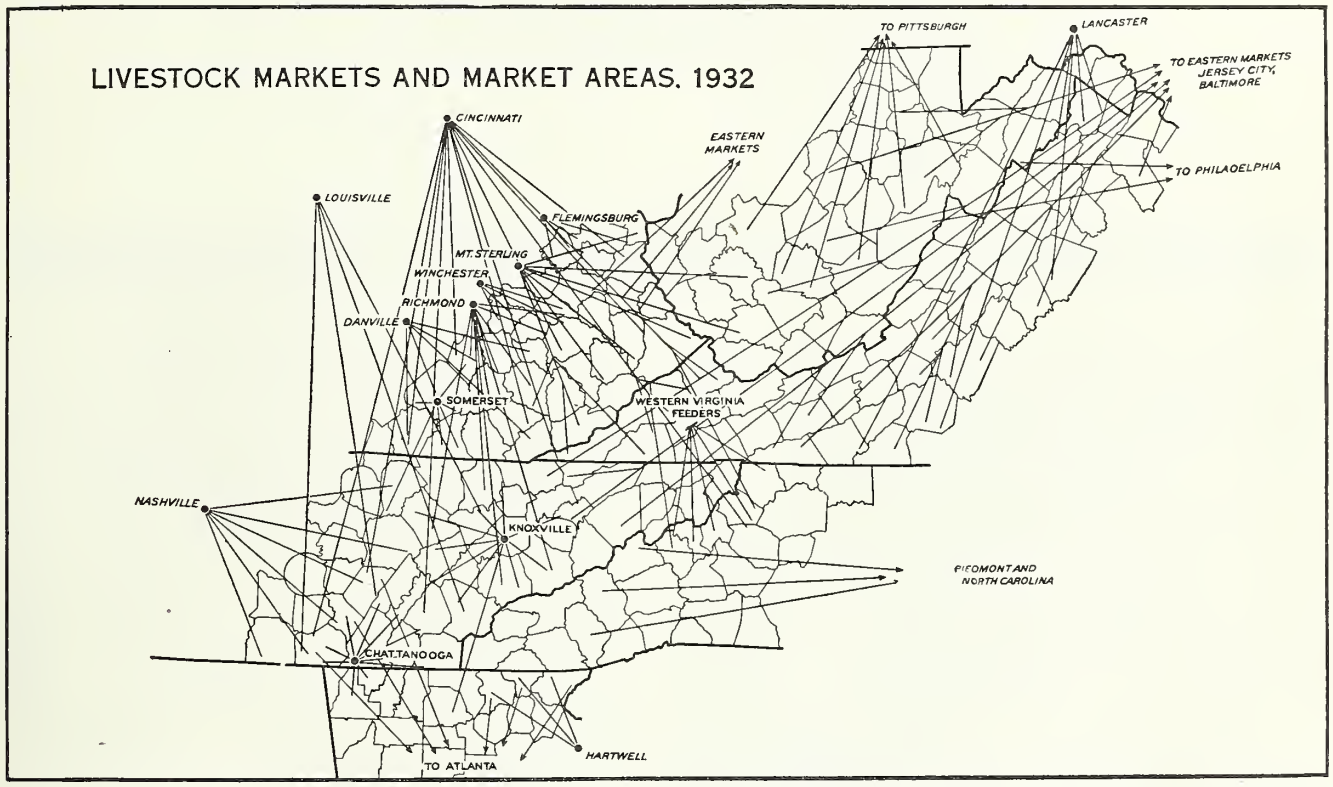

FIGURE 84.—The principal markets for livestock are located outside the region. The chief markets to the west are Nashville, Louisville, Cincinnati, and the auctions of central Kentucky; to the north, Pittsburgh; to the south, Atlanta; to the east, the industrial cities of the piedmont and eastern North Carolina. Local feeders in southwestern Virginia take some feeder and stocker cattle. Well-finished cattle are shipped chiefly to Baltimore, Philadelphia, and Jersey City. Spring lambs, chiefly from eastern Tennessee, are largely marketed at Jersey City and other eastern meat-consuming centers.

LIVESTOCK

Beef cattle, lambs, and hogs are the principal livestock grown for market in the region. Feeders and stockers are the principal classes of cattle grown in the mountainous sections while grass and grain-fed cattle are produced in the valleys of West Virginia and Virginia where abundant pasture and grain are available for a cattle-feeding business. Lambs are marketed principally from Virginia, West Virginia, and eastern Tennessee (fig. 84).

Production of hogs and dairy products in the region is distinctly below consumption. Feeder pigs are not infrequently shipped in from nearby areas more favored for hog production, and dairy products are imported in relatively large quantities. The population in coal, steel, textile, and other industrial centers, and the tourist population in such places as Asheville, provide favorable markets for as many hogs and as much dairy products as are produced locally.

POULTRY AND EGGS

The production of poultry and eggs in the Southern Appalachians is less than the consumption, except generally for a short period during the flush marketing seasons. In certain parts, especially in the Appala-

[22] In preparing this section, much information and many valuable suggestions were received from the following persons: C. J. Bradley, O. M. Farrington, D. G. Card, and C. D. Phillips of the University of Kentucky; S. W. Atkins, University of Tennessee; Joseph G. Knapp and H. R. Niswonger, North Carolina State College of Agriculture and Engineering; A. J. Dadisman, West Virginia University; Gordon W. Ward and Paul L. Fletcher, Virginia Agricultural and Mechanical College and Polytechnic Institute; and W. A. Minor, Jr., University of Georgia.

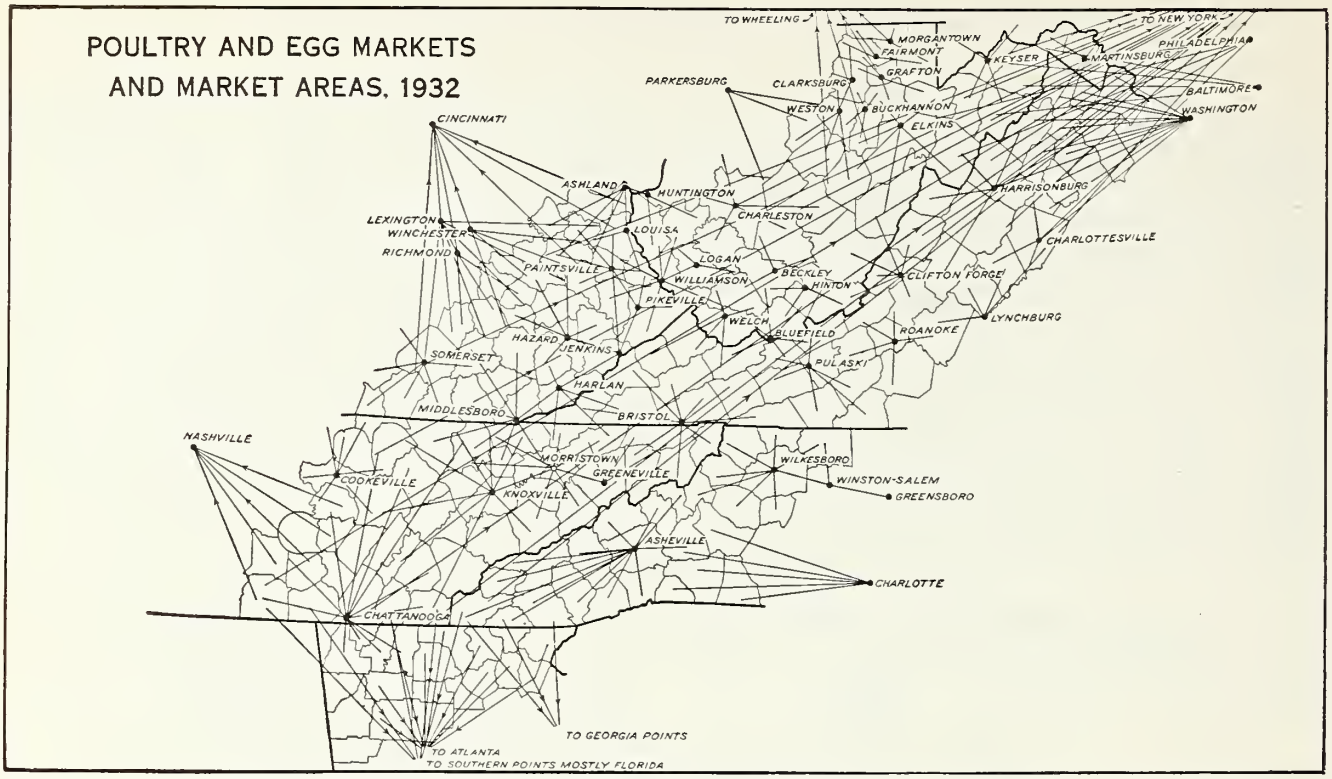

FIGURE 85.—The industrial, mining, and commercial centers within this region provide the principal market outlets for eggs and poultry. The importance of this source of demand is indicated by the large number of such consuming centers. Eggs and poultry are shipped out of the region chiefly during the flush marketing season. The region is favored in disposing of eggs and poultry by its proximity to the large consuming centers of the East and North, to which shipments out of the region are principally destined.

chian Valleys of East Tennessee and Virginia, where there are several poultry farms (fig. 64) and the size of farm flocks is relatively large (fig. 83), production is in excess of local consumption to a much greater extent. In the greater portion of the region the production is usually marketed locally at mining and other centers of population (fig. 85). New York City is the chief market outside the region although Washington, Baltimore, Philadelphia, Nashville, and Cincinnati are important, Knoxville, Chattanooga, Asheville, Charleston, Roanoke, and Lynchburg within the region, and Atlanta, Charlotte, Winston-Salem, Lexington (Ky.), and Wheeling, just outside the region, are also markets of considerable importance. Markets for both poultry and eggs tend to be the same, although they differ somewhat in importance, and in the channels of distribution. An important difference is that eggs apparently are shipped to more distant markets whereas poultry markets are somewhat more localized.

Considering the region as a whole, then, the marketing of eggs and poultry is largely an intercounty and intracounty movement rather than interregional in nature.

TOBACCO AND COTTON

Three important types of tobacco are grown—Burley, Virginia dark-fired, and flue-cured. Production is characteristically small-scale and mainly limited to three large areas—the Central Piedmont Plateau, the Appalachian Valleys of East Tennessee—including Washington County, Va., and Madison County, N.C., and those parts of the Highland Rim and Northwestern Cumberland Plateau in Kentucky (fig. 58). The first and last areas constitute outer fringes of two larger tobacco-producing areas to which tobacco is generally shipped for sale. Tobacco grown in the Appalachian Valleys is sold through local auction markets (fig. 86).

Cotton production is relatively unimportant except in the Southern Appalachian Valleys in Georgia and in Cleveland, Rutherford, and Polk Counties, N.C. (fig. 57). For this reason the marketing organization is not highly developed. Local markets serve as concentration points (fig. 86). Most of the cotton brought into the local markets is sold to independent and mill buyers and is then shipped to storing and milling points nearby, but mainly outside of the region. Textile mills, both in the region and at nearby points in North Carolina, South Carolina, and Georgia outside the region, provide favorable outlets for cotton.

FRUIT AND VEGETABLES

The principal commercial-producing centers for fruits and vegetables in the region are in the Appalachian Valleys in Virginia and Tennessee, the Central Appalachian Ridges, and along the Northern and Central Piedmont Plateau in Virginia (figs. 60 and 61). Apple production predominates in Virginia and West Virginia, and peaches, strawberries, potatoes, and truck crops are produced and marketed on a relatively large scale in Tennessee. From 300 to 700 carloads of peaches are also grown annually on the southern fringe of the region in Georgia.

Apples move to all the large consuming centers in the Central, Eastern, and Southeastern States (fig. 87).

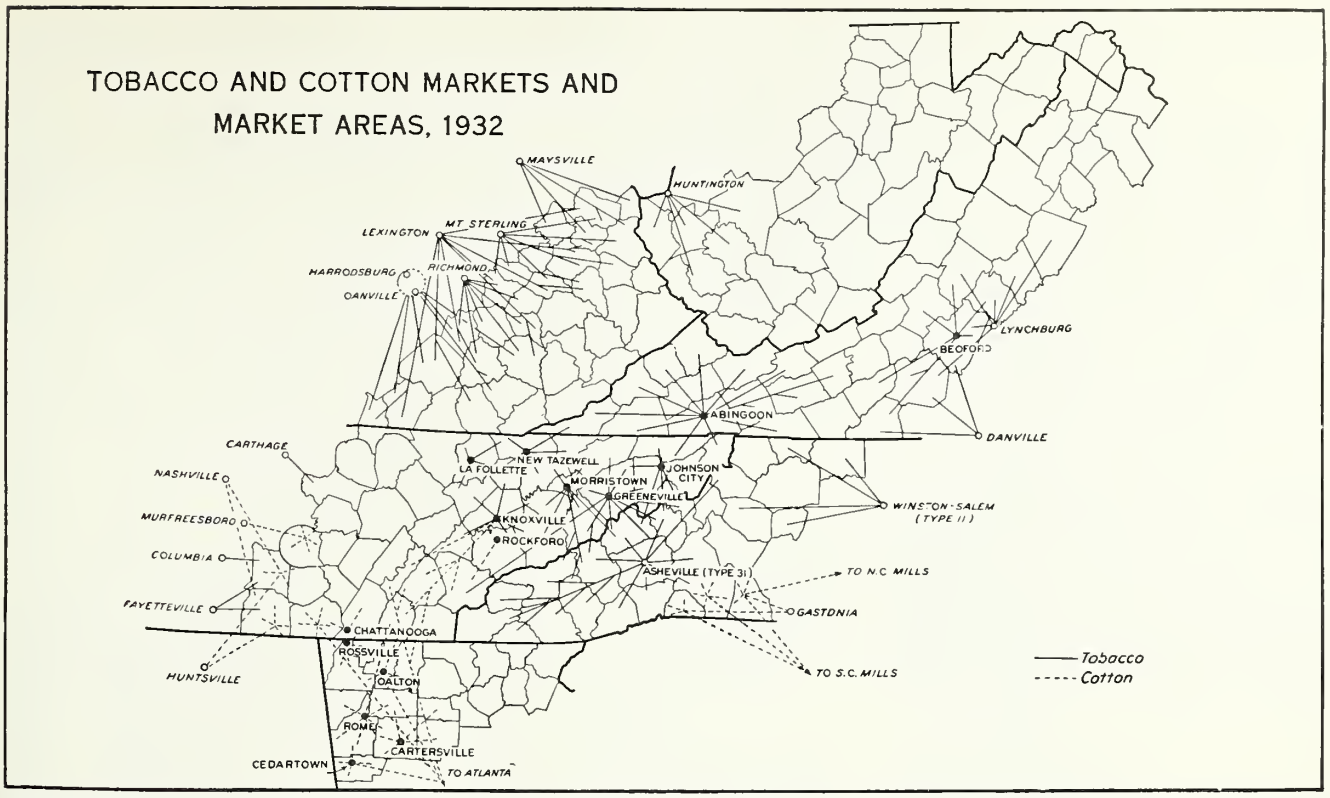

FIGURE 86.—Burley, Virginia dark-fired, and flue-cured are the chief types of tobacco grown in this region. Burley is marketed principally at the auction markets of central Kentucky and eastern Tennessee, and to a small extent at Abingdon, Va., and Asheville, N.C. Flue-cured tobacco is marketed almost entirely at outside markets, as Winston-Salem, N.C., and Danville, Va. Dark-fired tobacco is sold chiefly at Lynchburg and Bedford. Cotton markets within the region are characteristically small country markets and local textile-mill concentration points.

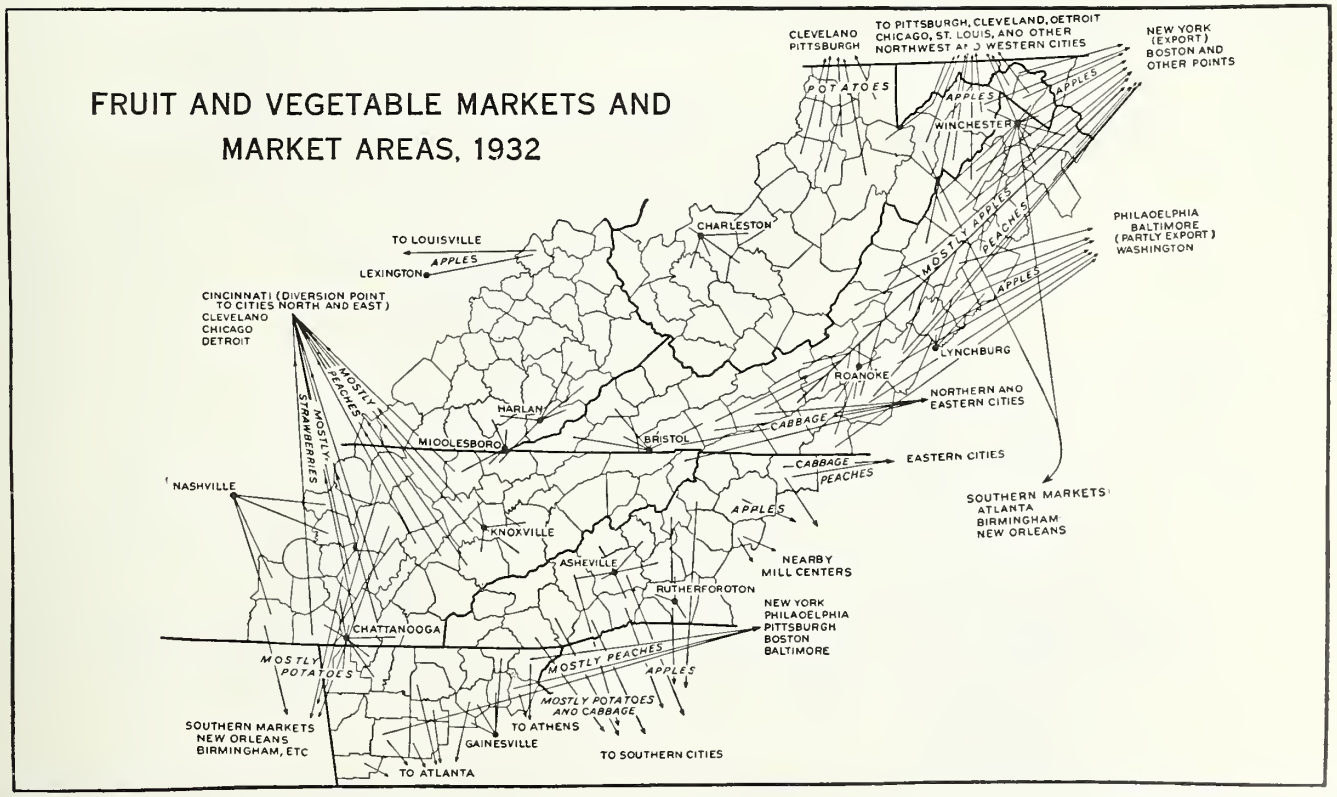

FIGURE 87.—Apples, peaches, and strawberries are the chief fruits grown commercially. Apples, grown chiefly in Virginia and to a less extent in West Virginia and North Carolina, find their way principally into eastern markets, partly for export, although local markets consume substantial quantities. Peaches and strawberries, grown chiefly in the southwestern part of the region, move in a northerly direction to Cincinnati, thence to northern and eastern markets. Potatoes, cabbage, and truck crops are grown chiefly for local consumption.

Several thousand carloads are exported annually to England and continental Europe, principally via New York and Baltimore. With the growth of improved highways, eastern and southeastern cities are becoming more important as market outlets. Practically all the apples grown in the two southernmost areas of extensive production in the region—centering near Wilkes and Buncombe Counties, N. C.—are now moved by motor truck to the cities of central and eastern North Carolina and the nearby cities of Georgia and South Carolina. The orderly marketing of this fruit is greatly facilitated by extensive storage facilities, especially at Winchester, Va., and by farm storage.

The peaches and strawberries grown in eastern Tennessee are marketed chiefly through Cincinnati, where they are diverted to Pittsburgh, Cleveland, Detroit, Chicago, and other northern cities. The mining and industrial centers of eastern Kentucky and western Virginia, where production of fruits and vegetables is less than consumption, are also important outlets. Knoxville and Chattanooga are important local wholesale markets for fruits and vegetables. A local canning industry in Cocke, Blount, and Sevier Counties, Tenn., provides a market for large quantities of vegetables. Potatoes, grown only on a small scale, are shipped largely to southern markets.

TRANSPORTATION

Any consideration of the transportation and commerce of the Southern Appalachians reveals the chief causes for the backward economic development and the isolation of much of the region. A rugged terrain presents great natural obstacles to the development of a satisfactory system of transportation. No great rivers penetrate or traverse the region, and those with outlet both to the Atlantic Ocean and to the Gulf of Mexico have less than the customary value of rivers for transport partly because of numerous rapids and shoals and partly because of uncertainty of navigation. Numerous high ridges that parallel the Atlantic are an impediment to ingress to the region and egress to the sea. Travel in the pioneer period was therefore chiefly by horse and wagon, and followed the valleys.

The Appalachian Valleys of Virginia, East Tennessee, and Georgia offer the least obstacles to penetration of the region and it is here that greatest progress has been made in developing transportation. First with roads, then by canal and improved river transportation, then by railroad, and finally by modern highway systems, they have acquired and maintained the principal arteries of transportation of the region. As long as dependence for transportation was on roads, most of the imports came across the mountains, costs were prohibitive, and the volume of commerce was small. The steamboat greatly facilitated trade, and, because of the location of the rivers, shifted the channels of trade of the western and southern portions southward to New Orleans. These routes, chief of which was the one by way of the Tennessee, Ohio, and Mississippi Rivers, were long, hazardous, and costly, and it was not until railroads were built that the chief barriers to communication and transportation were broken down.

This region shared in the early construction of railroads in the United States, but the topography was a hindrance to rapid development. By 1850, the Tuscumbia & Decatur Railroad had been completed around Muscle Shoals on the Tennessee River

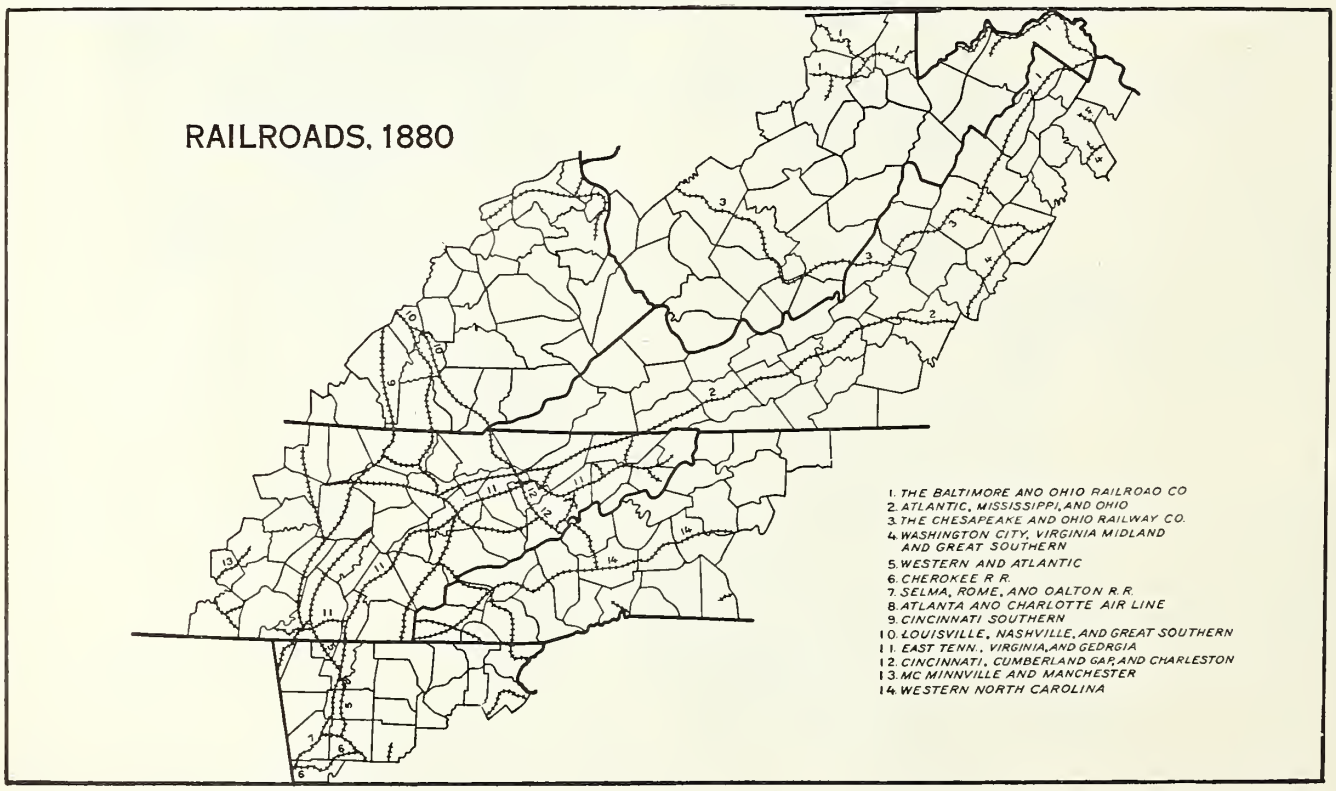

FIGURE 88.—Trunk lines were well developed by 1880 and provided transportation to the North, West, South, and East. These lines served principally the Appalachian Valleys, and left large groups of counties in the Northeastern Cumberland and Allegheny Plateaus, the Central Appalachian Ridges, and the Blue Ridge without any railroads. Intensive development of railroads within the region awaited a later period. (Based on data in the Rand McNally Atlas, 1880 (37).)

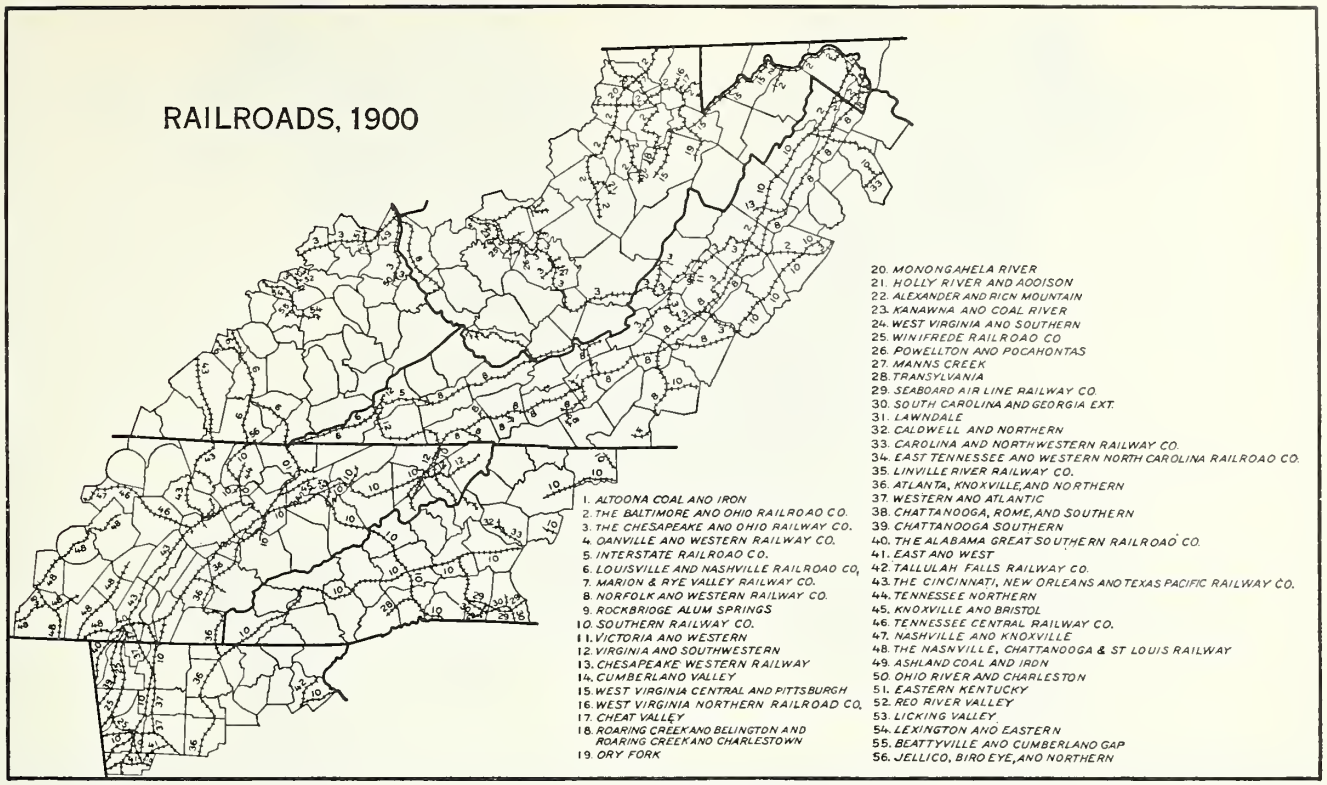

FIGURE 89.—Further consolidation of small lines into trunk systems and construction of short connecting lines were outstanding characteristics of railroad development in the region between 1880 and 1900. The greatest increase in railroad mileage took place in the Appalachian Valleys of Virginia and Tennessee and in the mining sections of West Virginia and Kentucky. In 1900 there were still large areas in Kentucky and West Virginia with no railroads. (Based on data in Rand McNally Atlas, 1900 (37).)

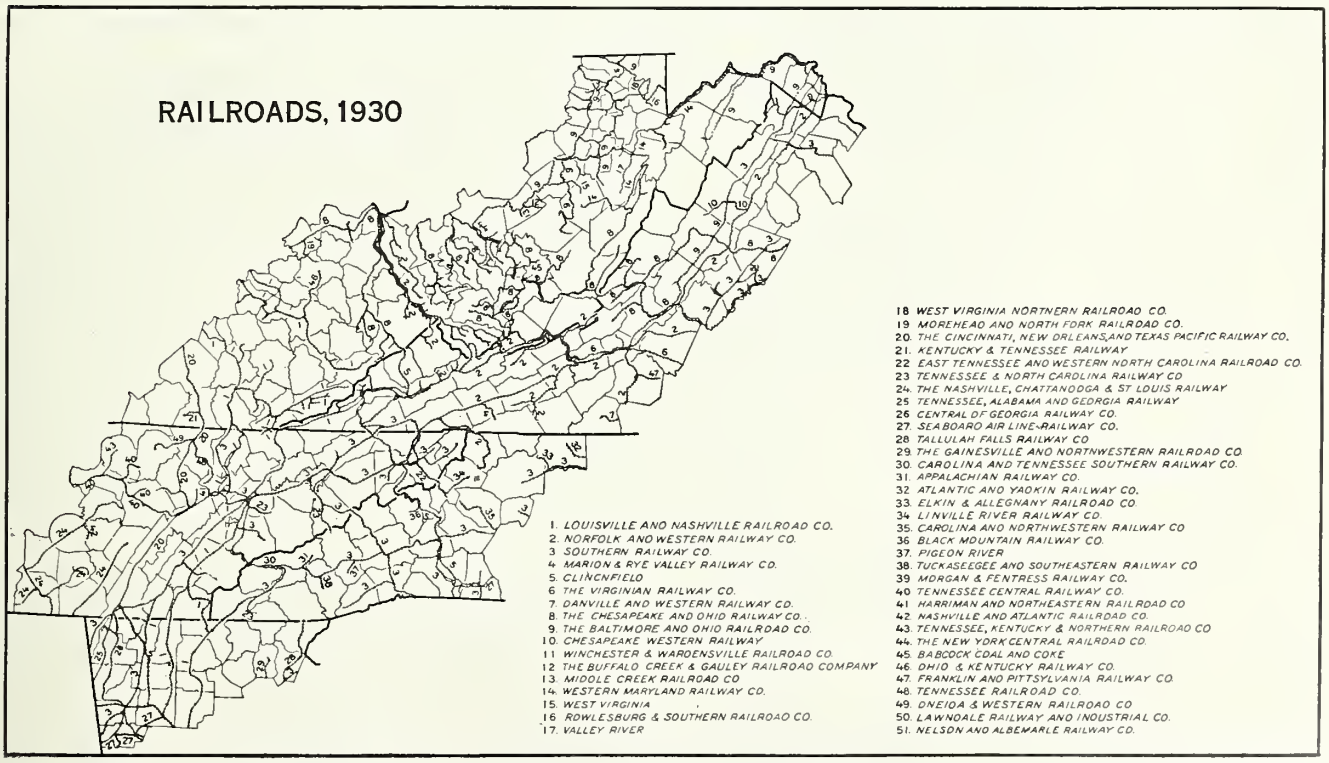

FIGURE 90.—A high degree of localization is an outstanding feature of present railroads in the region, with trunk lines in the valleys and many short connecting lines in the industrialized sections. Several mountainous counties still have no railroads and the service in many that have railroads is infrequent and poor, measured by modern standards of transport service. (Based on data in the Rand McNally Atlas, 1931 (37).)

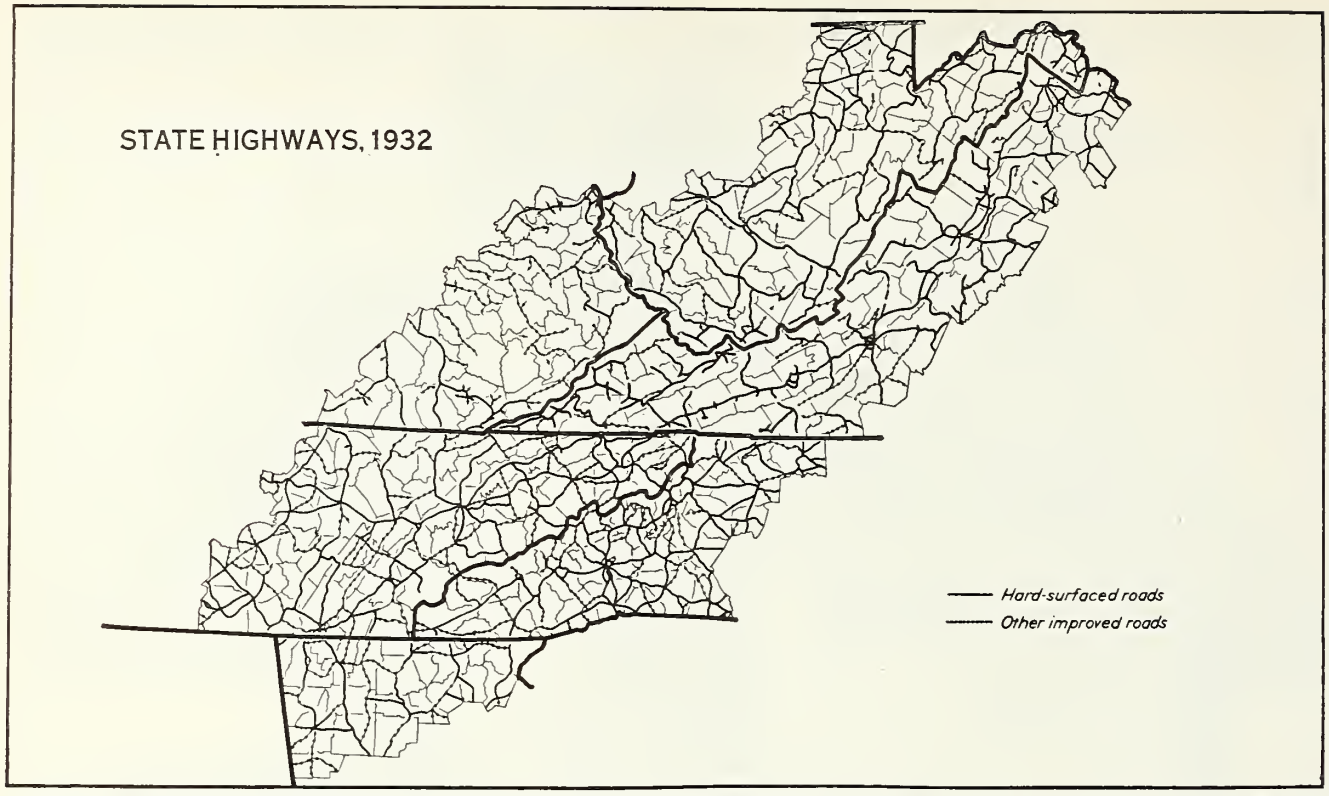

FIGURE 91.—A comprehensive network of improved State highways now covers the entire region and the extent of highway construction would be even more impressive if improved local roads were here shown. Progress in developing good roads is much more advanced in some parts of the region than in others. Generally speaking, the valleys and the wealthier sections are most favored. Present plans, especially of the State and Federal Governments, for future development augur well for the extension of improved roads in isolated areas. (Based on data obtained from highway departments of the several States.)

Chattanooga had gained rail connections with Charleston and Savannah; and two short lines had penetrated the Central Appalachian Valleys of Virginia. During the next decade the mileage was greatly extended and railroad systems, with Chattanooga as a base, opened markets not only to the East, through the Appalachian Valleys of East Tennessee and Virginia but also to the West and South, at such river towns as Memphis, Vicksburg, and New Orleans.[23]

The Civil War brought great wreckage and disorganization of transportation. The period immediately following the war was therefore devoted chiefly to reconstruction and reorganization of existing rail lines. The railroads of the region also participated in the integration of rail lines that was characteristic of this period of American railroad history and that was the beginning of the strong railroad systems of a later period. There was some extension of small lines into territory where roads were not to be leased or bought; and there were perfected near the close of this period, by construction, purchase, and lease, two systems—the Louisville & Nashville, and the Cincinnati Southern—which opened outlets to the North Central States.

Intensive development of railroads within the region occurred at a more recent period, and awaited the stimulant of a demand to exploit the local natural resources, chief of which were coal, iron, lumber, and petroleum. Consequently, with the development, particularly of the coal and iron resources toward the close of the last century, a large mileage of railroads was built (figs. 88–90) in the coal-mining sections of Kentucky and West Virginia. As the location of these resources is highly concentrated, there is a corresponding concentration of railroads, with the result that large areas are still not conveniently served by this mode of transportation.

Roads, which furnished the first improved means of transportation, were in the beginning scarcely better than trails hewn from the forests that covered the region. Slowly but steadily the natural difficulties of road construction in a rugged, wooded area were overcome. and transportation by horse and wagon developed.

Perhaps the most famous of the early roads was the Wilderness Road of Virginia, established by Daniel Boone in 1775. It extended down the Appalachian Valleys of Southwest Virginia and through the Cumberland Gap into Kentucky and became the principal thoroughfare across the Appalachians during the early settlement of Kentucky and the Middle West. Shortly thereafter a road 10 feet wide was built in Tennessee from the lower end of Clinch Mountain in Grainger County to Nashville. With these roads as a base, roads connecting with settlements in the West and South were constructed in rapid succession (*41, v. 5, p. 345*).

The building of a network of all-weather roads was much more recent. Construction of turnpikes, macadam, and plank roads was undertaken on a small scale in the period of extensive development of public works during the first part of the nineteenth century but was followed by over a half century of stagnation in road building. A renewed interest in public roads was evident at the close of the century, public attention then being directed to the construction and maintenance of highways chiefly by local governments, instead

[23] For further details, see Jones (*22, ch. 3*).

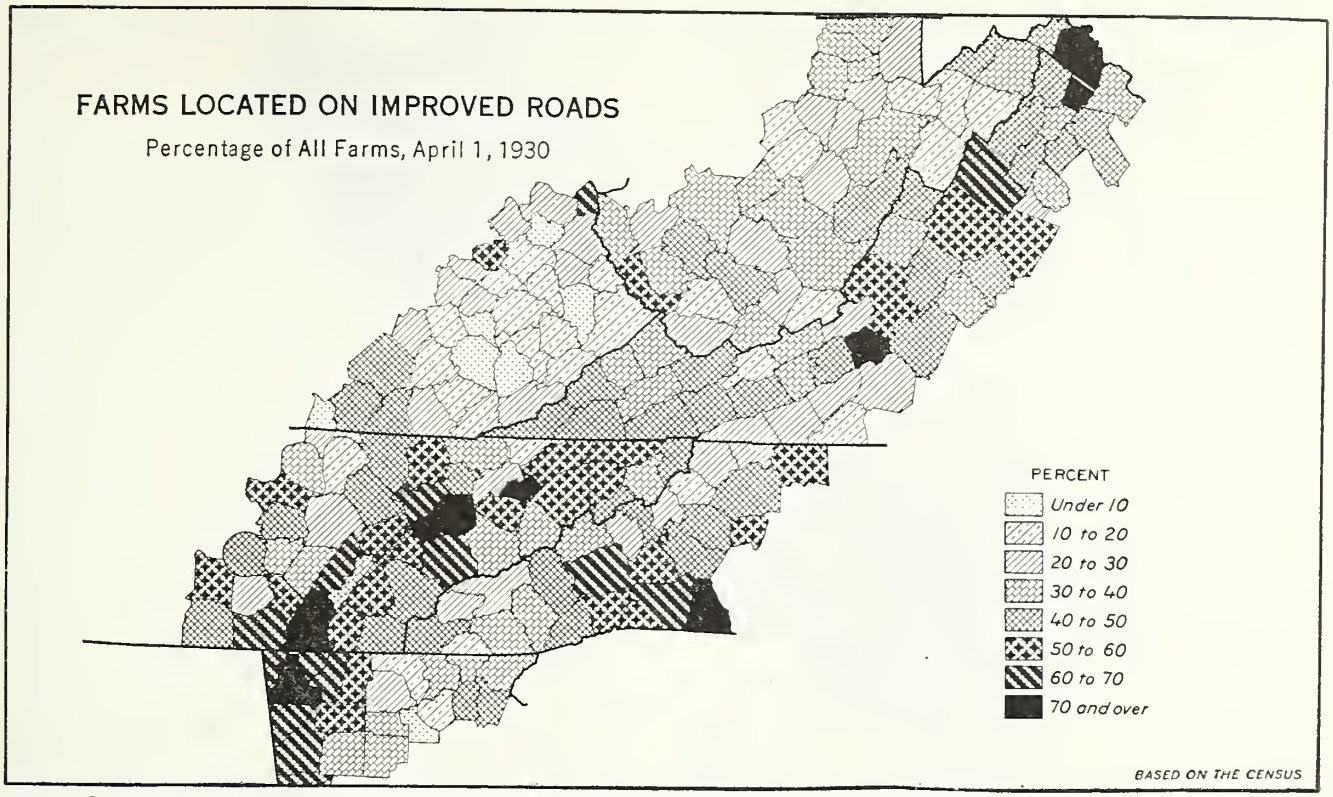

FIGURE 92.—In 1930, farmers in the Appalachian Valleys and in the counties of the Asheville Basin and the Piedmont Plateau in North Carolina were best supplied with improved roads. In the Northwestern and Northeastern Cumberland and Allegheny Plateaus and in the southern portion of the Blue Ridge, the large areas of rugged land interpose important physical obstacles to the development of improved highways. The quality, as well as the extent of improved highways, in most parts of these subregions compare unfavorably with those of the other subregions.

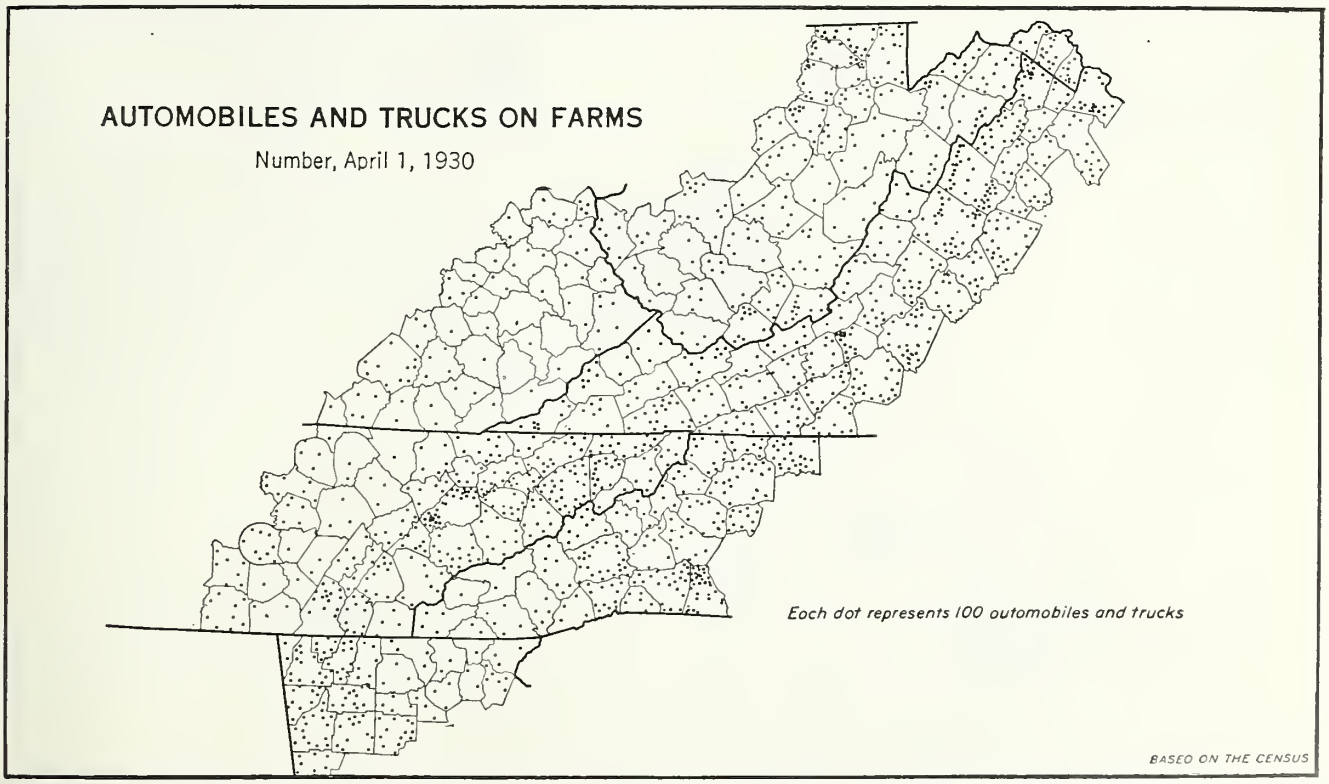

FIGURE 93.—With the improvement of highways, farmers have rapidly adopted modern methods of highway transportation, particularly in the sections most favored for agriculture. Automobiles and trucks owned by farmers totaled roughly 158,000 in 1930. An especially large part of this number were on farms in the Appalachian Valleys. In the Cumberland and Allegheny Plateaus, where there are few good roads (fig. 91) and farm incomes are small (fig. 65) in several counties there were less than 200 farmer-owned automobiles and trucks. In these counties travel is still largely by horseback and muleback.

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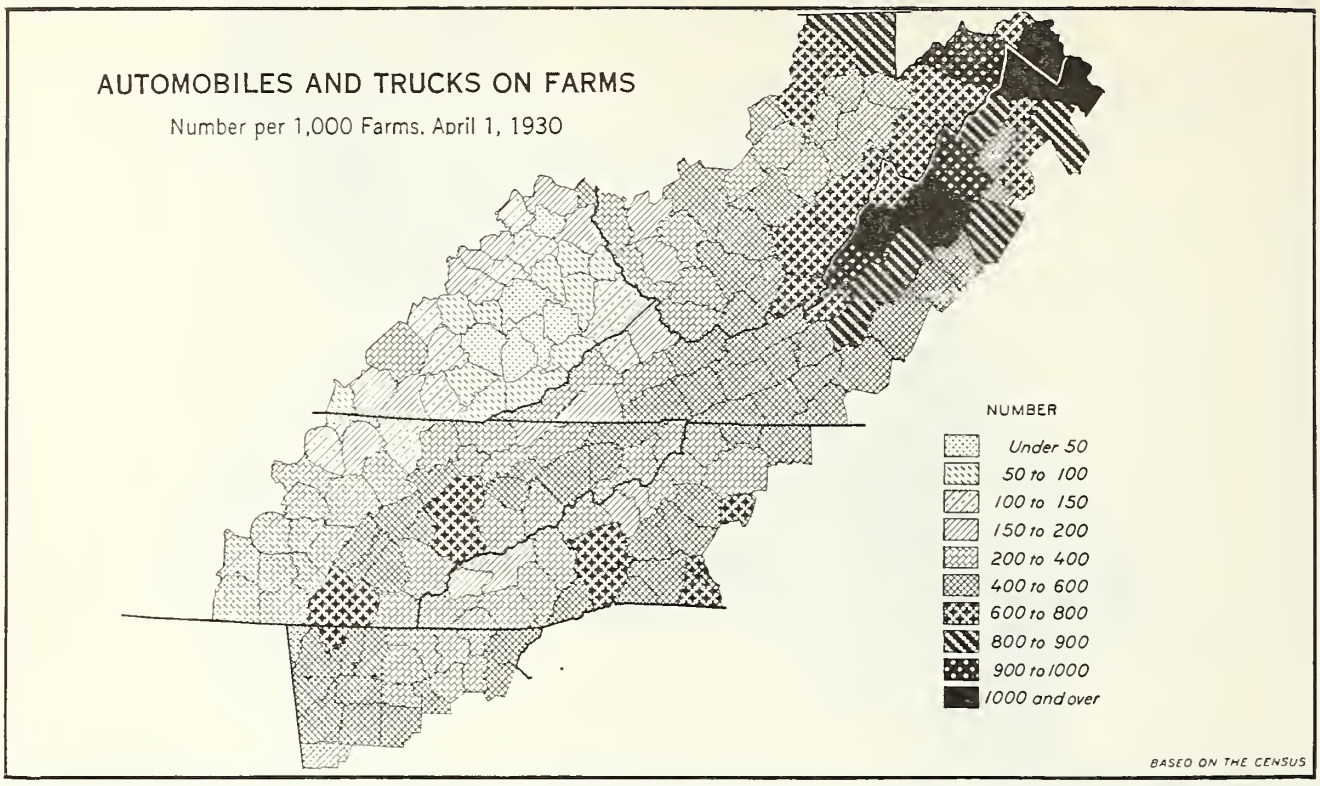

FIGURE 94.—On the one hand, there were 6 counties in the Northeastern Cumberland Plateau in 1930 where there was less than one farmer-owned automobile and truck to every 20 farms; on the other, there were 7 counties in the Central Appalachian Valleys where the number of farmer-owned automobiles and trucks was as great as or greater than the number of farms. The number of automobiles and trucks on farms in the other counties in the region varied greatly within these extremes, the more mountainous counties having relatively fewer in relation to number of farms than those in the valleys.

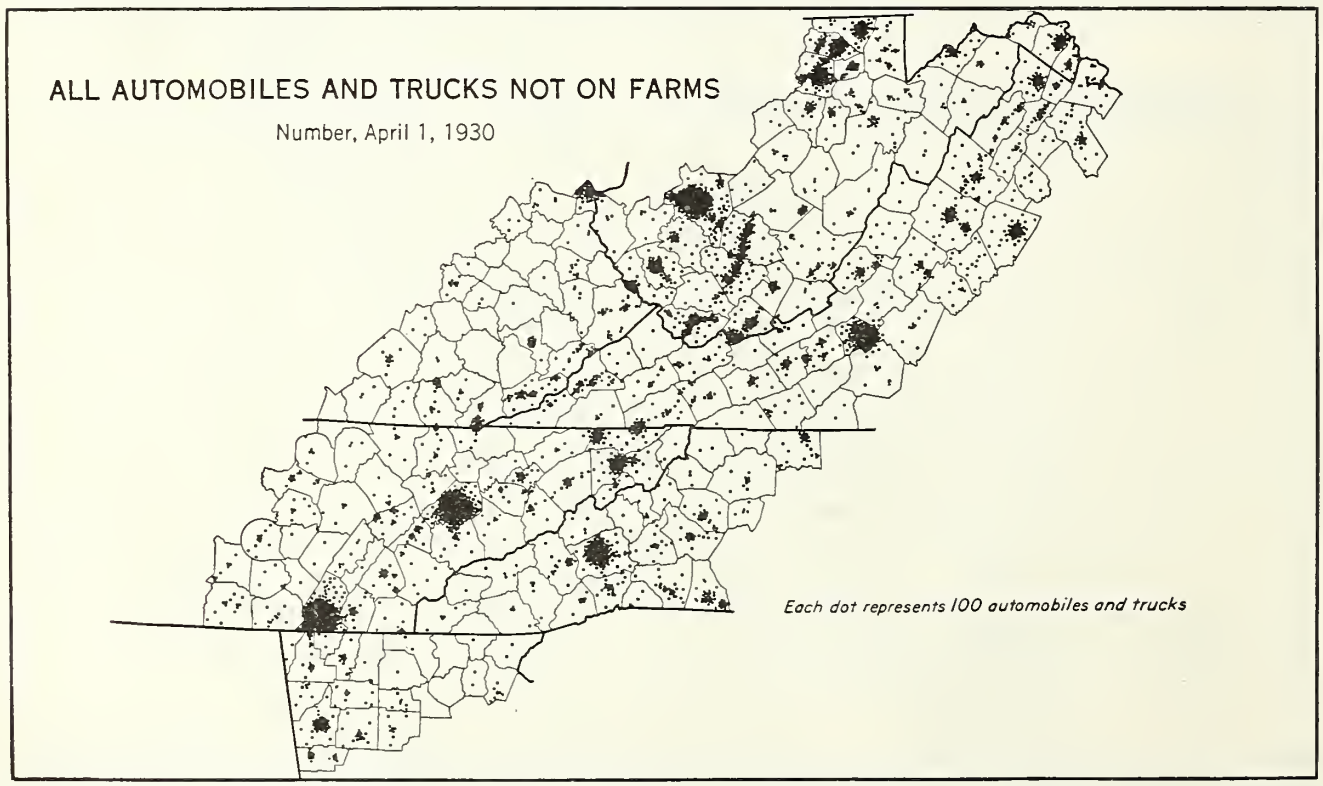

FIGURE 95.—In the region in 1930 there were approximately 388,000 automobiles and trucks not on farms. Many of these vehicles were owned by people living in population centers; hence a concentration of vehicles in the larger cities. In relation to population there were nearly twice as many automobiles and trucks off farms as on farms. (Based on registration of automobiles and commercial vehicles July 1, 1930, as reported in A Study of American Markets by Barton (*8*) and the census (*50*).)

of private operation which had prevailed in the earlier period. Progress in road improvement was slow, however, and extreme isolation was a characteristic of the rural population in the more mountainous parts until comprehensive systems of highways were developed by the various States, assisted by the Federal Government, in the present century.

A comprehensive plan of highway development, supported by Federal, State, and local governments, now encompasses the entire region. Greater progress in building improved highways has been made in some parts than in others (fig. 91). Some States began their road-building program earlier than others. Generally speaking, the wealthier sections and those favored by physical conditions, as the Appalachian Valleys of Virginia and Tennessee, have made the most progress in the construction of both State and county roads. (The latter are not shown in figure 91.)

The relatively large proportion of farms on improved roads in these parts of the region and the extent to which farmers are taking advantage of these roads are further shown in figures 92–94. In 9 of the 205 counties, more than 70 percent of all farms in 1930 were located on improved roads and in 13 other counties from 60 to 70 percent of all farms. A large percentage of the farms in the more mountainous sections, as in Kentucky and West Virginia, are still not located on improved highways and a large part of the farmers are unable to use automobiles and trucks to advantage. Plans for building State and local improved highways into these sections have been perfected and, considering the natural difficulties, the high cost of road construction, and the relative scarcity of wealth in many of the sections, good progress is being made to provide modern rural transportation. By reason of better roads and greater wealth in urban than in rural areas, the ownership of automobiles and trucks per capita in the urban areas is higher than in the country (fig. 95).

DISTRIBUTIVE SERVICE

RETAIL STORES

The retail stores in much of the Southern Appalachians have a small volume of business, a low degree of specialization, and poor service, as measured by the standards of commercial, industrial, and most other agricultural regions. Notable exceptions to this generalization are to be found in the commercial and industrial centers and the better agricultural valleys. Fifty-one percent of the counties average from 10 to 20 retail stores per 1,000 farm population (fig. 96). Most of these counties are predominantly rural and the farmers in them have a low average spendable income. The country general store is frequently the predominant type in the rural counties.

Country general stores are classified by the census (*50*) as those handling a general line of merchandise in which groceries and foods constitute an important part of the total. They are typical of retail-trade areas restricted, as is so common in this region, by rugged topography and an undeveloped rural highway system. Twenty-four percent of the principal kinds of retail stores are of this class. Ninety-three of the 205 counties each have more than 50 such stores.

Food stores, including those handling groceries, meats, confectionery, dairy, and other food products, constitute the second important class. These ar

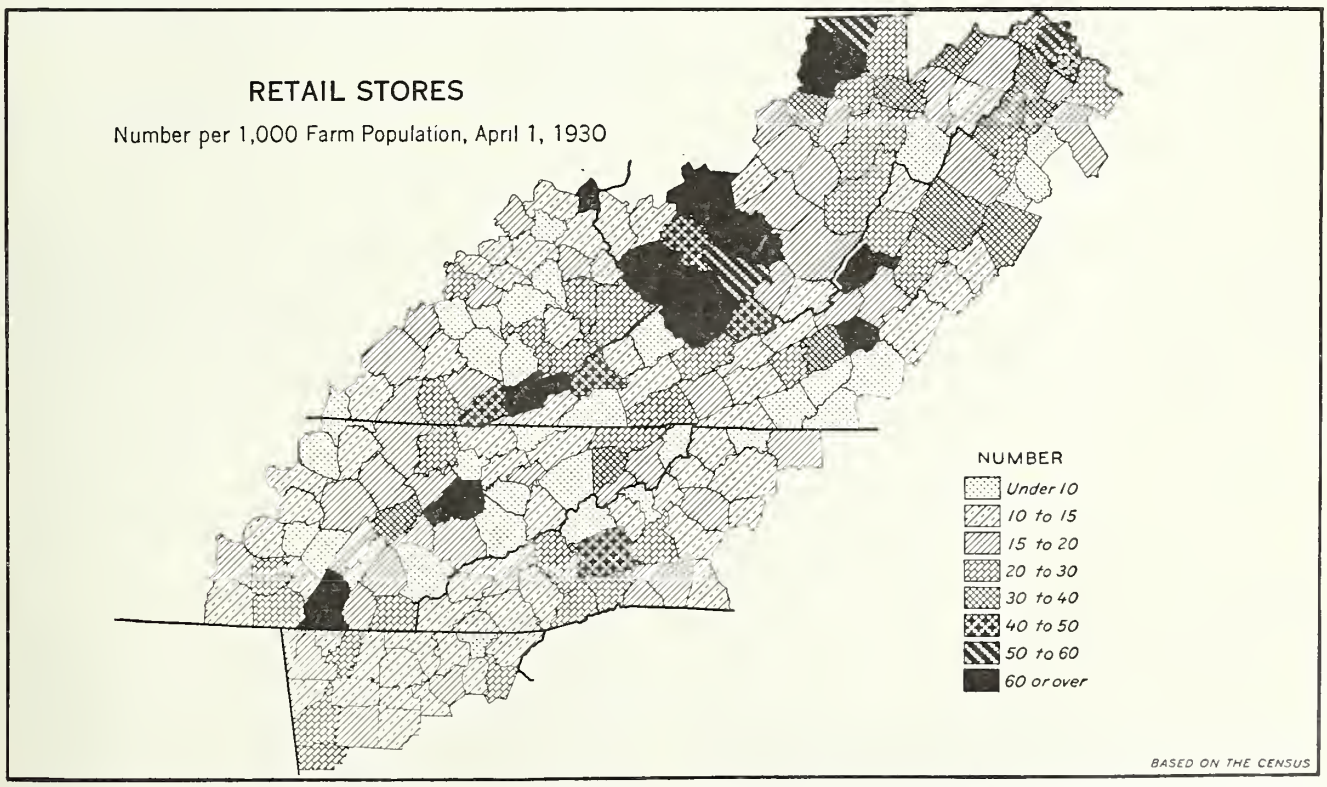

FIGURE 96.—Fifty-one percent of the counties had from 10 to 20 retail stores per 1,000 farm population in 1930. Near urban centers the number per unit of farm population was much larger than this, but in distinctly rural sections it was frequently smaller. The quality of retail service is generally best in urban centers and poorest in rural districts where general stores predominate. In the region as a whole there were 40 percent more retail stores per 1,000 total population than in the United States, but the average net volume of sales per store was only 70 percent as great.

located chiefly in urban centers and are thus accessible to only a small part of the farm population. Apparel, furniture and household, lumber, shoe, and drug stores are likewise found only in the larger centers of population where the volume of retail purchases can support a high degree of specialization in retailing. Eighteen counties are without a drug store; 131 are without a shoe store; 49 without a clothing store; and 53 without a lumber yard (table 17). General merchandise and automotive stores are restricted largely to county seats and the larger trade centers.

Another important factor contributing to the frontier type of distributive service is the relatively low purchasing power of the people. A relatively high degree of self-sufficiency and a relatively low productivity of the land restrict cash incomes to the lowest of any comparable region in the United States. Spendable income for retail service is therefore small, particularly in the rural sections, and it appears to be small in direct proportion to the isolation and mountainous character of the different sections. Seventy-five counties of the region, all predominantly rural, had total retail sales of less than $100 per person in 1929, and in only 15 counties were the sales $300 or over (table 18). The latter counties in every instance had a large urban population. The range in retail sales per capita in the counties within a subregion is largely the result of differences in the proportion of the people who buy all or nearly all of their food (largely the rural nonfarm and urban population), and differences in the proportion of the purchases made by people of a particular county in other counties. Because of the very small retail sales per capita in strictly rural areas, it is not surprising that a large part of the farm population is denied the privileges of efficient retail service.

TABLE 17.—*Counties of the Southern Appalachians with specified number of retail stores for selected business groups, 1930*

Business group	Counties with—					
	No stores	1–5 stores	6–10 stores	11–15 stores	16–20 stores	21–25 stores
	Number	*Number*	*Number*	*Number*	*Number*	*Number*
Food	0	13	19	14	21	17
General [1]	0	1	5	8	6	11
General merchandise	9	35	54	27	23	18
Automotive	3	24	30	24	25	20
Apparel	49	77	31	19	8	5
Shoe [2]	131	63	4	3	3	1
Furniture and household	46	89	42	17	5	1
Lumber and building	53	105	29	8	2	2
Drug	18	124	38	14	3	2

Business group	Counties with—					
	26–30 stores	31–35 stores	36–40 stores	41–45 stores	46–50 stores	Over 50 stores
	Number	*Number*	*Number*	*Number*	*Number*	*Number*
Food	15	15	8	9	7	67
General [1]	19	18	12	18	14	93
General merchandise	8	6	4	3	3	15
Automotive	12	7	14	3	7	36
Apparel	2	2	2	2	0	8
Shoe [2]	0	0	0	0	0	0
Furniture and household	0	1	0	2	0	2
Lumber and building	2	1	2	0	1	0
Drug	1	0	0	1	1	3

[1] According to the census classification, country general stores are nearly always located in places of less than 10,000 population and correspond roughly to the classification known as general-merchandise stores in the larger cities. The country general stores as a rule handle foods which constitute an important part of their sales. The general-merchandise stores include department, dry-goods, and variety stores as well as other general-merchandise stores.

[2] For men, women, and children.

Based on the census (*50*), 1930.

TABLE 18.—*Counties of the Southern Appalachians with specified retail sales per capita, by physiographic divisions and subregions, 1929*

Physiographic division and subregion	Counties with retail sales per capita of—							Total
	$0–$49	$50–$99	$100–$149	$150–$199	$200–$249	$250–$299	$300–and over	
	Number	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
Eastern division: Blue Ridge	1	16	9	6	1	0	2	35
Central division:								
Central Appalachian Valleys	0	0	1	1	4	2	2	10
Central Appalachian Ridges	0	4	6	4	0	0	1	15
Appalachian Valleys of Southwest Virginia	1	2	4	1	2	0	1	11
Appalachian Valleys of East Tennessee	2	4	3	4	2	1	3	19
Southern Appalachian Valleys	0	2	2	3	0	2	0	9
Total	3	12	16	13	8	5	7	64
Western division:								
Allegheny Plateau	0	0	3	8	2	1	1	15
Northeastern Cumberland Plateau	6	9	4	6	4	0	1	30
Northwestern Cumberland Plateau	0	9	5	2	0	0	0	16
Total	6	18	12	16	6	1	2	61
Eastern fringe:								
Northern Piedmont Plateau	1	2	0	1	1	0	0	5
Central Piedmont Plateau	0	5	3	1	0	0	1	10
Southern Piedmont Plateau	1	2	2	3	0	0	0	8
Total	2	9	5	5	1	0	1	23
Western fringe:								
Upper Ohio Hills	0	1	1	0	1	1	3	7
Highland Rim	1	6	6	2	0	0	0	15
Total	1	7	7	2	1	1	3	22
All subregions	13	62	49	42	17	7	15	205

WHOLESALE TRADE

The wholesale trade has a pattern in keeping with the characteristics mentioned for the region. In the aggregate the volume of sales is large—about $575,000,000 for those counties reported separately by the census in 1929 and probably about $10,000,000 in all other counties—but far below the total volume of $995,000,000 of retail sales. On a per capita basis, wholesale sales were small when compared with those of other regions because of the relatively low purchasing power of the region, the small degree of industrialization, and the absence of a large total agricultural production to be shipped out of the region. Because of the local nature of much of the trade in farm products, a considerable part does not pass through wholesale channels.

Although data are not available to indicate the relative importance of the different classes of sales, it appears probable that the function of wholesaling is relatively more important in supplying the region with manufactured products and the raw materials for manufacture and relatively less important in furnishing a market for the products of agriculture, than in the United States as a whole. Exceptions are the Appalachian Valleys in Virginia and Tennessee. The

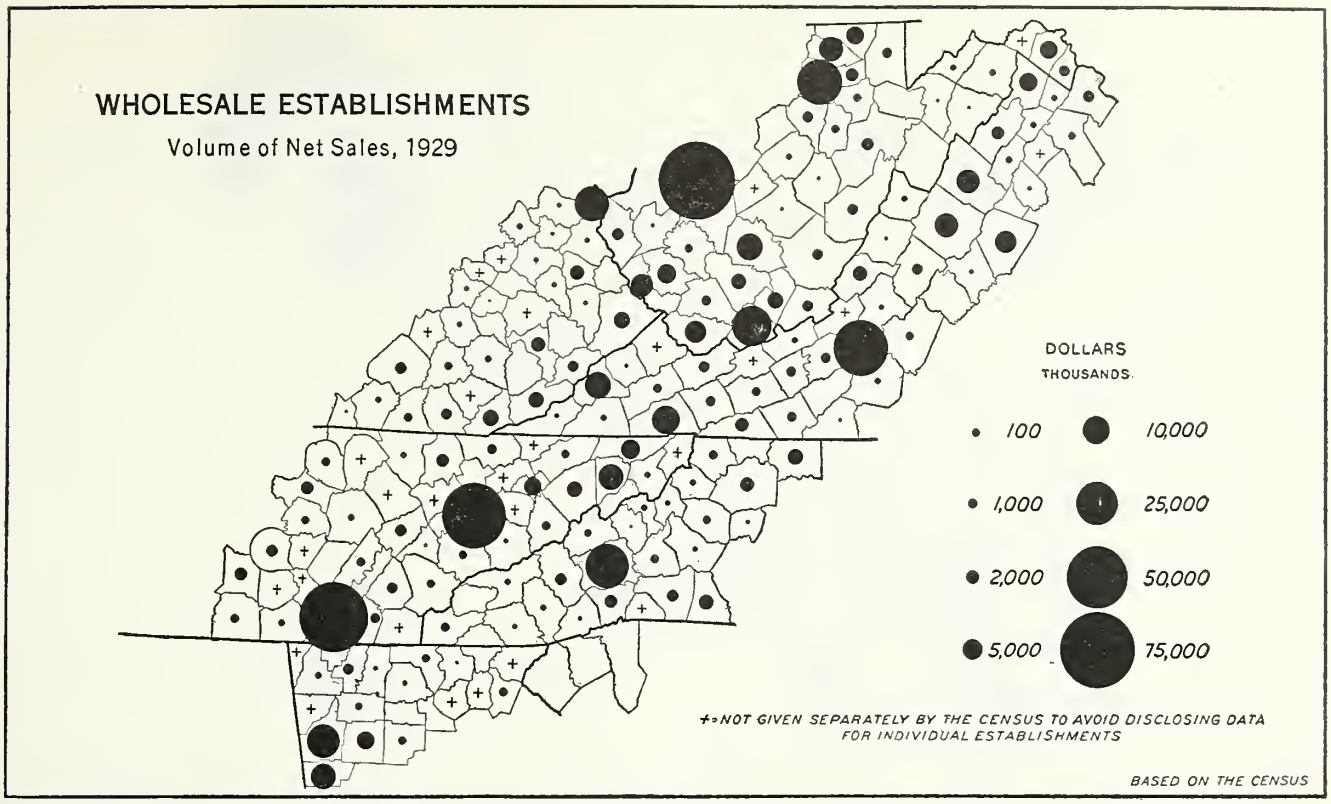

FIGURE 97.—Wholesale trade in 1929 was largely concentrated in a few urban centers. Most of the rural sections were served only by small widely scattered wholesale establishments. The volume of net sales of wholesale establishments, including estimates for counties not reported separately by the census, was roughly $585,000,000. The volume of sales per capita was less than one-fourth that of the United States. Wholesale trade was a relatively small part of all trade, partly because many transactions are made in wholesale establishments outside the region and partly because most people in isolated areas buy at retail.

agriculture of the remainder of the region is of such a self-sufficing character, both from an individual-farm and a community point of view, as to call for no comprehensive organization for wholesale distribution. This fact is illustrated by the location of the principal wholesale markets at Chattanooga and Knoxville, Tenn.; Roanoke, Va.; and Charleston, W.Va. (fig. 97). The first three markets are located in the most highly commercialized agricultural sections of the region and in proximity to important manufacturing industries, and the wholesaling at Charleston serves primarily an industrial population.

There is a wide dispersion of wholesaling outside of these principal centers but it is generally of small scale and is conducted in a manner in keeping with the kinds of goods and the class of service demanded by the country general stores, the chief retail distributive agencies that serve farmers.

In the region as a whole the net wholesale and retail sales per capita in 1929 were $118 and $200, respectively, as compared with $564 and $400 in the United States. In the Blue Ridge and the Cumberland and Allegheny Plateaus, the wholesale and retail sales per capita were $98 and $177, respectively, and in the Appalachian Valleys and Ridges, $160 and $239, respectively. In the Northwestern Cumberland Plateau wholesale sales per capita were $38 and retail sales per capita were $111. Although the wholesale and retail sales per capita do not indicate with any considerable degree of accuracy the standards of living, money income, or the quantity of commodities consumed per person, they illustrate the comparatively restricted character of the wholesale and retail trade in many parts of the region.

COOPERATIVE BUYING AND SELLING [24]

Cooperative marketing among farmers is of minor importance notwithstanding the fact that the marketing of farm products is not well developed in many parts. Only 1.5 percent of all farmers reported cooperative sales in 1929 to the census and these sales were only approximately one-fourth of the total sales of those farmers participating in cooperative marketing. Cooperative purchases were reported by 1.6 percent of all farmers but the total of cooperative purchases was only two-fifths of cooperative sales.

Cooperative buying and selling have not developed uniformly over the region (figs. 98 and 99). Progress has been chiefly in the principal agricultural sections. It has developed most slowly in the areas in which agricultural production is least commercially developed, and where market outlets for farm products and retail service are least satisfactory. Of the 205 counties included in the study only 4—2 in Virginia and 2 in Tennessee—had 10 percent or more farms for which cooperative sales were reported and in only 14 counties was the number more than 5 percent.

Farmers in Virginia make more use and farmers in Kentucky less use of cooperative buying and selling than in any other State included in the study. Cooperative selling is more general in livestock and livestock products than in crops, although, when measured in value of products, cooperative marketing attains greatest importance in fruits and vegetables in certain counties. Cooperative packing and selling of apples is especially important in the northern part of the

[24] Acknowledgment is made of the assistance of O. M. Farrington, University of Kentucky, in preparing the following paragraphs.

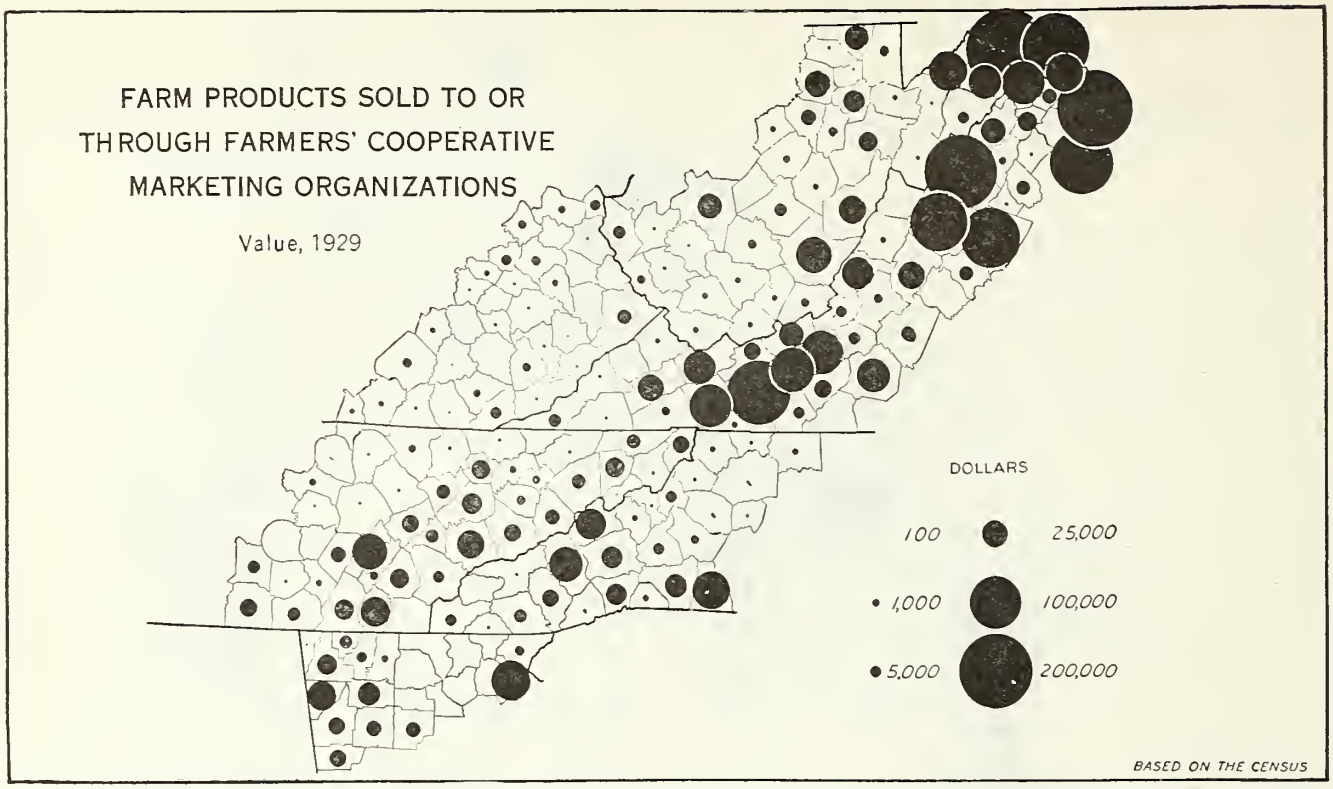

FIGURE 98.—Cooperative selling in 1929 had its greatest development where agriculture was most commercialized. Livestock and fruits and vegetables were the chief products sold cooperatively. The local character of the trade in farm products and the noncommercial type of agriculture are important deterrents to association efforts in many sections of the region. Only 1.5 percent of all farmers reported cooperative sales and the value of such sales was only 1.4 percent of the value of all farm products sold or traded.

Central Appalachian Valleys in Virginia and West Virginia and in adjoining counties. Some peaches are sold cooperatively in this area, especially in West Virginia. Strawberries, peaches, and potatoes are marketed cooperatively in several of the counties of eastern Tennessee and northern Georgia.

A large percentage of the wool clip, a minor product in the region, is sold through local wool pools, particularly in southwestern Virginia and in eastern Tennessee. A considerable quantity of wool from these local pools is sold through the United Wool Growers' Cooperative Association which is affiliated with the National Wool Marketing Corporation.

Cooperative shipping of livestock, in varying quantities, is general throughout the region and is of considerable importance in several counties of eastern West Virginia and in the Central Appalachian Valleys of Virginia. Informal local association is a favorite method of marketing spring lambs.

Several small cooperative cheese factories serve the dairy farmers in northeastern Tennessee and in the adjoining sections of North Carolina and Virginia. Live poultry is shipped cooperatively in car lots from several points in North Carolina and Tennessee and some poultry and eggs are sold cooperatively in the Central Appalachian Valleys.

Cooperative purchases of farm supplies, although reported by more farmers than reported cooperative sales in 1929, amounted to a smaller volume of business, being approximately $1,190,000 compared with $3,030,000. Cooperative purchasing of supplies is even more localized than cooperative marketing (fig. 99). These purchases are principally for fertilizer, feed, seed, and orchard supplies and are mainly made through cooperative selling organizations, although local farm bureaus are important distributors of farm supplies in Virginia and county mutual exchanges are becoming an increasingly important agency in cooperative buying in North Carolina. An important factor in promoting cooperative purchases in these States during recent years has been the Virginia Seed Service, Inc., a farmers' cooperative wholesale association which has developed a successful business by giving attention to selling products of dependable quality and at reasonable prices.

Neither cooperative selling nor cooperative buying appears to have reached the limits of possible development in this region. The local character of much of the trade in farm products, the noncommercial type of agriculture in many sections, and the problems inherent in cooperative organization are effective obstacles, but they are not insuperable barriers to further progress in association efforts. Experience has already demonstrated that there are opportunities through cooperative effort, for creating new and better markets and for improving distributive service, especially in such supplies as feeds, seeds, and fertilizers.

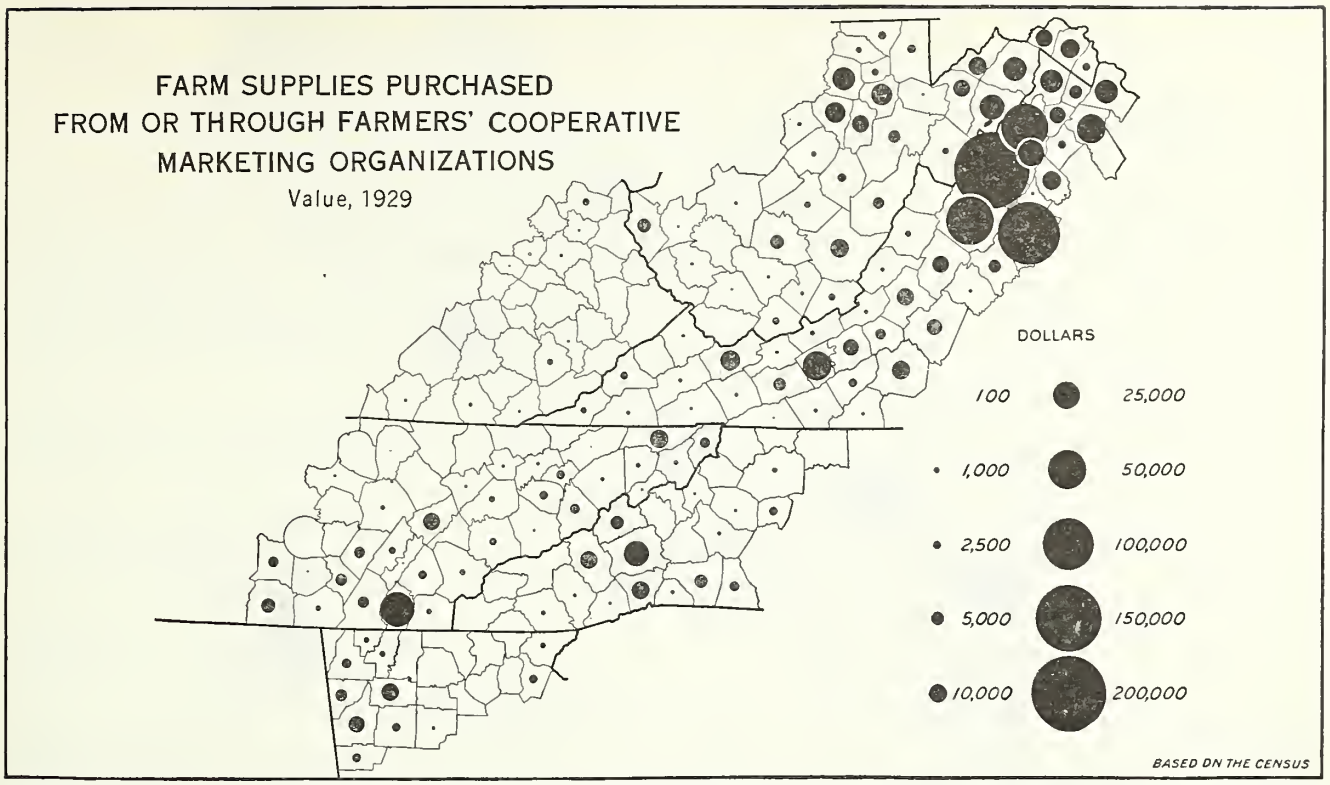

FIGURE 99.—Cooperative buying by farmers in 1929 was highly localized and chiefly in Virginia. The principal purchases were fertilizer, feed, seed, and orchard supplies. They were made chiefly through cooperative selling associations although cooperative buying associations have become increasingly important as sources of purchases of farm supplies. The total value of farm supplies purchased cooperatively in 1929 was only two-fifths as great as cooperative sales but was participated in by a slightly greater number of farmers.

MANUFACTURING [25]

During the last quarter century, manufacturing in the South largely regained the relative position it held a century earlier. Moreover, progress in manufacturing during the present century, especially since 1920, has been greater in the region of this study than elsewhere in the South. Rapid improvement of transport facilities, the growth of urban centers, and the development of water power have both accompanied and contributed to the recent expansion. Not only has there been a marked physical expansion of manufacturing, but the proportion of finished products is greater than formerly. In other words, the statement that the transport facilities were developed primarily to get raw materials out of the region rather than to develop local manufactures is not now as applicable as formerly.

Within the Southern Appalachians, there were 77 counties in which the added value of local manufactures amounted to $1,000,000 and over, in 1929, and 22 counties in which it amounted to $5,000,000 and over. Dispersion rather than concentration is an outstanding characteristic of the location of manufacturing establishments (figs. 100 and 101). Concentration is greatest in Tennessee, whereas the opposite is true in North Carolina. Within the region, not all of the States have reached the same plane of industrial development, Kentucky being the most retarded and North Carolina the most advanced. This difference is partly attributable at least to the potential and developed water power in the two States, Kentucky having little of either (fig. 51).

[25] Acknowledgment is made of the assistance of C. J. Bradley, University of Kentucky, in the preparation of this section.

The manufacturing establishments are also characteristically small and the average added annual value per worker is low, ranging from around $1,000 to $3,000 in 1929. There are notable exceptions to this general rule, but at the same time there are few establishments comparable in size and productivity to those frequently found in more highly industrialized areas.

Many kinds of manufactures are produced, but those best suited to the nearest raw materials—timber, iron, and cotton—predominate. Wood is used in the production of rayon at Elizabethton, Tenn.; furniture at Mount Airy, Lenoir, Asheville, and Morganton, N.C.; and print stock at Kingsport, Tenn. At several other points, except in Kentucky and Georgia, wood is used extensively in the production of print stock and of tanning and other hide-processing materials. Lumbering is still important throughout the region, but less so in Kentucky and Georgia than elsewhere (fig. 47). Ashland, Ky., Knoxville and Chattanooga, Tenn., Charleston, Clarksburg, Morgantown, and Bluefield, W.Va., and Roanoke and Clifton Forge, Va., are important iron-working centers. Knoxville and Chattanooga also have other widely diversified types of manufacturing establishments. Roanoke, as the general headquarters of the Norfolk & Western Railway, has extensive railroad shops which normally employ about 6,000 persons.

Considering the number of counties, textile production is most important in Georgia with North Carolina a close second. Textile centers in the Georgia portion of the region are Rome, Cartersville, Summerville, Cedartown, Rossville, and LaFayette; and in the North Carolina portion, Rutherfordton, Forest City, Lenoir, Marion, Shelby, and Asheville. Important textile

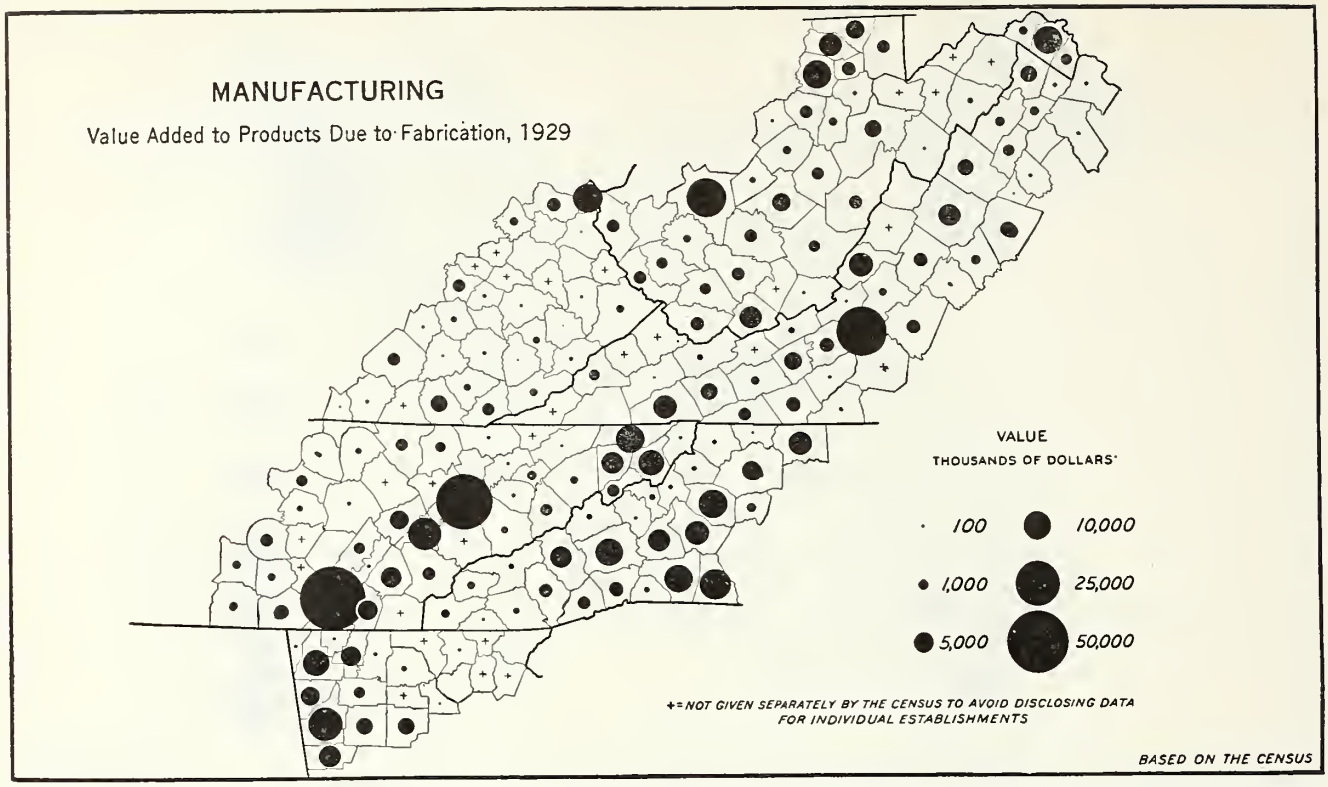

FIGURE 100.—The value of products added by manufacture in 1929 was approximately $451,000,000, excluding those counties for which data were not reported separately by the census. Manufacturing in most of the counties excluded was unimportant, the total in all counties probably not exceeding $18,000,000. The value added by manufacture in Boyd County, Ky., Kanawha and Harrison Counties, W.Va., Knox and Hamilton Counties, Tenn., and Roanoke County, Va., comprised practically two-fifths of the total in the region. In several large groups of counties the value of products added by manufacture was negligible.

centers embraced by the region in other States include Knoxville, Chattanooga, Loudon, Kingsport, and Bristol, Tenn., Martinsburg, W.Va., and Roanoke, Va. Kentucky is the only State subdivision that has no textile development.

Despite the nearness of large supplies of raw tobacco there are no tobacco factories of any importance in the region. Clay, glass, and stone industries are important in selected counties, particularly Carter County, Ky., Cherokee and Pickens Counties, Ga., and Harrison, Kanawha, Lewis, Marion, Monongalia, and Taylor Counties, W.Va. Other manufactures, indicative of the large variety of manufactured products of the region, include a large aluminum plant at Maryville, Tenn., an overall factory at Bristol, Va., and a large printing establishment and branch camera plant at Kingsport, Tenn.

OCCUPATIONS

In 1930, there were 1,624,950 persons 10 years old and over in the region who were usually employed at some gainful occupation or who were temporarily so employed at the time the census was taken (table 19). Approximately 263,000, or 16.2 percent of the gainfully employed, were women. The proportion of all people in the region who were classed as gainfully employed was 32.7 percent as compared with 39.8 percent in the United States. In the United States as a whole, however, 22 percent of the gainfully employed were women.

Slightly more than one-third of the gainfully employed in the region in 1930 were engaged in agriculture, and agriculture was the chief source of employment in almost one-half the counties. In the several subregions, however, the percentage of the gainfully employed who were in agriculture ranged from less than 17 percent in the Upper Ohio Hills to over 50 percent in the Piedmont Plateau and the Highland Rim. Nearly 20 percent of those gainfully employed in agriculture were unpaid family workers.

The number of workers in manufacturing and mechanical industries was second only to that in agriculture. The number gainfully employed in these industries was largest in the clothing and textile group, and was followed by the number employed in the building industry, lumber and furniture industries, iron and steel industries, chemical and allied industries, and clay, glass, and stone industries. A large proportion of those gainfully employed in the clothing and textile industries were in the Appalachian Valleys of East Tennessee and Georgia and in the Central and Southern Piedmont Plateau. The persons employed in iron and steel industries were largely in the Appalachian Valleys of East Tennessee and Southwest Virginia, and the Upper Ohio Hills.

Extraction of minerals was the third largest industry group from the standpoint of number of persons employed. At least 85 percent of those gainfully employed in this group were engaged in mining coal. Most of the persons so engaged were in the Cumberland and Allegheny Plateaus and the Upper Ohio Hills. Those engaged in transportation and communication, trade, professional, and domestic and personal services, although including more than 485,500 persons classified by industry in 1930, are limited by the number, distribution, and productivity of those engaged in agriculture, forestry and fishing, extraction of minerals, and the manufacturing and mechanical industries.

TABLE 19.—*Number gainfully employed persons 10 years old and over in the Southern Appalachians by physiographic divisions and subregions, 1929*

Physiographic division and subregion	Agriculture[1]	Forestry and fishing	Extraction of minerals[2]	Manufacturing and mechanical industries					
				Clothing and textile	Building	Lumber and furniture	Iron and steel	Other[3]	Total
	Number	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
Eastern division: Blue Ridge	95,347	2,189	3,429	8,982	6,435	7,593	1,032	15,331	39,373
Central division:									
Central Appalachian Valleys	28,124	231	1,741	5,526	4,271	1,816	994	6,725	19,332
Central Appalachian Ridges	23,715	1,510	3,760	864	2,008	1,932	1,213	5,923	11,940
Appalachian Valleys of Southwest Virginia	35,702	395	5,456	2,171	4,525	2,796	4,365	10,814	24,671
Appalachian Valleys of East Tennessee	68,749	79	6,049	23,502	11,757	7,781	11,372	26,413	80,825
Southern Appalachian Valleys	31,947	54	1,029	16,131	1,854	1,463	1,431	4,568	25,447
Total	188,237	2,919	18,035	48,194	24,415	15,788	19,375	54,443	162,215
Western division:									
Allegheny Plateau	34,862	3,086	38,350	708	3,888	3,765	2,055	6,336	16,752
Northeastern Cumberland Plateau	86,034	2,356	101,647	891	8,023	3,421	3,231	15,795	31,361
Northwestern Cumberland Plateau	27,917	1,076	7,157	675	1,069	2,641	1,009	1,480	6,874
Total	148,813	6,518	147,154	2,274	12,980	9,827	6,295	23,611	54,987
Eastern fringe:									
Northern Piedmont Plateau	12,714	44	70	34	1,030	432	67	562	2,125
Central Piedmont Plateau	46,005	416	985	5,010	2,611	4,062	596	4,021	16,300
Southern Piedmont Plateau	30,435	37	97	9,416	954	319	539	1,802	13,030
Total	89,154	497	1,152	14,460	4,595	4,813	1,202	6,385	31,455
Western fringe:									
Upper Ohio Hills	16,036	136	19,707	505	3,762	729	5,065	13,487	23,548
Highland Rim	46,027	413	1,658	1,037	1,327	1,836	933	2,492	7,625
Total	62,063	549	21,365	1,542	5,089	2,565	5,998	15,979	31,173
All subregions	583,614	12,672	191,135	75,452	53,514	40,586	33,902	115,749	319,203

Physiographic division and subregion	Transportation and communication			Trade			Public service (not elsewhere classified)	Professional service	Domestic and personal service	Industry not specified	Total[6]
	Steam and street railroads	Other[4]	Total	Wholesale and retail trade	Other[5]	Total					
	Number	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
Eastern division: Blue Ridge	3,753	8,603	12,356	11,357	1,884	13,241	1,683	10,590	14,920	4,755	197,883
Central division:											
Central Appalachian Valleys	2,374	4,714	7,088	6,288	1,266	7,554	836	5,352	7,529	3,125	80,912
Central Appalachian Ridges	4,093	3,527	7,620	3,436	443	3,879	437	3,362	4,134	1,128	61,485
Appalachian Valleys of Southwest Virginia	8,879	5,701	14,580	8,626	1,723	10,349	1,178	6,747	9,008	2,666	110,752
Appalachian Valleys of East Tennessee	9,680	13,886	23,566	24,156	5,601	29,757	3,301	15,082	25,686	5,042	258,786
Southern Appalachian Valleys	1,421	2,611	4,032	4,482	709	5,191	1,585	2,817	5,511	774	78,387
Total	26,447	30,439	56,886	46,988	9,742	56,730	7,337	33,360	51,868	12,735	590,322
Western division:											
Allegheny Plateau	9,802	5,860	15,662	9,232	1,271	10,503	1,079	8,785	8,417	2,814	140,310
Northeastern Cumberland Plateau	13,056	10,879	23,935	18,895	2,689	21,584	2,704	13,393	17,908	5,504	306,426
Northwestern Cumberland Plateau	2,655	2,611	5,266	2,483	241	2,724	610	2,160	2,427	1,142	57,353
Total	25,513	19,350	44,863	30,610	4,201	34,811	4,393	24,338	28,752	9,460	504,089
Eastern fringe:											
Northern Piedmont Plateau	228	1,584	1,812	962	212	1,174	316	1,022	2,285	440	22,002
Central Piedmont Plateau	1,934	3,318	5,252	4,550	681	5,231	639	4,739	6,361	1,558	87,486
Southern Piedmont Plateau	458	1,498	1,956	2,278	355	2,633	318	2,144	2,914	588	54,152
Total	2,620	6,400	9,020	7,790	1,248	9,038	1,273	7,905	11,560	2,586	163,640
Western fringe:											
Upper Ohio Hills	3,686	5,352	9,038	8,829	1,694	10,523	1,286	6,817	7,011	1,856	95,958
Highland Rim	2,452	2,578	5,030	3,739	403	4,142	507	2,737	3,519	1,400	73,058
Total	6,138	7,930	14,068	12,568	2,097	14,665	1,793	9,554	10,530	3,256	169,016
All subregions	64,471	72,722	137,193	109,313	19,172	128,485	16,479	85,747	117,630	32,792	1,624,950

[1] Includes 112,002 unpaid family workers and 126,599 farm laborers.
[2] Includes 162,158 persons engaged in coal mining.
[3] Includes 25,056 in chemical and allied industries; 17,816 in clay, glass, and stone industries; 12,209 in food and allied industries; 10,819 in paper, printing, and allied industries; 8,633 in independent hand trades; 8,748 in automobile factories and repair shops; and 32,468 in other manufacturing industries.
[4] Includes 21,081 in construction and maintenance of streets; 20,016 in automobile agencies, garages, greasing, and filling stations, etc., 9,059 in telegraph and telephone services; 8,435 in postal service; and 14,131 in other transportation and communication industries.
[5] Includes 17,064 in banking, brokerage, and real estate, and 2,108 in other trade industries.
[6] Includes 1,362,276 men and 262,674 women.

Based on the census (*50*).

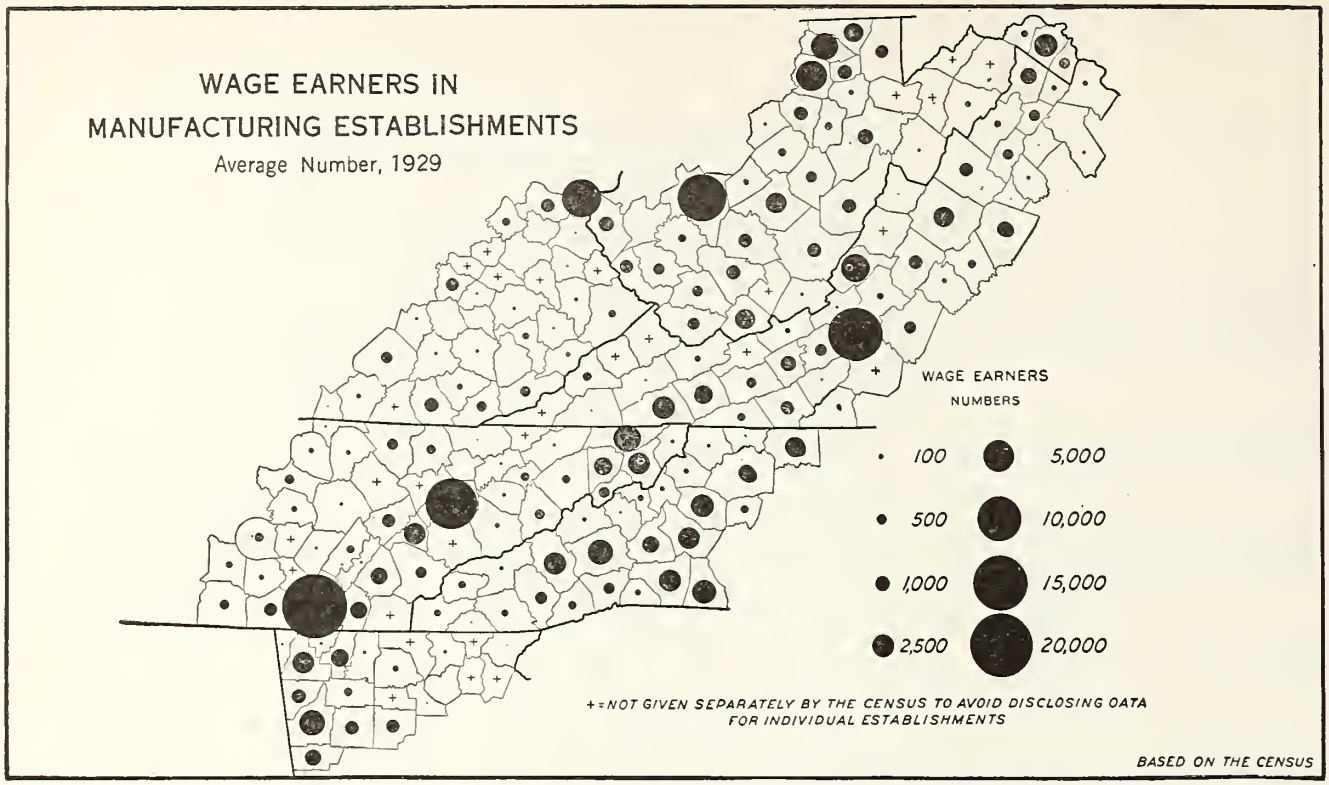

FIGURE 101.—The number of wage earners in manufacturing establishments in 1929 was roughly 207,000, excluding those counties for which data were not reported separately. The total for all counties was probably not over 215,000. In general, there is a close relationship between the number of workers in manufacturing establishments and the value of products added by manufacture (fig. 100).

Although a considerably larger percentage of the gainfully employed in the region are engaged in agriculture than is true in the United States as a whole (36 percent compared with 21 percent in 1930), in several subregions industrialization has reached a rather high level. In such subregions and in those subregions in which extraction of minerals is important, population has increased most rapidly (table 21), not only because of the development of manufacturing and mining but also because of the accompanying expansion of transportation, communication, and trade.

The extraction of minerals (mostly coal) has been the important factor influencing the increase in population and the development of transportation, communication, and trade in the Cumberland and Allegheny Plateaus. In fact, the workers engaged in extraction of minerals out-numbered nearly 3 to 1 the workers in manufacturing and mechanical industries in 1930 in these subregions and about equaled in number the persons gainfully employed in agriculture. Of interest is the fact that the development of manufacturing and mechanical industries has been least in these subregions of any of the subregions of the Southern Appalachians and the opportunities in agriculture are also least. In view of the irregularity of employment in the coal-mining industry and the closing of exhausted mines, maintenance of a permanent economic organization based largely upon coal mining without alternative opportunities in agriculture or manufacturing and mechanical industries appears difficult and, in fact, has so proven since the beginning of the present economic depression.

Only a very small number of all the gainfully employed workers are usually employed in forestry and fishing and lumber and furniture industries although most of the land is preeminently adapted to forestry, and roughly two-thirds of the land is in forest (table 1). Moreover, in the near future, except for possibly short periods, the number of workers who will be employed in these industries is not likely to increase (p. 39). Only 8,633 people are gainfully employed in the independent hand trades, although the independent hand trades are frequently mentioned in connection with the existing types of industries in the region. The importance of both forestry and the lumber and furniture industries and independent hand trades, however, is not fully revealed in the figures above because of the people who are usually employed in other industries, such as agriculture, but who engage, during a part of their time, in these industries.

PROBLEMS OF PUBLIC FINANCE AND FARM TAXES

By Donald Jackson, *agricultural economist, Division of Agricultural Finance, Bureau of Agricultural Economics* [25]

The major source of revenue of local governments is the general property tax, which is principally a real estate tax. In addition to local governments, most State governments obtain an appreciable amount of revenue from this source. This reliance on the general property tax, combined with the demand for increased governmental revenues in recent years, has placed a heavy tax burden upon property owners with small incomes. Outstanding examples of this class are farmers and small-home owners. Tax data available for the Southern Appalachians relate principally to the former group.

Taxes constitute a large item of expenditure by farmers. It is estimated that in 1929 the farmers of the Southern Appalachians paid $14,000,000 in real estate taxes, and perhaps $2,000,000 in personal property taxes. Probably not far from two-thirds of the total was used for schools and local roads.

Although property taxes go principally to the support of local institutions and the control of the tax levies rests largely with the local communities, the States set certain minimum standards which they require local communities to maintain. The States also supervise in varying degree the expenditures and debts of local governments. Unsupervised local-government borrowing has led many communities so deeply into debt that a third or more of their annual tax revenues are required for debt service.

Because of the excessive expenditures and indebtedness of the local governments, the State government of North Carolina inaugurated, in 1929, a much more stringent control of local debt than is customary in most States. To increase the efficiency with which tax revenues were used, the State in 1931 took over the administration and support of all roads and of the 6-month constitutional school term. Large parts of the funds required for these functions are now obtained from sources other than the property tax. The State government of Virginia has similarly taken over the road administration in counties that desired the transfer.

Attempts often are made to lessen the burden of taxation in local units of government, by granting them continuing financial aid from the State. But sometimes such "aids" encourage the local governments to spend more money instead of decreasing taxes. The grant itself frequently requires that a local taxing jurisdiction shall raise a certain minimum amount by taxation before it can receive the aid.

At present there is a considerable sentiment for partial reorganization of local governments, coupled with increased centralization of control, in an attempt to obtain more improvements and services with present taxes, or to maintain present functions with less taxes.

FARM REAL ESTATE TAXES PER ACRE AND PER $100 OF REAL ESTATE VALUE

The Southern Appalachians form a region with sharp contrasts in resources, topography, and quality of land (p. 7). Forthis reason, the amount of local governmental service demanded varies greatly from county to county Tax-paying ability also varies, and not necessarily in conformity with variations in the demand for public revenue. Between States the weight of the property tax varies also with the degree to which this tax is supplemented from other sources.

The variation in real estate taxes per acre for 1929 on owner-operated farms in the region is shown by figure 102. In a general way, counties having superior economic resources can be distinguished in this illustration, and differences in the general level of taxes per acre between States are exhibited.

In 1929 real estate taxes probably were as well equalized between taxing jurisdictions and between taxpayers as at any time. For a decade there had been a rather gradual upward movement in tax payments, with relatively few rapid or irregular changes to confuse the judgment of taxing officials. The 1929 figures for farm real estate taxes per acre and per $100 of real estate value for each of the Southern Appalachian counties thus show as nearly as practicable a normal distribution of farm taxes in the region.

Because of the variation in values of farm real estate, the amount of taxes per $100 of value provides a better measure than do taxes per acre of the burdensomeness of farm taxes between counties. Figure 103 shows real estate taxes per $100 of real estate value for the counties of the region. Taxes per acre and per $100 of real estate value in 1913 and in 1929 are shown in table 20 for each of the six States of which the region is a part. The variations between States principally reflect differences in the State tax systems.

Table 20.—*Average tax per acre and per $100 of real estate value in the United States and each of 6 Appalachian States, 1913 and 1929*

Country or State	Tax per acre		Tax per $100	
	1913	1929	1913	1929
	Dollars	*Dollars*	*Dollars*	*Dollars*
United States	0.24	0.58	0.55	1.19
North Carolina	.10	.60	.41	1.28
West Virginia	.13	.49	.44	1.26
Tennessee	.15	.47	.54	1.13
Georgia	.13	.30	.66	1.16
Kentucky	.16	.42	.51	.96
Virginia	.12	.34	.40	.67

Throughout the period since 1913, taxes per acre for the region and for the six States of which the region is a part have averaged close to the same figure (fig. 104). Offhand this is surprising in view of the topography of the Southern Appalachians, but it must be remembered that there is barren, rough, and swampy land in other parts of these States.

Throughout the period since 1913, the tax per acre has been decidedly lower in the six States than in the entire United States. This is accounted for mostly by the lower values per acre for farm land in the Southern Appalachian States. Between 1913 and 1929 in the six States and in the United States, taxes per acre increased more than the taxes per $100 of real estate value. At the beginning of the period, however, the States of Virginia, North Carolina, and West Virginia also had taxes per $100 of real estate value from 15 to 20 percent below the United States average. The lower land values are due in large part to rough topography and low fertility, though no small part reflects the combined effect of meager resources and inaccessibility to large markets.

[25] Acknowledgment is due Bushrod W. Allin, formerly of the Division of Agricultural Finance, Bureau of Agricultural Economics, for organizing this section of the study jointly with the author.

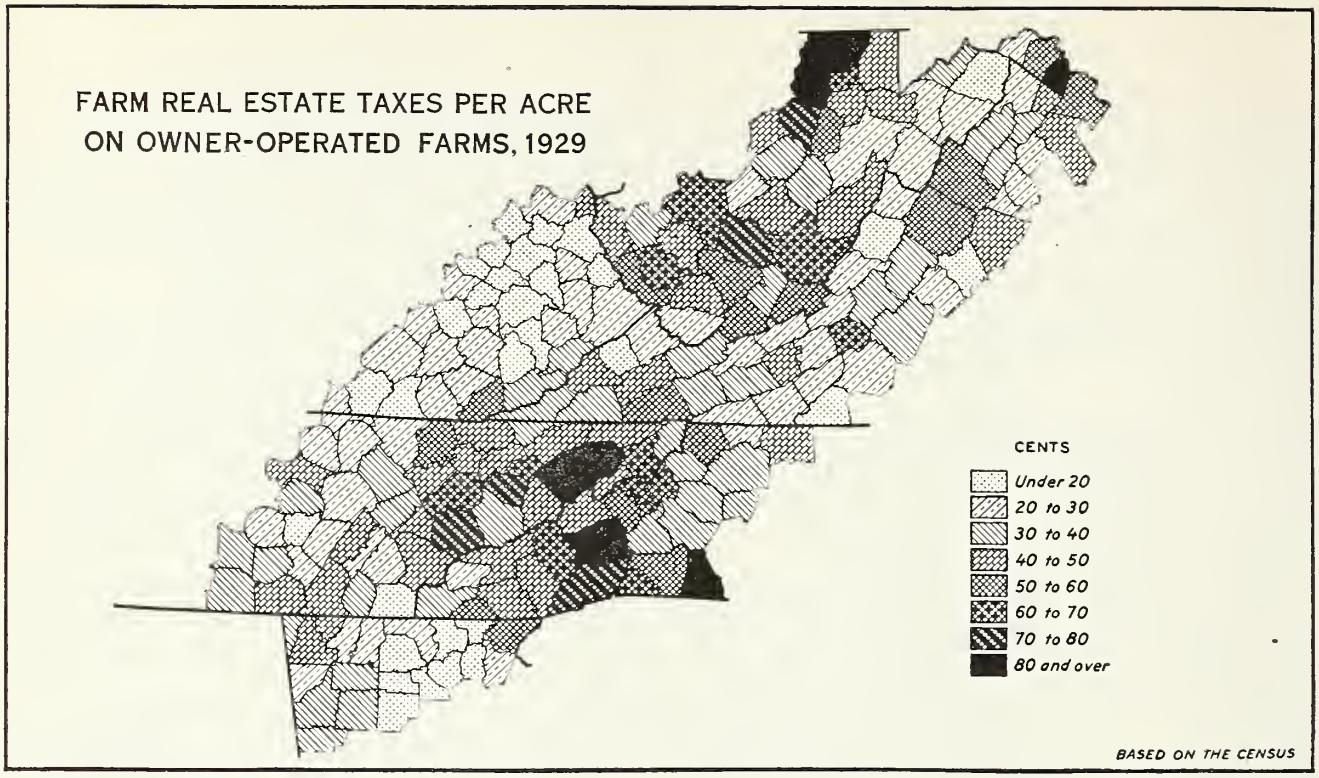

FIGURE 102.—Real-estate taxes, estimated for all farm land in the Southern Appalachians from taxes reported paid on owner-operated farms, averaged 41.8 cents per acre in 1929. The corresponding average for all farm land in the six States of which the region is a part, was 42.7 cents, and for the United States as a whole, 58 cents. The differences between average taxes paid per acre in the Southern Appalachians and in the country as a whole are only partially explained by variation in land values. Variations in tax rates and in ratios of assessed valuations to true values must also be considered.

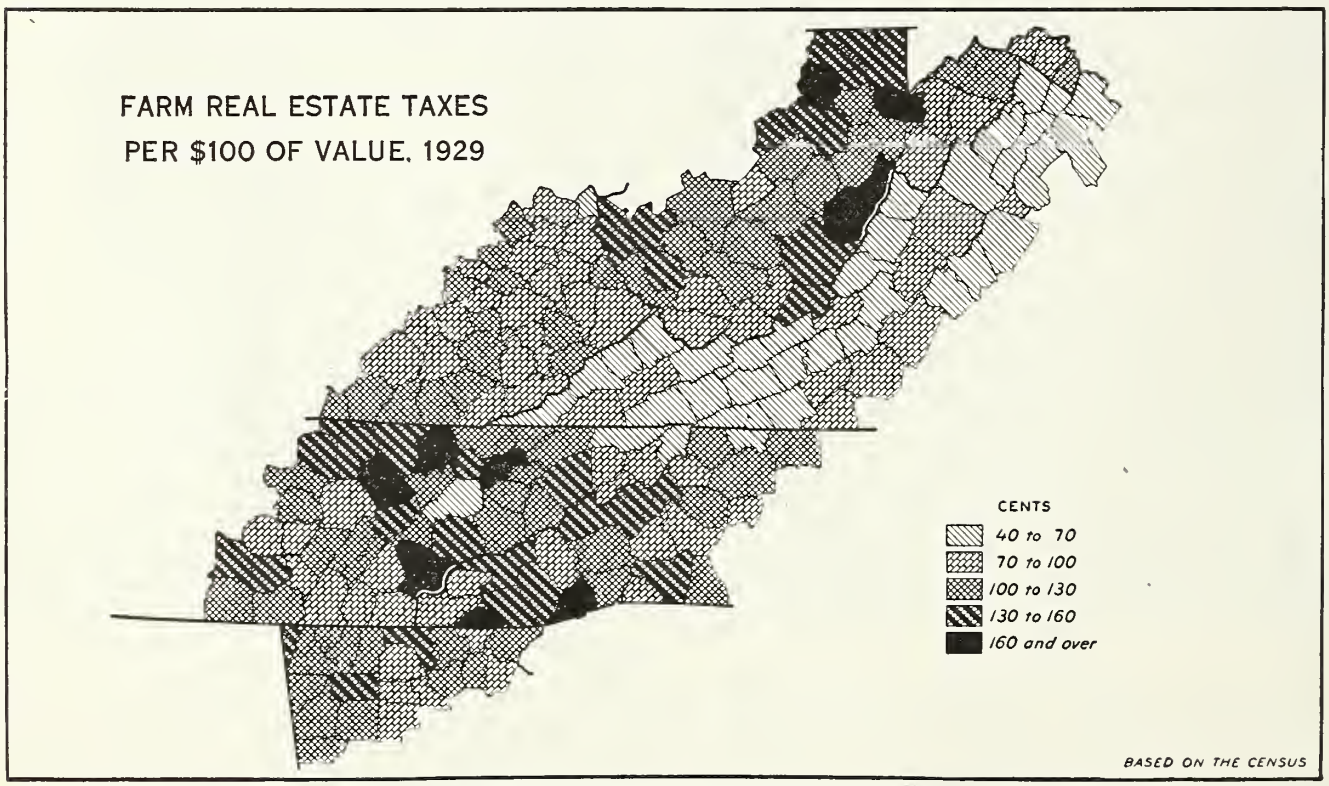

FIGURE 103.—Real-estate taxes in relation to real-estate values are helpful in comparing the tax burden between taxpayers and between taxing jurisdictions at a given time. Taxes per acre in the region are affected largely by mineral resources, quality of land, and nearness to markets, and indicate the actual amounts that individuals must pay. Taxes per $100 of real estate value should indicate the relative ease or difficulty with which tax payments normally can be met, though actually they do indicate this only within very broad limits.

From the standpoints of Government revenue and of relative burden upon different taxpayers, the rate of taxation per $100 of property value is more important than is the rate of tax per acre. An ad valorem levy is more equitable to taxpayers and likely to yield a larger revenue than is a flat tax per acre. For these reasons taxes are levied upon the former basis. The tax per acre, nevertheless, offers a somewhat more tangible concept of the total amounts which individual farmers have to pay in taxes, and of the variation in these amounts from year to year.

TREND OF FARM REAL ESTATE TAXES PER ACRE

In the region as a whole, the average tax per acre increased 241 percent between 1913 and 1929 (figs. 104 and 105). For the six States as a whole the corresponding increase was 229 percent. The high point for the country was reached in 1929, and for the Southern Appalachians in 1928. The difference between the figures for the Appalachian counties and those for the six States as a whole is not significant. The increase for the United States during the same period was 141 percent. Thus, for the country as a whole, the increase in the tax per acre was less than 60 percent as great as in the 205 Appalachian counties. Between 1913 and 1932, the tax per acre increased 174 percent for the Southern Appalachians, and 90 percent for the country as a whole. Whereas, for the country as a whole, the tax per acre in 1929 was 241 percent of the 1913 figure, in North Carolina it was 631 percent, in West Virginia 372 percent, and in Tennessee 316 percent.

The large percentage increases in the tax per acre in North Carolina, West Virginia, and Tennessee were, in large part, the result of a relatively low tax in 1913, the base year. But there was considerable variation among the six States in the actual increase in the tax per acre and per $100 of property value (table 20). In North Carolina and West Virginia the increase exceeded that in the United States as a whole, and the tax levy in 1929 was higher in these States than in the remaining States of the Southern Appalachians. Tax levies in North Carolina and West Virginia increased much more rapidly than did the average levy in the United States and these States also levied appreciably higher farm taxes in 1929 than were levied in other States. In Kentucky, the increase in the tax levy was small and farm taxes in the State were comparatively light in 1929. Virginia not only began with light farm taxes in 1913, but showed a relatively small increase.

Variations in these tax levies among the six States may be attributed to variations in amount of governmental services rendered, in debt policy, and in the degree to which property taxes are supplemented by other taxes for State and local purposes.

The question of supplementing the general property tax is of particular significance to farmers and to small-home owners, because this tax is so preponderantly a real-estate tax. Real estate usually cannot be concealed or otherwise escape taxation. Personal property commonly does escape to a very considerable extent. Frequently it is concealed or actually moved out of the taxing jurisdiction, or made to appear of little value. To prevent these occurrences, personal property often is frankly assessed at an extremely low ratio to its true value. This applies even to tangible personal property, but it applies with far greater force to intangibles. Local assessors cannot well be equipped to discover the amount of wealth each person holds in the form of money, bank accounts, or securities. The result is that the general property tax bears on tangible property more heavily than on intangibles, and bears on real estate far heaviest of all.

PROPORTION OF THE TAX BASE REPRESENTED BY REAL ESTATE

The census of 1930 (*50*) showed on a country-wide basis that, for farmers operating their own farms and able to give adequate records of their taxes, real-estate taxes represented 85 percent of the total property taxes paid 1929. It is probable that, even for farmers, the value of real estate does not bear any such ratio as this to the total value of property, and it is certain that it does not for the country as a whole. The situation in the Southern Appalachians, in this respect (fig. 106), is not markedly different from that in the rest of the country. A double injustice to the farmer and small-home owner is suggested by figure 106. Not only do these classes of owners have an unusually large portion of their wealth in the form of real estate, and hence bear a disproportionate share of the taxes, but they suffer a further disadvantage from inequality of tax payments resulting from the irregular application of the property tax.

TAXES AND INCOME

The rate of taxes per $100 of real-estate value indicates the weight of the real-estate tax upon different taxpayers, to the extent that real-estate values reflect the net income yielded by the land. In situations in which income fails temporarily, as in the case of crop disasters, land value obviously may reflect normal tax-paying ability better than does income. Land value rests upon expected net income, the only source from which taxes can normally be paid.

The census of 1930 (*50*) shows that on cash-rented farms in the United States in 1929, approximately 22 percent of the gross rents were taken by real-estate taxes. For the owners of these farms, the gross rents correspond fairly well to net income before taxes are deducted. For the six States the following percentages of gross cash rents were required for real-estate taxes in 1929: Tennessee, 17.6 percent; Georgia, 18.6 percent; Kentucky, 19.4 percent; North Carolina, 23.2 percent; Virginia, 21.1 percent; and West Virginia, 37.6 percent. Comparable percentages for the Appalachian counties showed some tendency to be higher than those for the six States.

Ratios of taxes to net income for all farms in the 205 counties are not available but in general it is evident that the portion of farmers' incomes taken by taxes has greatly increased as a result of changes in economic conditions since 1929. The severe drop in income, rather than increase in taxes, accounts for this. In most counties of the country farm taxes actually decreased from 1929 to 1932, but the decrease was not so great as the drop in farm income. For samples of several thousand owner-operated farms throughout the country, the average proportion of net cash receipts (before payments for taxes, interest, and improvements) taken by taxes increased from 13 percent in 1929 to 69 percent in 1932. In figuring net cash receipts, allowance was made for changes in inventory of personal property, but not for changes in real-estate value. There is little doubt that there was a somewhat similar increase in the ratio of taxes to net cash receipts in the Southern Appalachian counties.

FARM REAL ESTATE TAXES PER ACRE, 6 SOUTHERN APPALACHIAN STATES, 205 HIGHLAND COUNTIES, AND AVERAGE FOR THE UNITED STATES

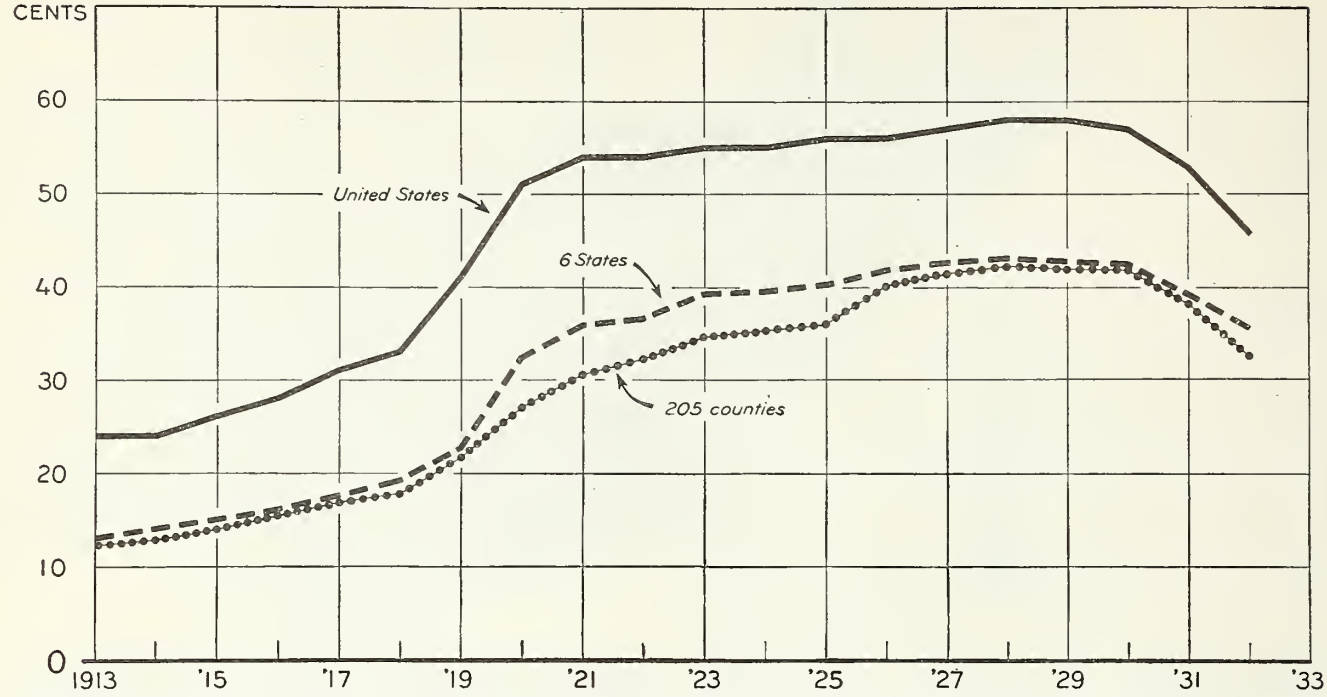

FIGURE 104.—The average farm real estate taxes per acre in the region rose from 12 cents in 1913 to a high point of 42 cents in 1928, then fell to 33 cents in 1932. For the six Southern Appalachian States as a whole they rose from 13 cents in 1913 to 43 cents in 1928, then fell to 36 cents in 1932. For the United States as a whole the corresponding figures were 24 cents, 58 cents, and 46 cents.

INDEX OF FARM REAL ESTATE TAXES PER ACRE, 6 SOUTHERN APPALACHIAN STATES, 205 HIGHLAND COUNTIES, AND AVERAGE FOR THE UNITED STATES

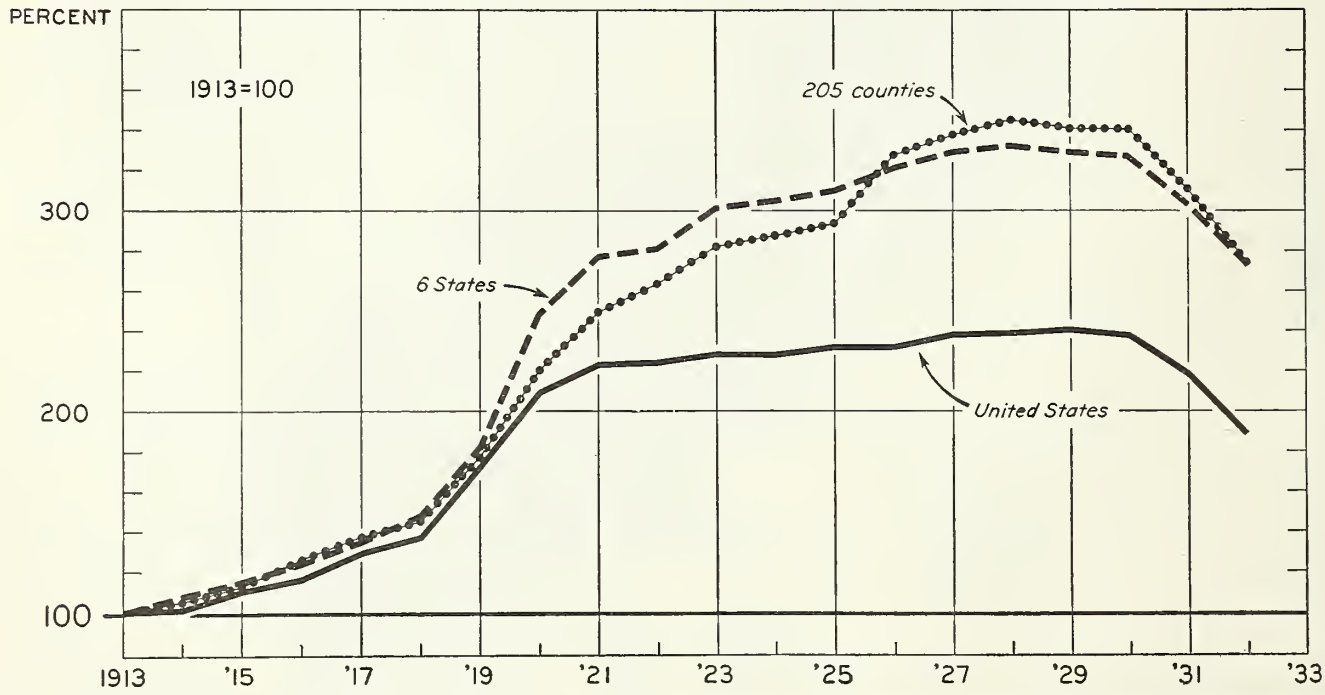

FIGURE 105.—By 1928, the year in which farm real estate taxes per acre reached a peak in the Southern Appalachians, taxes stood at 345 percent of the 1913 figure for the region, at 332 percent for the six States, and at 239 percent for the country as a whole. In 1932 the taxes per acre expressed as percentages of the 1913 figure, had decreased to 274 for the region, 273 for the six States, and 189 for the country as a whole.

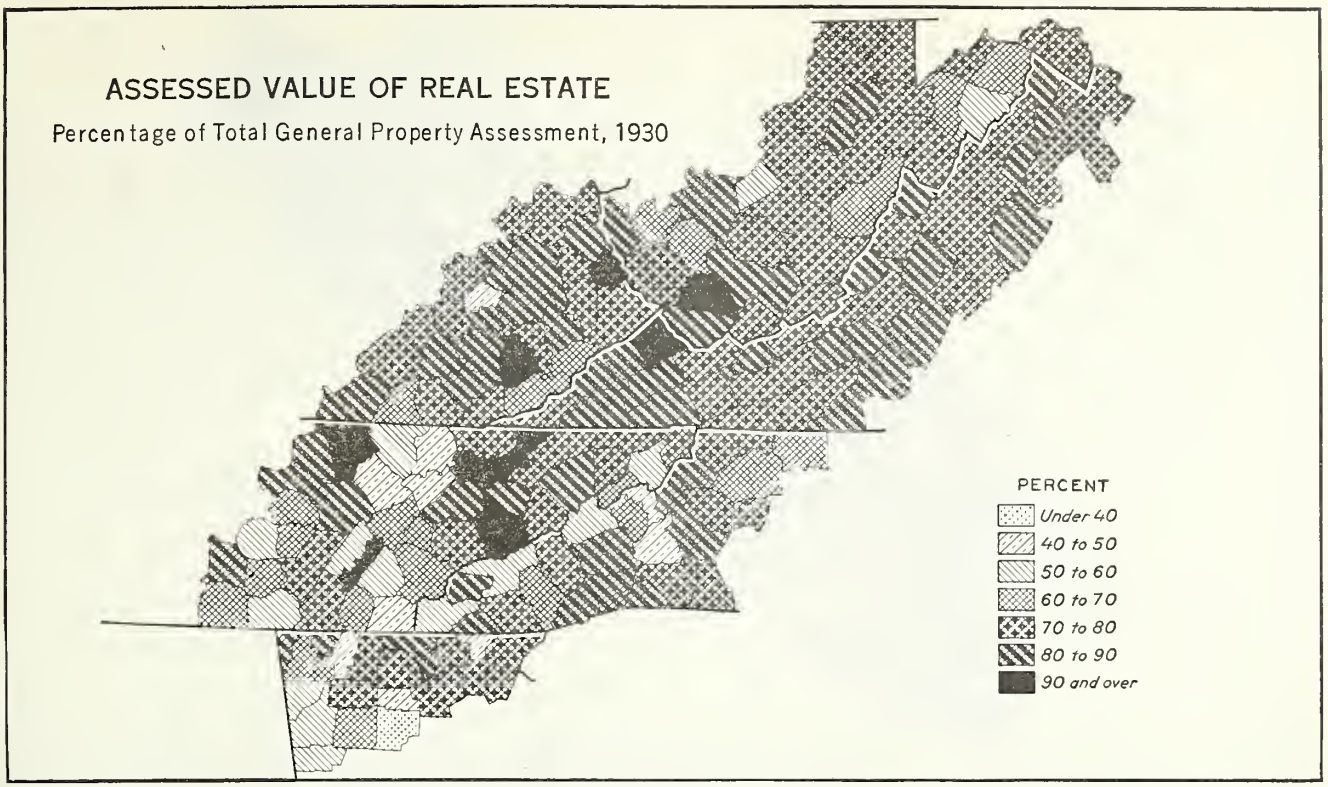

FIGURE 106.—For the 205 counties of the region, the assessed valuation of real estate varied from 38 to 98 percent of the total general property assessment, but in more than one-half of the counties, real estate comprised over 75 percent of the total. The unweighted average of county percentages was 74 percent. The extreme differences were due to wide variations in local resources and industry. The relationship depends upon the value of the land, the amount of personal property present, the extent to which personal property is listed for taxation, and the relative rates of assessment of real estate and personal property.

Although data as to net income are not available for the farms in the region, data as to gross income are provided for the year 1929 by the census. Subtracting from gross income the three major items of expense—feed, fertilizer, and labor—gives partially net income figures which are useful in indicating the relative weight of taxes upon farm income in different counties (fig. 107). Inclusion of total expenses probably would raise the ratios most in counties with the largest proportion of commercial farms. In counties in which self-sufficing farms predominate (fig. 53), the three expenses that are included ordinarily form a preponderant part of the total expense.

REAL ESTATE TAXES AND LOCAL GOVERNMENTAL FUNCTIONS

County governments and their subdivisions receive the principal part of their revenue from property taxes. The two largest items of cost of these governments are schools and roads, the two together commonly representing more than one-half of the cost of rural local government. In cities and villages other very important items appear. Examples of these are water and sewage systems and police and fire protection. Yet urban educational and highway facilities usually become more extensive and of higher quality than their rural counterparts, and their costs remain the major charges against tax receipts.

Recently, State governments have reached more and more into the educational and highway fields. Until the present time, State activities have been directed so as to avoid encroaching upon the functions of the local governments. They have been largely restricted to regulatory problems—that is, to problems concerning the establishment and administration of unified State-wide methods or standards. This has required increasing development of supplementary functions, such as the training of teachers. As these supplementary activities grew, most States searched for means of supporting them without increasing property taxes. Many current expansions of State activities are not aimed to supplement existing local governmental activities, but partially to displace them. This is calling for a revised view of the relationship between State and local governmental revenues.

One item called into serious question is that of "aids", or grants and subventions. Subventions or grants in aid have existed for many years as assistance rendered by State governments to their subdivisions. The Federal Government also grants aids for special purposes, notably for education and for highways. In one sense, such aids are partial substitutes for enlarged taxing jurisdictions. They are means of equalizing the funds available for governmental services between those jurisdictions of greater and those of less wealth or income, or they may cause a similar equalization between classes of taxpayers. The principle of taxing in proportion to ability to pay with equal distribution of benefits, obviously leads to equalization between taxpayers within any one jurisdiction analagous to that between different jurisdictions. To avoid such equalization would be to levy taxes strictly according to benefits received by the taxpayer. To do this is neither feasible in practice nor generally favored in theory.

Several serious problems have arisen in connection with the various types of aids. If by unduly restrict-

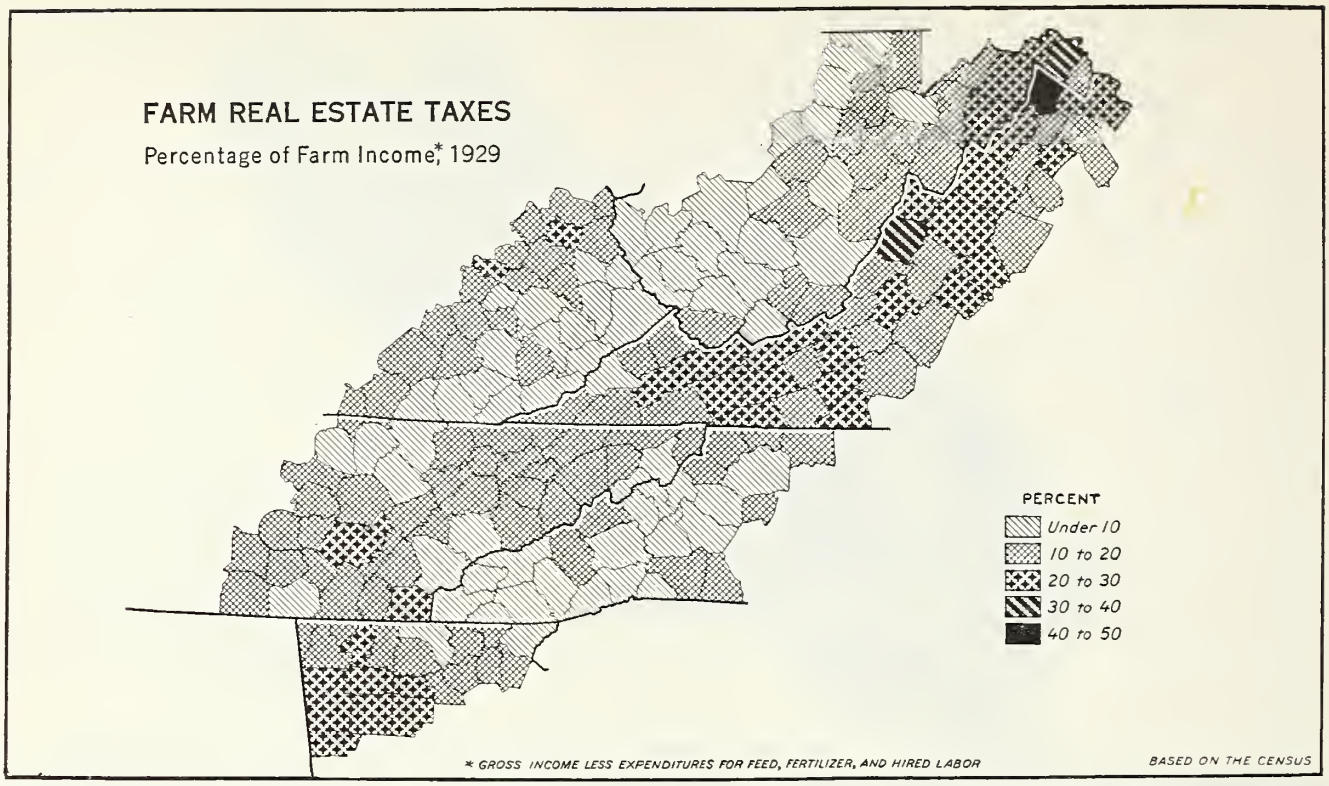

FIGURE 107.—The burden of farm real-estate taxes tended to be much lighter in the Cumberland Plateau, the Allegheny Plateau, and the Blue Ridge—subregions in which the self-sufficing type of farm tended to predominate—than in the Appalachian valleys and ridges, where more commercialized farming is practiced. If expenses other than those for fertilizer, feed, and hired labor were deducted, the probable effects would be to accentuate the contrast in burden of taxation on the poorer and the better farms.

ing the quantity and quality of service which it gives its citizens, a local government can obtain its principal support from aids, it may make little effort to obtain revenues locally. Occasionally a local government, for instance, levies no school tax, but supports its schools by State aids. This temptation has led to "dollar matching", or the requirement that a taxing jurisdiction shall raise a set minimum of local revenue in order to be eligible for an aid. This requirement in turn often encourages local governments to spend lavishly in order to obtain maximum aids. Dollar matching is likely to result also in aid to the local governments well able to raise considerable revenue locally, rather than to those most in need. The two tendencies of overspending and of underspending due to aids, have raised the further question of more direct and positive State control of local government. The principal types of control exercised so far concern tax rates, debts, and standards of service.

CONCLUSIONS DRAWN FROM TAX STUDY

In the tax situation of the Southern Appalachians, several significant points stand forth:

(1) Real estate taxes are high and, except during the present depression, their movement has been sharply upward.

(2) Demand for increases in governmental services is calling for added revenue.

(3) State governments have repeatedly raised minimum standards.

(4) The States (and the Federal Government to a lesser extent) have granted aids for the support of local functions.

(5) These State aids often have failed to relieve the local taxpayers as intended.

Some States are recognizing that aids often do not accomplish their purpose of relief. A prevailing question is whether other sources, such as the income and gasoline taxes, shall be tapped, without assurance that the resulting revenue will benefit overburdened property taxpayers. A related question is whether a State shall furnish funds to be administered by the local governments, or shall demand a voice in the control and administration. To an increasing extent the States are inclined to favor partial reorganization and greater centralization for the sake of efficiency.

Where impartial examination indicates that reorganization of the local government would increase efficiency, the people sooner or later must face the choice of forfeiting, in the interest of economy, some part of their local governmental independence, or of continuing the present degree of local control at the cost of higher taxes than would otherwise prevail. A wide degree of local option undoubtedly is worth something in satisfaction to a local community, but the question raised is, how much is it worth? At the present time, this decision and a broadening of the tax base, so that income from other sources will share the tax burden now borne by real estate, are the two most important farm-tax problems in the Southern Appalachians.

SCHOOLS AND EDUCATION

By W. H. GAUMNITZ, *senior specialist in rural-school problems, Office of Education, Department of the Interior,* with a foreword by L. R. ALDERMAN, *principal specialist in adult education and chief of the Service Division, Office of Education, Department of the Interior*

The presence or absence in any community of educational opportunities and of schools which provide such opportunities is a matter of far-reaching social and economic significance. A truly democratic social order is not possible unless the oncoming generation is taught to read and to write. Each member of such an order must also be equipped with knowledge and training sufficient and suitable to enable him to compete happily and efficiently with his fellows. In this section an attempt will be made to appraise, insofar as possible, the amount and the kind of the educational opportunities that are provided in the Southern Appalachians.

Much has been said and written about the very backward state of the schools of this region but it is obvious that blanket indictments are neither justified nor helpful. As is true of all other parts of our country, the schools of the Southern Appalachians are poor in some respects or in some communities, and good in many others. Only occasionally is a county found to be poor in most or all parts of its educational system. It is the purpose of this section, so far as possible, to show graphically just what these conditions are. It is hoped that the several types of indices presented will make it possible to see at a glance just where and how the system of education in the region is strong and where and how it is weak.

An appraisal of the educational conditions of the 205 counties in the Southern Appalachians is not only an essential part of such a general economic and social survey as this, but is also most timely. A planned system of education must more and more relate itself to all the factors of the social and economic order which it seeks to serve. It must exercise foresight with respect to such a far-reaching matter as determining the communities where populations and industries are destined to increase and where they will decrease. Society obviously cannot afford to develop expensive educational facilities in communities which, under any planned social order, must eventually become a State park or a national park, or a game or timber preserve, or be turned to some other use not suitable for the development of homes and industries.

Few attempts have been made thus far to provide a comprehensive picture of the educational conditions in the Southern Appalachians. A study of this character by Frost (*13*), of Peabody College for Teachers, should be mentioned. The facts presented in his study date back about 20 years, but they will be found useful as a means of comparing changes in conditions over a period of time.

INTRODUCTORY CONSIDERATIONS

The statistics used in this section were gathered largely from published reports and from the files of State departments of education. Variations in the character of the school statistics and in the manner of compiling such statistics made it very difficult to find educational measures for each of the counties of the several States that were sufficiently comparable to permit their presentation by hachure maps. Certain significant measures of education are not gathered in some States, and the costs in time and money in gathering these specifically for this survey for each of the 205 counties proved prohibitive.

So far as it was possible to obtain separate statistics for whites, this section of the study concerns itself with the education of white persons only. This limitation was necessitated by the fact that the effects of rugged topography, isolation, and other factors with which this study is particularly concerned could not otherwise be noted. Since educational provisions for Negroes, few of whom live in the more rugged areas, are usually inferior to those provided for whites, the inclusion of Negroes would have tended to obscure important differences in the quality and quantity of educational facilities in different counties.

It should be held in mind that the counties comprising the region vary greatly in the degree to which the terrain is mountainous, with all that term implies both socially and economically. As has already been pointed out some subregions, like the Central Appalachian Valleys, are rich in fertility, have land relatively well adapted to farming, are traversed by good roads, and in most other respects are similar to other well-developed agricultural areas. In such parts the schools as a rule are good or even excellent. The Southern Appalachians as a whole vary from such economically and socially well-developed subregions to other subregions of which large parts are extremely rugged, sparsely settled, and largely undeveloped culturally. In these parts the educational problems are very dissimilar to those in the Central Appalachian Valleys. But extreme backwardness of educational conditions is limited chiefly to the comparatively few isolated and undeveloped areas and is not general throughout the region. It is in part the purpose of this study to cause these backward areas to stand out in order that efforts looking toward improvement may be concentrated there.

School conditions are, of course, greatly influenced by such factors as State and local policies of school administration and State and local policies of tax assessment and distribution. Then, there are such variable but potent influences as popular attitude, character of leadership, and the interplay of social and economic forces. In any effort to account for the specific educational conditions revealed or to correlate the facts depicted one must bear these influences in mind. Variations between States will sometimes point directly toward specific State policies, but variations between counties can often be explained only if all the local factors are known. For example, it is a State policy in West Virginia to pay to teachers salaries comparatively higher than those paid in the other five States of the Southern Appalachians; but, as between counties in West Virginia, the location of mines is an important local factor influencing the quality of public education.

In the following discussion the major lines of inquiry will be developed in the order named: (1) Proportions of the various age groups attending school; (2) illiteracy conditions both present and future; (3) educational opportunities provided as measured by (*a*) annual number of days schools are open and regularity of attendance, (*b*) school progress and retention, and (*c*) provisions for training through club work and classroom instruction in the practical arts; (4) the quality of education available as measured by (*a*) salary, training, and experience of the teachers employed and (*b*) value of buildings and grounds, assessed value of property

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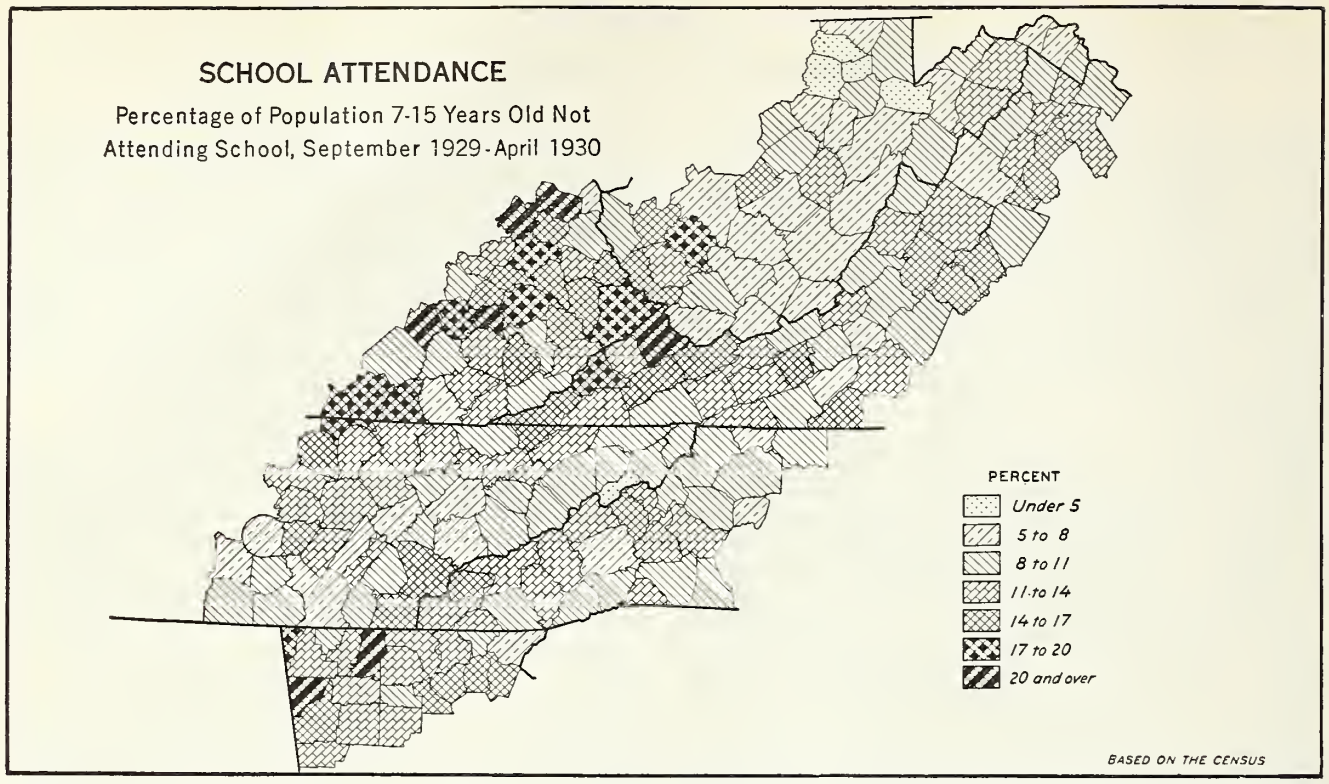

FIGURE 108.—Under the American system of education, children 7 to 15 years of age are expected to attend school. Compulsory education laws of Kentucky, Tennessee, and West Virginia require the attendance of children 7 to 16 years old; Virginia, 7 to 15; North Carolina, 7 to 14; and Georgia, 8 to 14. Despite these facts, fully one-fifth of the white children 7 to 15 years of age did not attend schools of any kind between September 1929 and April 1930 in 7 counties of Kentucky, Georgia, and Virginia. All 6 States showed counties with one-seventh of this age group not attending school.

taxed, annual school expenditures, and financial aid to schools from State and Federal sources; and (5) detailed studies of selected counties to show the location and accessibility of the schools in mountainous areas.

POPULATION AND SCHOOL ATTENDANCE

The first essential of any system of education is that the schools shall be accessible to the children. The proportion of the total number who are educable actually enrolled is probably the primary measure of whether educational opportunities are available. In counties in which a large percentage of the children fail to attend it may be assumed that the schools are either hard to reach or unattractive, or both.

The data presented (figs. 108, 109, 110) should be regarded as affording comparatively rough indices of the relative extent to which people are not reached by elementary, secondary, and adult educational endeavor respectively. Conversely, those in school are also shown. Figures 111 and 112 provide some idea of the degree to which educational responsibilities are divided between publicly and privately supported institutions.

A great many facts must be taken into account in interpreting these school-attendance data. Many persons normally of high-school age, because of educational retardation will be found in the elementary schools. On the other hand, a few will have made rapid progress and will be found in educational groups beyond their normal age levels. The census data for school attendance includes all those who, for any period, either long or short, attended school during the period from September 1929 to April 1930. Pupils attending commercial-business schools and evening schools, and others receiving formal instruction on a part-time basis, as well as those attending the regular day schools, were included. Figures presented, therefore, will have to be considered as approximate—especially those relating to high-school ages. In figures 111 and 112 allowance must be made for the pupils living in one county and attending school in another. This source of error is limited chiefly to college and high-school levels, and more especially to counties having schools under private control.

A question may be raised as to why there are not closer relationships between the proportion of children out of school and the subsequent data showing percentage of illiteracy, grades to which pupils continue in school, taxable wealth, and the like. The census from which the data relating to school attendance and illiteracy were obtained, defines as illiterate "any person 10 years of age and over who is not able to read and write, either in English or some other language" (*50*). Illiteracy should be expected to reflect the presence or absence of educational advantages. But it must be borne in mind that the bare ability to read and write is an extremely low measure of school accomplishment. Practically all communities offer their children sufficient education to make them literate. In some States definite campaigns have been undertaken to abolish illiteracy. This level of educational achievement is therefore often reached despite poor school attendance.

Data showing continuance in school are unfortunately limited to the public schools. Pupils who continue their high-school work in private schools are not included. Besides, many of those attending public high schools live in one county and attend school in

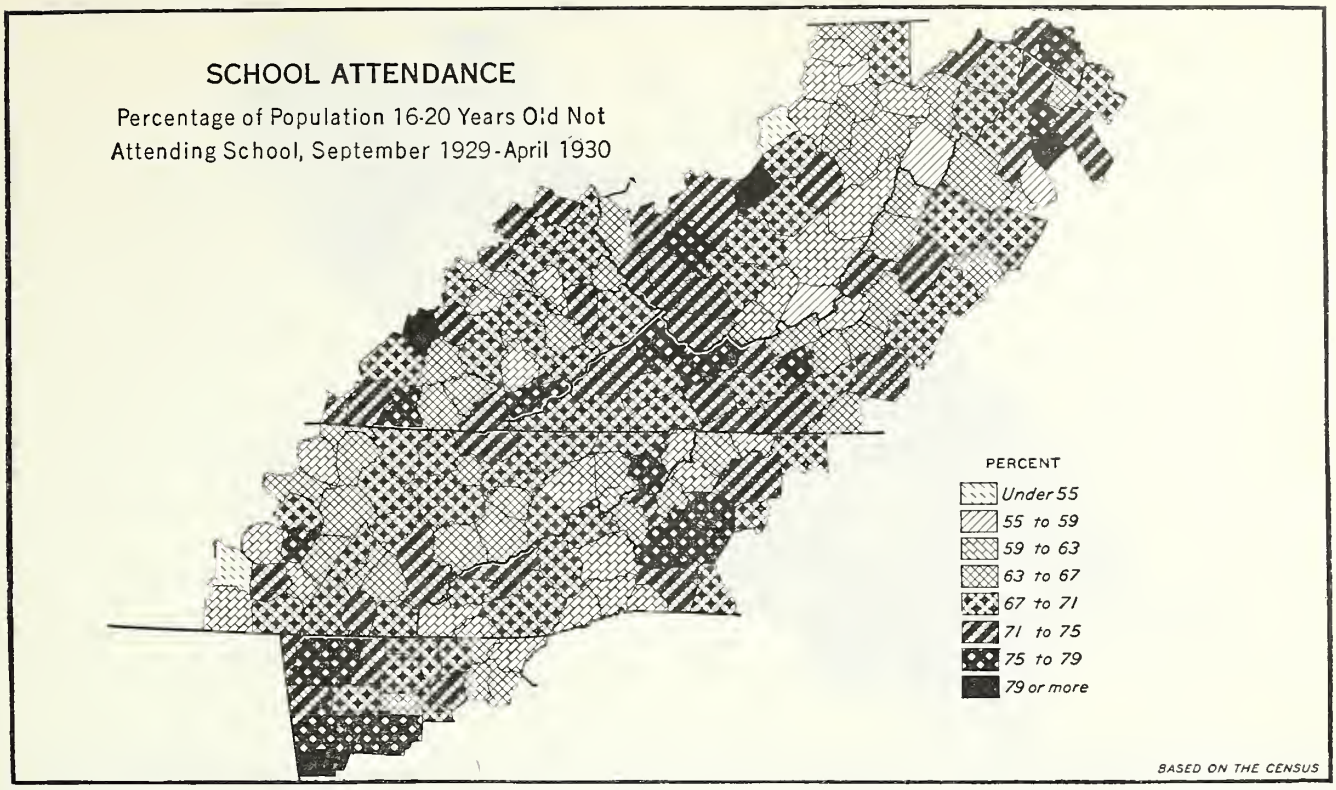

FIGURE 109.—In 23 counties more than 3 out of every 4 persons 16 to 20 years of age did not attend any school during the school year 1929–30. Counties with high percentages of children out of school were somewhat scattered throughout each of the 6 States. Since this age group coincides roughly with the age of pupils in high school this figure presents a fairly accurate picture of the extent to which children in the region are not being reached by a secondary education.

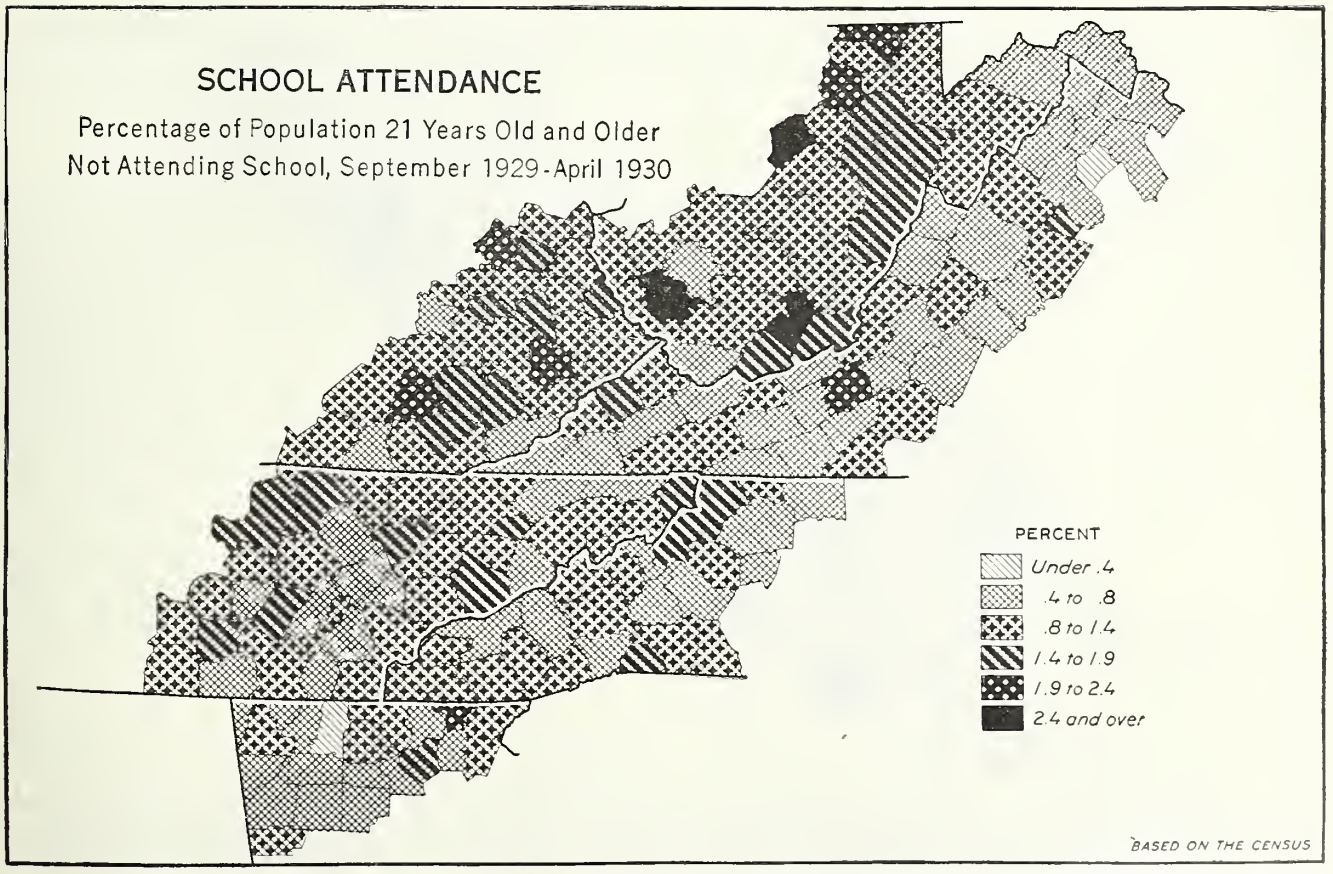

FIGURE 110.—Comparatively few people in the region who are over 20 years of age are attending school. For the school year 1929–30, however, 3 West Virginia counties included in the study showed 2.5 percent or more of this age group attending some school. On the other hand, there was 1 county in Virginia and another in Georgia in which practically none of this group attended school. Persons over 20 years of age who attend school are usually in college or in classes for illiterates and therefore represent the two extremes in educational endeavor.

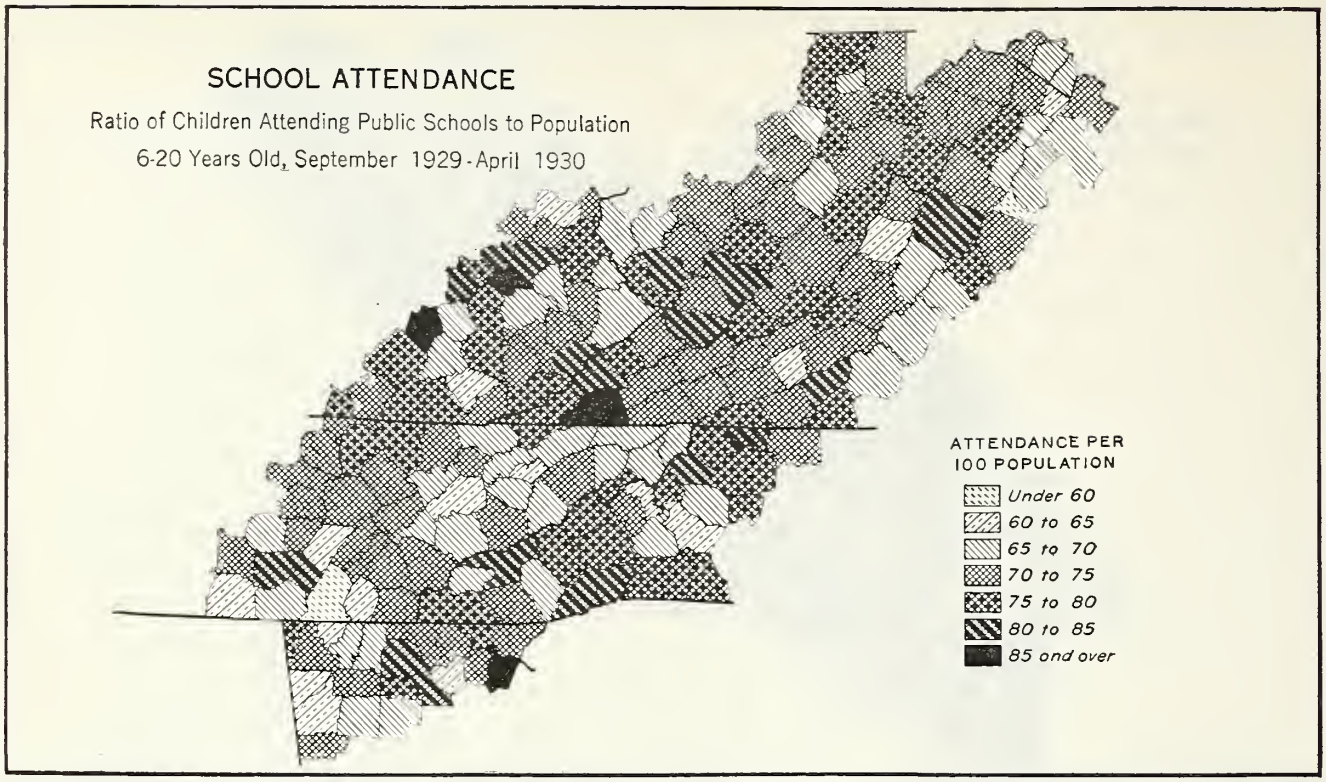

FIGURE 111.—As might be expected, most of the persons 6 to 20 years of age who are attending school are enrolled in schools maintained through public funds. The proportion of all children 6 to 20 years years old who attend public schools is influenced by the number attending private schools and the number not attending any school. In some cases, differences in the ratios of attendance between counties are exaggerated because pupils are enumerated in their home counties but are counted as attending school in another county. (Based on reports of the State departments of education and the census.)

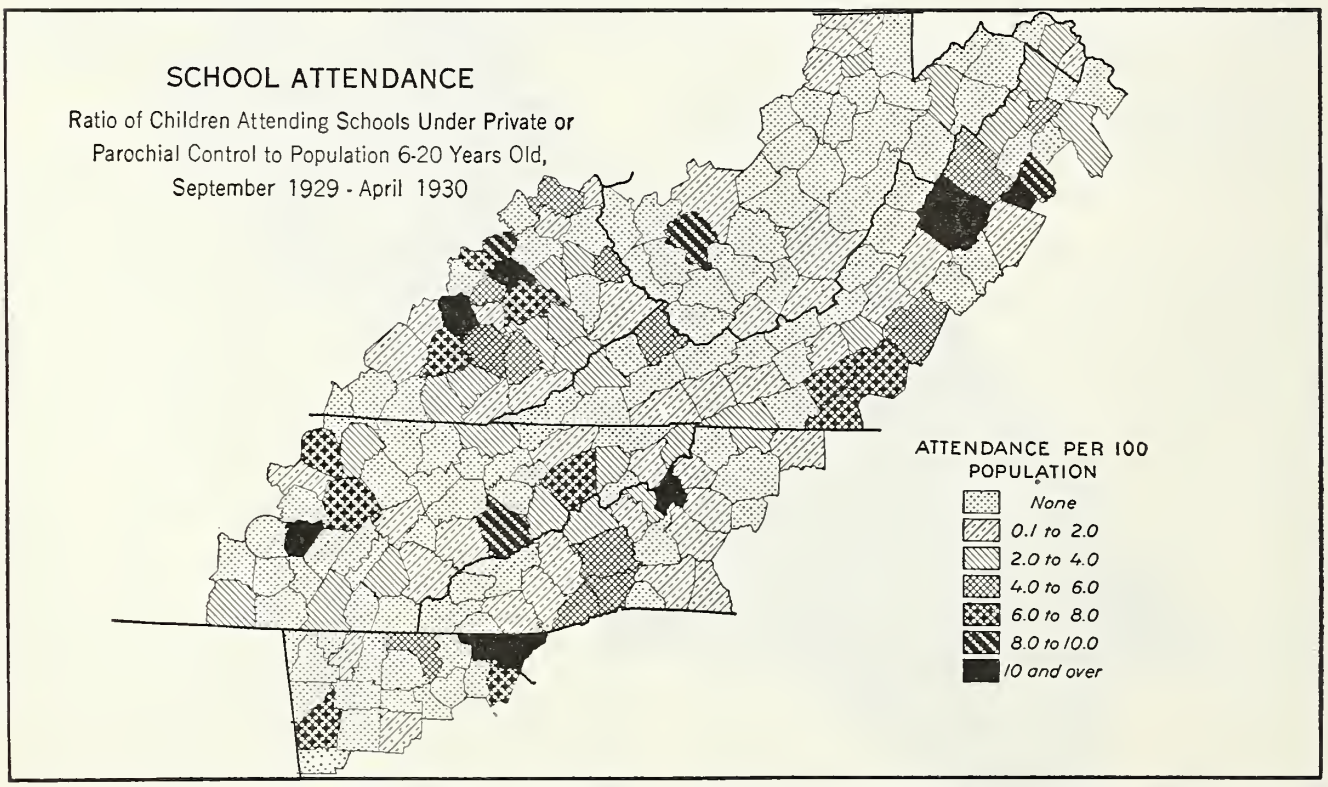

FIGURE 112.—Data here presented provide, in part, a complement to those in figure 111. Except for the Central Appalachian Valleys, attendance at elementary and secondary schools under private control is limited chiefly to counties with localities in which public education especially on the secondary level is not readily available or in which the service rendered by such education is meager. In a few counties a single school accounts for the large proportion of children in private schools in the county. (Based on reports of the State departments of education and the census.)

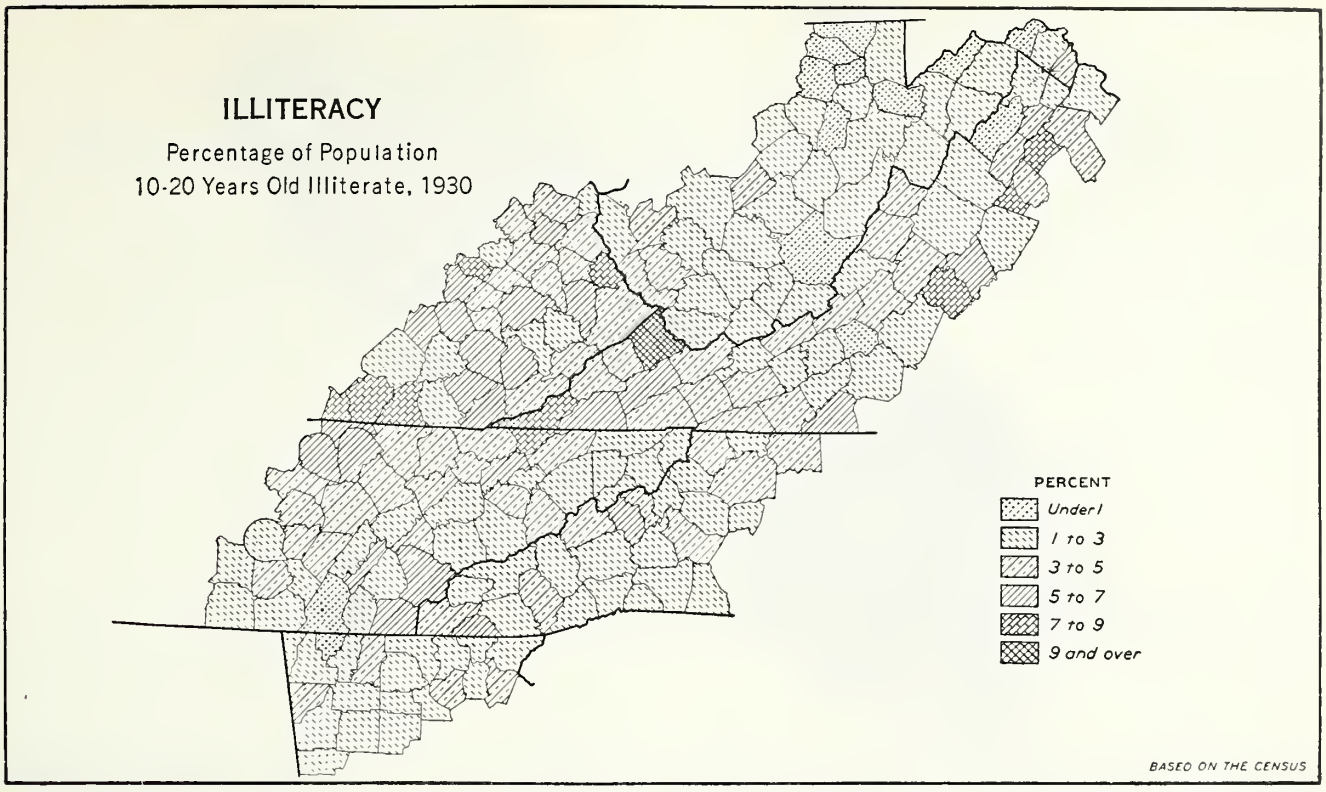

FIGURE 113.—Since a child 10 to 20 years of age should either be attending school or have only recently completed his schooling, these data may fairly be regarded as indicating the extent to which the schools are at present failing to produce a literate citizenry. Many counties, including several in or near which are large cities, show few such youthful illiterates; in 11 others (10 of which are in Kentucky and Virginia) fully 7 percent of the population 10 to 20 years of age in 1930 were reported unable to read and write.

another county. For those data relating to proportion of children out of school (figs. 108–111), pupils are counted where they live; for those relating to continuance in school (figs. 120 and 121), however, they are counted in the counties where they attend.

It would be difficult if not impossible to establish a definite relationship between the amount of taxable wealth and educational opportunities provided. Naturally, counties that have very low wealth are strictly limited in the schooling they can provide. But it does not always follow that if a county has much wealth it will spend a proportionately large amount upon education.

These limitations do not mean that the data on population and school attendance and progress through school have no value in a general survey of educational conditions. On the contrary, the data serve as important indices of such conditions in any given county. The point is that education is a very complex social function and the measuring instruments in use are crude. Therefore its various aspects can by no means be fully evaluated by a general survey. To trace out the various interrelationships involved would necessitate an intensive study.

ILLITERACY

Since there is very little foreign element in the Southern Appalachians the census definition of literacy would mean ability to read and write English. No specific test of literacy is applied by the census enumerator, but a proficiency greater than the scant ability to write one's name is expected.

Even when this very low standard of literacy is applied it is clear from the data here presented (figs. 113 and 114) that the schools have failed in a large number of cases to achieve this result. It is particularly disturbing to note that not all of the illiterates are left-overs from a past generation. The fact that in many of these counties there are a considerable number of children 10 to 20 years of age who are unable to read and write is evidence that the present inadequate efforts of these counties are leaving the handicap of illiteracy upon these children. A normal child, except under unusual circumstances, should have been taught to read and write by the time he is 10 years old.

EXTENT AND TYPES OF EDUCATIONAL OPPORTUNITIES

Data already presented (figs. 108–112) may be thought of as indicating the extent to which, in the various communities, there are schools of various levels sufficiently close to the homes to provide educational opportunities within the reach of the children. Beyond the question of the bare availability of schools there is the significant question of the amount and kind of education made available.

LENGTH OF SCHOOL TERM AND REGULARITY OF ATTENDANCE

A primary consideration is whether the schools are open and for what portion of the year. Unless schools are actually in session their presence or absence in a community does not greatly matter. School opportunities are obviously very different in a community where the school is open for 9 months from what they are where the school is open only 5 months. It is practically impossible to accomplish satisfactory results in preparing children for life in schools open less than half of the year. The next important point is whether children attend regularly while the schools are

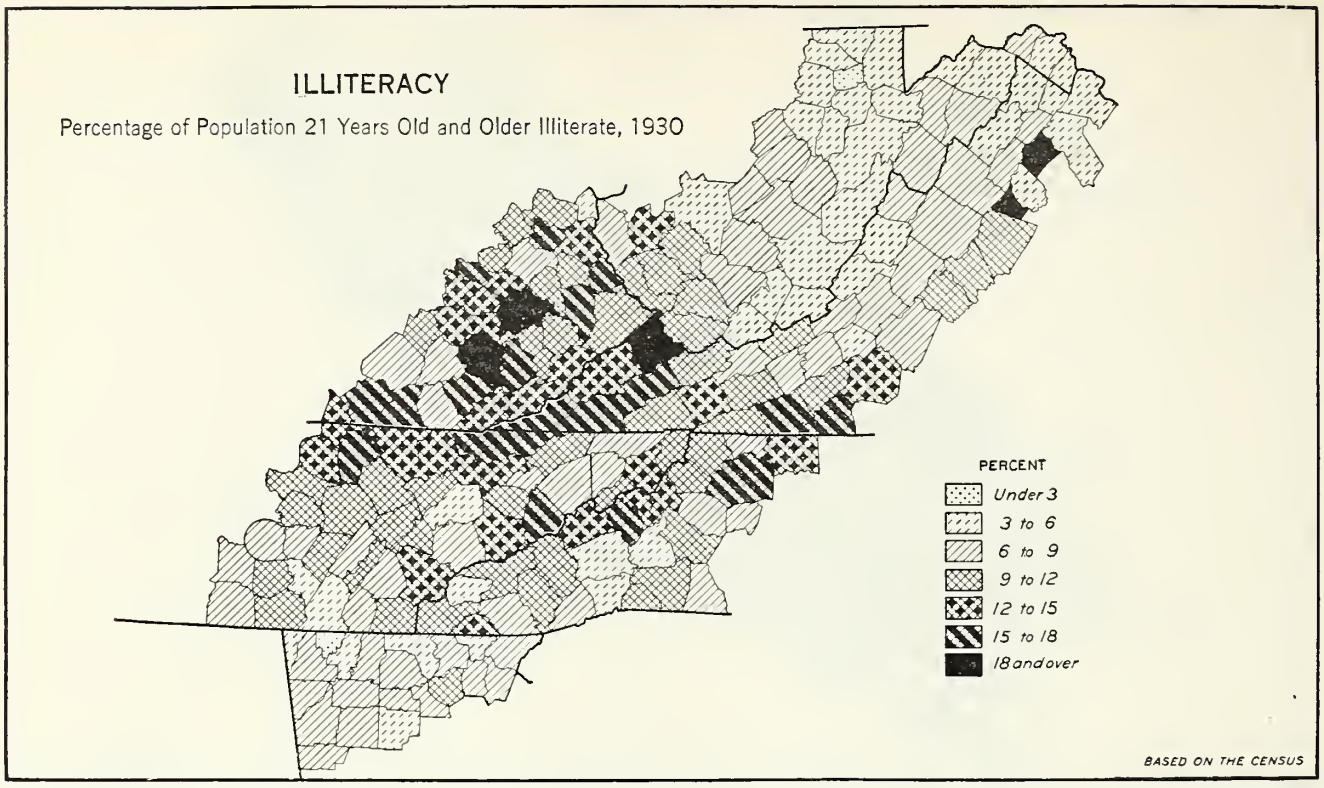

FIGURE 114.—The percentage of illiterates in the population over 20 years of age indicates fairly well the extent to which schools in the past have failed to produce a literate citizenry. It may also he observed that counties which show much or little illiteracy among adults, generally speaking, show similarly high or low illiteracy among those 10 to 20 years of age (fig. 113). Those counties having a large percentage of illiterates also probably have many adults who have an education only slightly above the ability to read and write.

in session. Wide variations are found among communities in both respects (figs. 115 and 116). Some counties and some States clearly excel others in the regularity with which pupils attend school as well as in length of school term. The more mountainous counties of Kentucky, Georgia, and North Carolina provide distinctly fewer days of schooling for their children than those of the other three States in the region. The average length of school term for the United States was 175 days in 1930, and the average number of days attended by the pupils enrolled was 143.

Closely related to the length of the school terms and the regularity of the attendance is the progress the pupils make through the grades. It may be assumed that the greater the number of days children are in school and the better the quality of instruction provided, the more rapidly they will complete the curriculum prescribed, or acquire the information, attitudes, and habits that society deems necessary.

EDUCATIONAL PROGRESS

To obtain a fair index of the progress the children make through the schools of the several counties, data relating to age of pupils and grade attained were compiled and compared. For example, a child 10 years old, if he makes normal progress through the grades, should be in either the fourth or the fifth grade. A child in the fourth grade who is older than 10 years is behind the normal grade for his age and is therefore said to be retarded in his school progress. The percentage of children who were retarded in 1930 are shown in figure 117.

In considering the percentage of pupils who are retarded in their school progress the question naturally arises as to how much they are retarded. When children are found to be several years behind their normal grades it tells quite a different story about the character and amount of school opportunities available than when they are retarded but a single year. To arrive at an average figure of retardation for each county (fig. 118) the fourth grade was used as representative of the entire situation. The retarded children were weighted by the number of years each was retarded. There were some pupils who were as much as 6 years older than the normal ages for grade 4; there were very large numbers who were 1 year older. Dividing the total number of years all pupils were retarded by the total number of pupils in the fourth grade yielded an index of overageness comparable for all counties.

There is a great deal of retardation in the region. The fact that children enter school late and frequently attend irregularly only partially accounts for their slow progress. The distances of the schools from many isolated homes and especially the low quality of education provided in some communities are probably the chief causative factors. Retardation tends to beget more retardation because it is most difficult to teach, in the same grade, children who are as much as 5 and 6 years apart in point of age. One may logically raise the question whether the school system, through more and better education, should not seek to prevent a situation in which persons 15 and 16 years of age are in grades adapted to much younger children or whether an entirely different type of school should not be provided for persons who have become overaged for their grades.

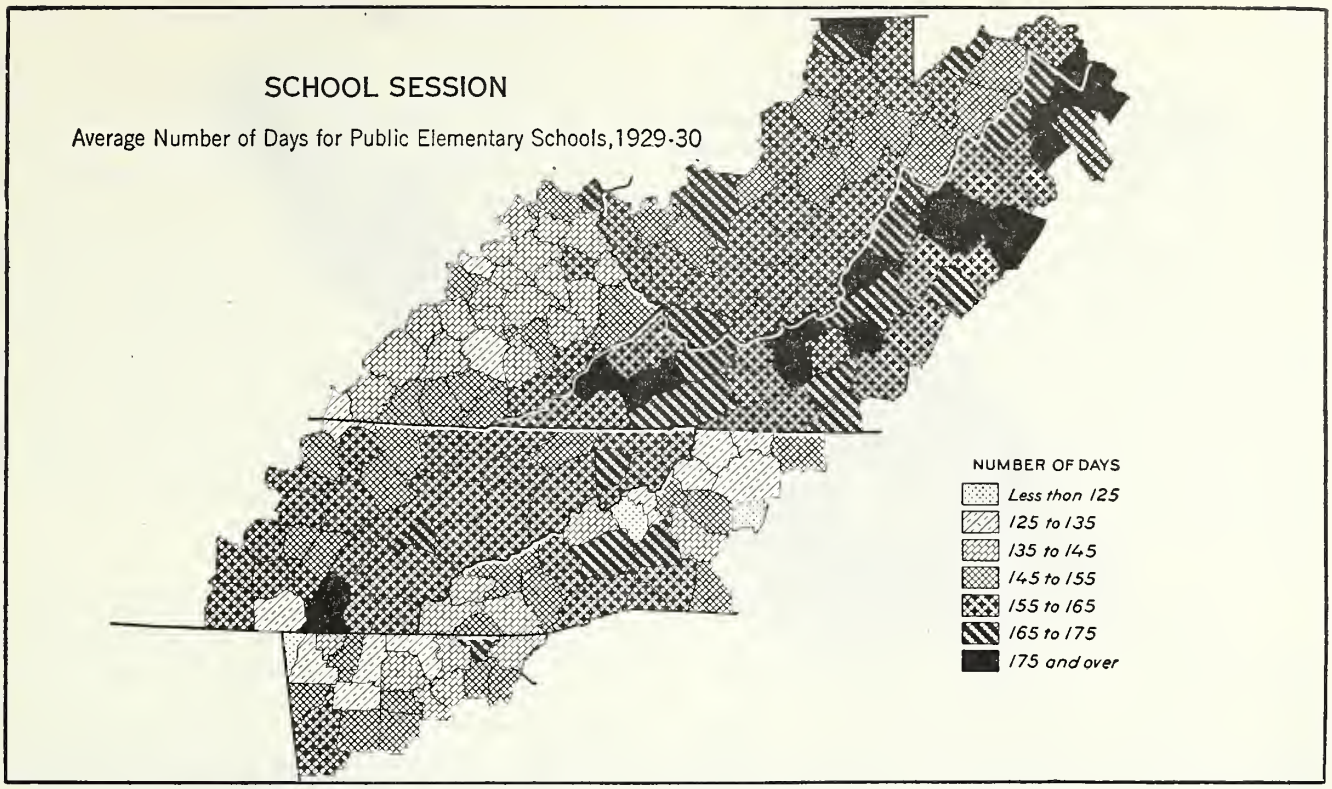

FIGURE 115.—In 3 counties the elementary schools were kept open an average of less than 125 days during the school year 1929–30, and in 14 others less than 135 days. On the other extreme, there were 15 counties, several in or near which were large cities, that maintained schools an average of 175 days or more. Considerable variation in the length of the school term, which frequently exists within the several schools of a given county, is not revealed by these data. (Based on reports of the State departments of education.)

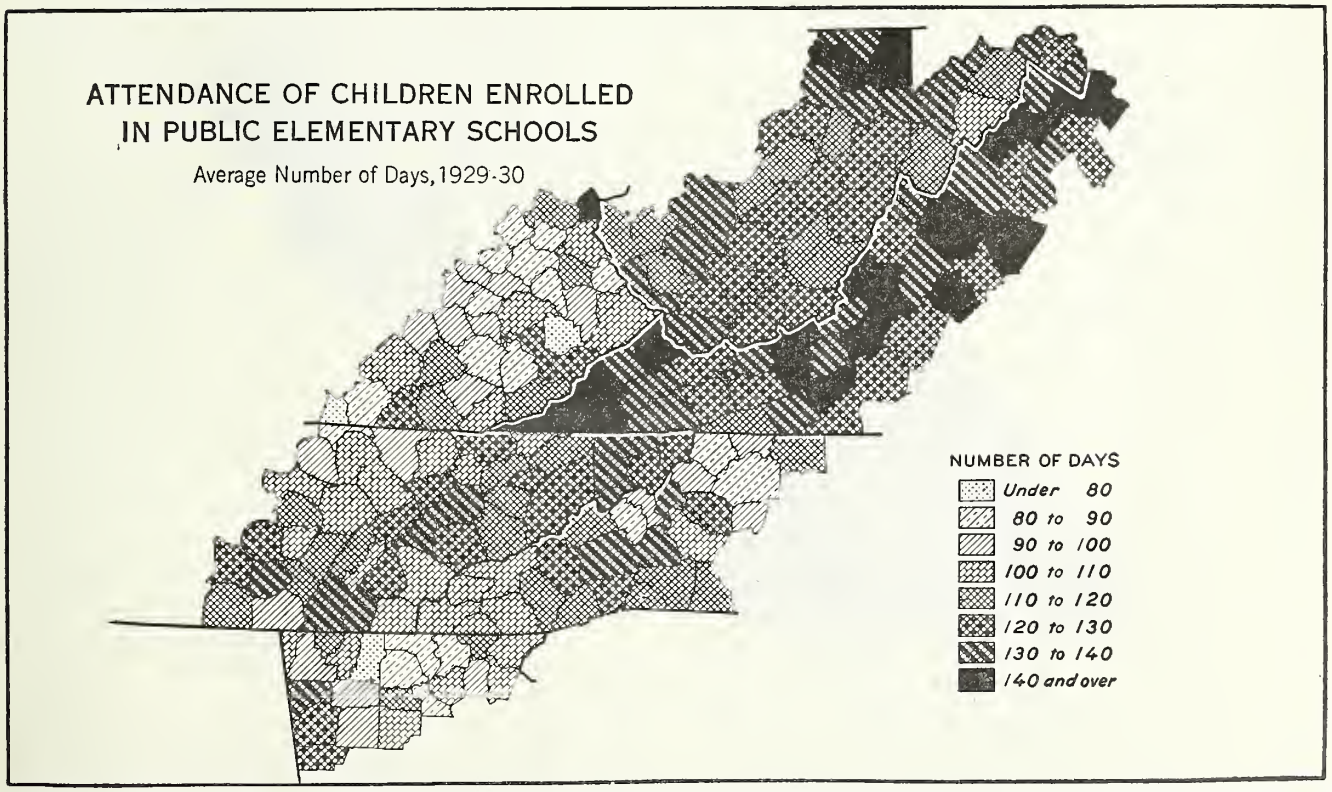

FIGURE 116.—The length of the school session limits definitely the maximum number of days children can attend school during the year, but other factors such as the remoteness of schools, the degree to which compulsory-education laws are enforced, and popular attitude, largely determine how regularly they attend. In general, there is a close relationship between the data presented in this figure and those of figure 115. Regularity of attendance, however, seems to be disproportionately lower in those counties in which school sessions are short. (Based on reports of the State departments of education.)

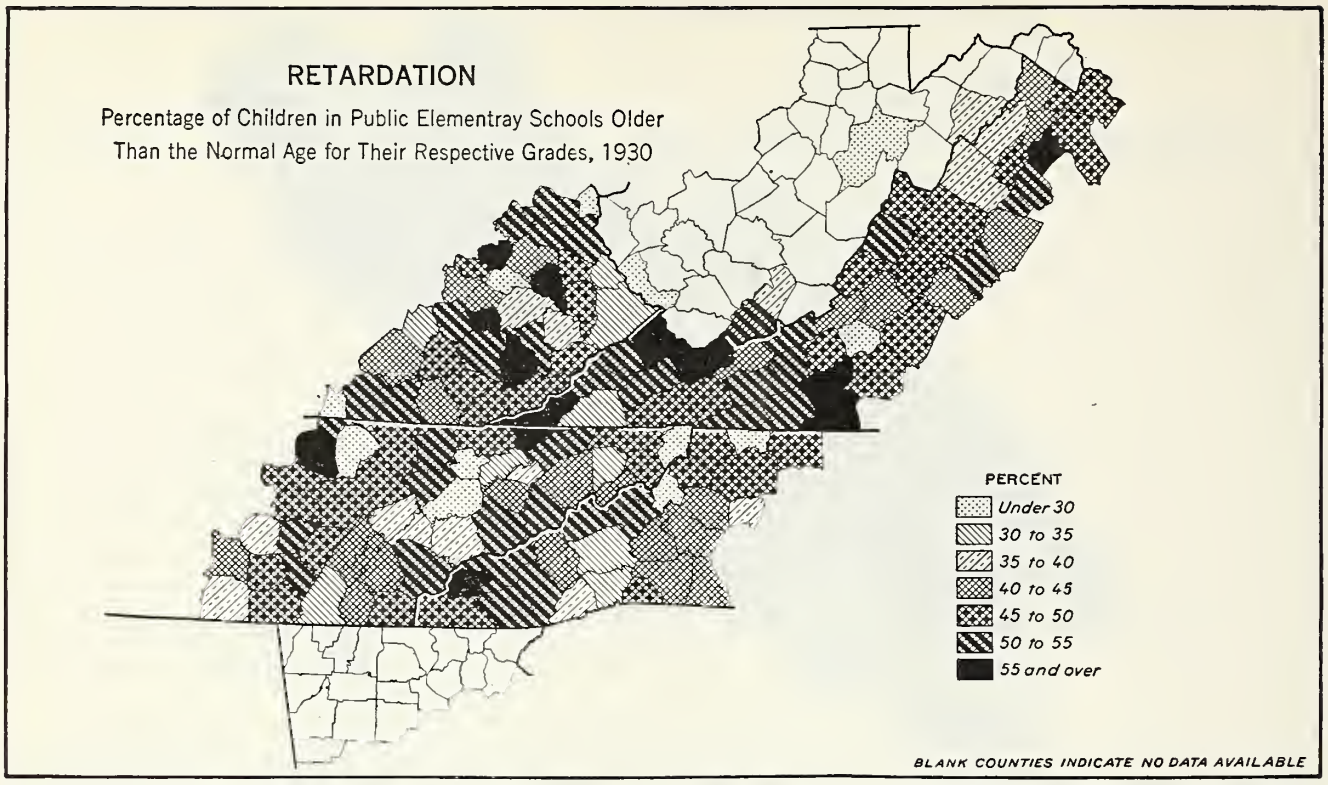

FIGURE 117.—In those parts of the region for which data were available there were 13 counties in 1930 in which 55 percent or more of the children in the elementary schools were older than they should be for their grade in school. Many of the remaining counties also had a very high proportion of pupils in school grades lower than normal for their age. The data presented in this figure and those of figure 115 show comparatively little relationship between retardation and length of school session. (Based on reports of the State departments of education.)

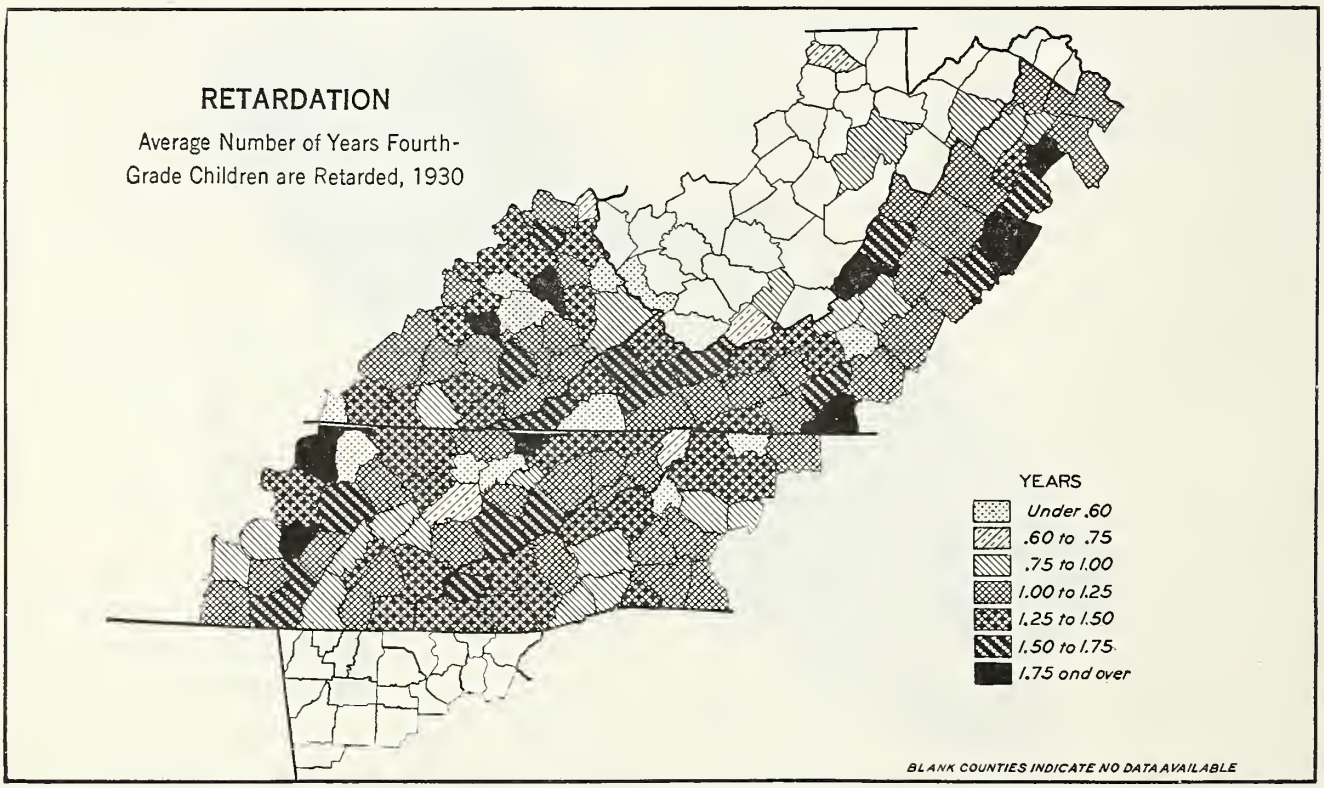

FIGURE 118.—There is a very close relationship between the percentage of pupils retarded (fig. 117) and the average number of years all pupils in the fourth grade are retarded. In other words, counties that have many pupils behind their regular school grades also show the pupils as a group to be many grades behind. Retarded pupils, as a rule, tend to become discouraged and usually leave school long before completing the elementary grades. (Based on reports of State departments of education.)

Retardation in school progress does not show as close relationships to length of school term and regularity of attendance as one would expect to find. Several explanations may be hazarded. The standards upon which children are passed from grade to grade vary between schools. No general or absolute basis of promotion exists. In schools in which the school term is short the amount and quality of work required of the pupils are often low. It is also probable that schools in which the school term is short spend more time in drill upon minimum essentials. Some degree of proficiency in reading, writing, and arithmetic is demanded for promotion in all schools. The less total time available, the larger the proportion spent upon these subjects to the exclusion of other worthy school activities, such as health education, citizenship training, and character training. Thus it is possible to promote pupils about as regularly in schools with short terms as in schools with longer terms.

CONTINUANCE IN SCHOOLS

Still another measure of the amount of education made available in the region is the grade level reached by the children before leaving school. For this purpose, ratios were computed (figs. 119, 120, and 121) between the number of children in the third grade and the number in the sixth grade, the first year of high school and the last year of high school, respectively. The third grade was used as a basis of comparison because the number of pupils in this grade seemed most nearly to approximate the total number of those educable in a given age group. Pupils starting school late are represented in this grade and elimination because of overageness has not yet taken place to any great degree. Since the high schools attended by the pupils are not always located in the same counties in which the children reside it may be that the ratios given in figures 120 and 121 show certain counties to be retaining larger proportions of their educable children than is true to fact. A few counties have no public high schools within their borders and in others the existing high schools do not offer more than 1 or 2 years of high-school work.

Some pupils, especially when they are ready for high-school work, leave the public schools and attend private schools. Data showing the continuance in school of such pupils could not be gaged and therefore are not included in figures 119 to 121. The percentages of children retained to the higher grades are also influenced by the proportion of children of successive ages in the various communities who migrate and those removed by death. As children approach adulthood many of them, more in some counties than in others, leave their home counties to work or attend school elsewhere. Comparative losses in school attendance due to death probably will not greatly affect the percentages because the death rate is low and fairly constant as between counties.

As a rule, children who become retarded in their progress tend more and more to drop out of school as they become overaged. Retardation is therefore usually one cause of early elimination. But in the sixth grade this factor may actually work the other way. Sixth-grade enrollments are sometimes higher, not so much because a county is successful in keeping children in school, but because there are many pupils who should normally have moved on to the next grade but did not.

The ratios present in figures 119, 120, and 121 were computed for counties as wholes. It is clear that if data for individual communities were available they would show even more extreme conditions. In some mountain communities children seldom progress farther in their school work than the fourth or fifth grade; in others, comparatively large numbers reach high school. Generally speaking the grade levels to which children are retained in the schools are low for the entire region. By comparison it should be noted that for the United States as a whole an average of about 82 percent of the children of a given age group reach the sixth grade, about 70 percent enter the first year of high school, and about 30 percent reach the last year of high school. Thus it is clear that, from any viewpoint, the opportunities for an education are seriously limited in many of the 205 counties. School terms are short, attendance is irregular, progress through the grades is poor, and the entire school career of many children is closed at or just above the middle of the elementary period of education. Comparatively few receive an education equivalent to high school.

PRACTICAL NATURE OF EDUCATION

In figures 115 to 121 an attempt has been made to present indices of the amount or quantity of educational opportunities provided in the Southern Appalachians. By implication these illustrations, as well as figures 108 to 110 showing percentages of various population groups attending school, also show in a general way the kind or type of educational opportunities provided. To throw some additional light upon the kind of education provided in these counties data were gathered along two lines (1) opportunities for instruction in the practical arts and (2) membership in girls' and boys' clubs.

Since the economic and social life in the region is intensely practical and in many counties rather close to the margin of want, it may be assumed that the type of education given under the Smith-Hughes and George-Reed Acts (vocational education in agriculture, home economics, and trades and industries) and the Smith-Lever and Capper-Ketcham Acts (as they apply to agricultural extension work with boys and girls) is particularly significant. In figure 122 the ratio of enrollment in agriculture, home economics, and in the trades and industries to population 16 to 20 years of age is shown. Many of the 205 counties, especially those with large mountainous areas, seem not to provide these types of instruction in their schools; and, in only 22 counties, do more than 10 percent of the pupils receive such instruction. Since these types of education are almost entirely limited to the high school, the fact that comparatively few of the children reach this level of education probably accounts, in a large measure, for the small percentage of pupils enrolled for instruction in this type of education.

Boys' and girls' clubs (fig. 123) are not, strictly speaking, a part of the system of public-school education. As at present administered, such clubs form a part of the program of agricultural extension. As a rule they are organized and supervised by club leaders and county agricultural and home demonstration agents. Their chief purpose has been to interest and instruct children 10 to 20 years of age in the practices of scientific agriculture and home economy.

But boys' and girls' clubs do have great educational possibilities. Through agricultural clubs and similar

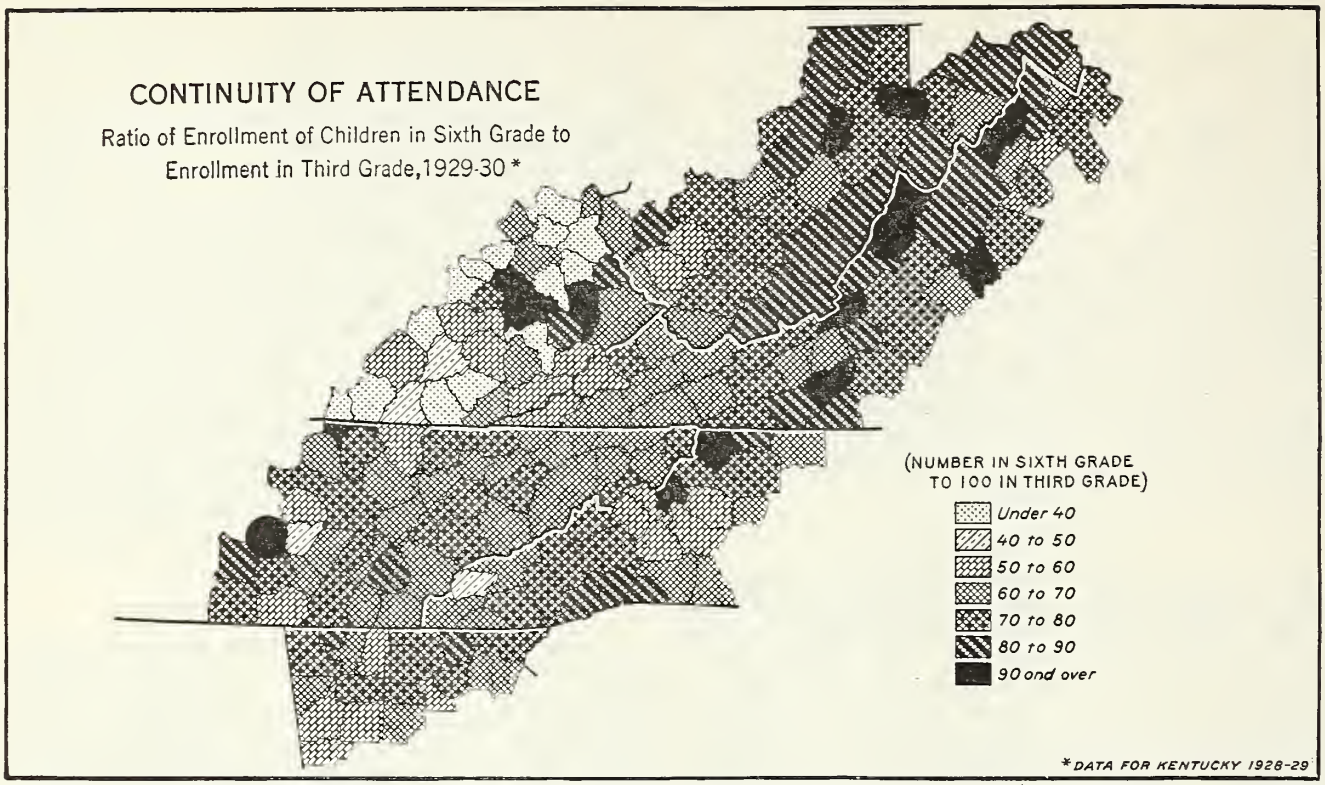

FIGURE 119.—In several counties, especially in Kentucky, enrollment of children in the sixth grade in 1929–30 was less than one-half that in the third grade; in many others, it was at least three-fourths that in the third grade. These data indicate that the level of educational accomplishment with which many of the children in the region will enter adult life will be somewhere between the third and fifth grades. They also indicate wide variations among counties with respect to educational opportunities. Data for Kentucky are for the year 1927–28. (Based on reports of the State departments of education.)

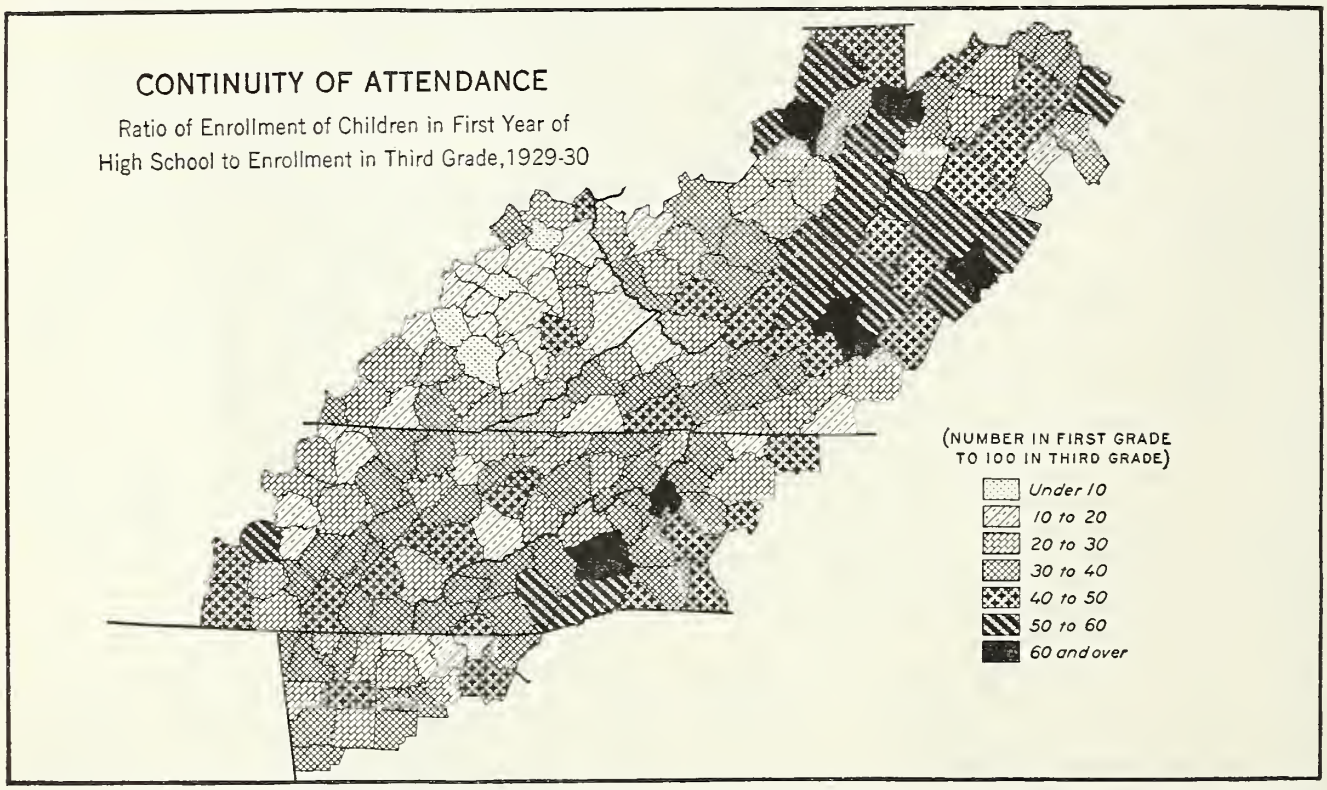

FIGURE 120.—In more than 30 counties the enrollment in the first year of high school was less than 20 percent of that in the third grade. Several counties, chiefly in the northern part of the region, however, showed over 50 percent reaching high school. The average for the United States is about 70 percent. If these data constitute a fair index it is clear that in large portions of the Southern Appalachians a comparatively small proportion of children attend high school. Data for Kentucky are for the year 1927–28. (Based on reports of the State departments of education.)

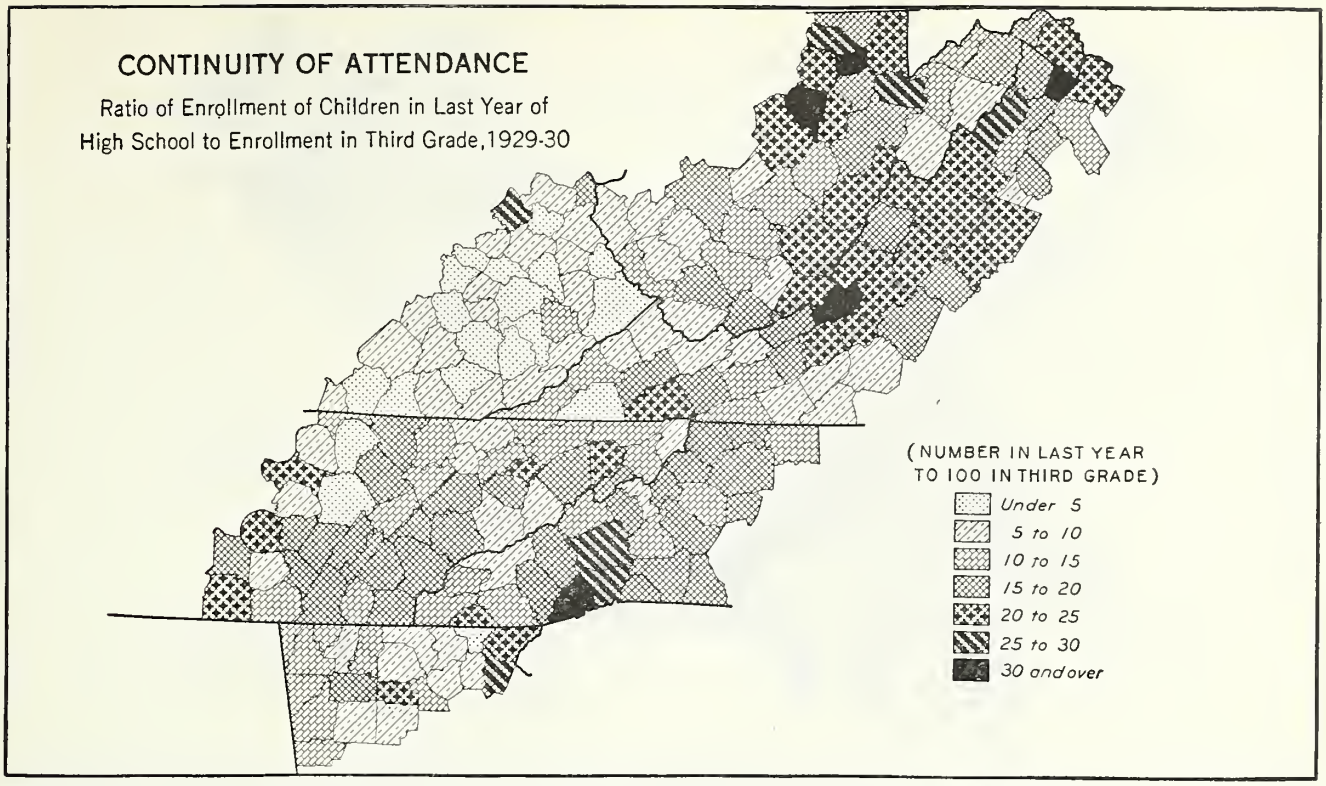

FIGURE 121.—Many pupils who enter high school drop out before reaching the last year. In more than one-third of the counties in 1929–30 less than 1 person was enrolled in the last year of high school for every 10 children enrolled in the third grade. In only 12 counties was the ratio 1 to 4 or less. The data indicate that retention to the last year of high school is the exception rather than the rule in many counties of the region, especially those of Kentucky and Georgia. Data for Kentucky are for the year 1927–28. (Based on reports of the State departments of education.)

projects children can be taught a great many things not ordinarily taught in the schoolroom as well as important lessons relating to social and economic life. Such clubs provide an excellent means of motivating instruction in the tool subjects, proficiency in which is necessary to the future acquisition of knowledge and mastery in agriculture and homemaking. Seldom however, is the membership in such clubs as much as 15 percent of the population 10 to 20 years of age. In nearly 50 of these counties in 1932, there were, no boys' and girls' clubs. Since percentages were computed on the basis of the total number of persons 10 to 20 years of age living in the counties, those having large cities in which agricultural clubs would naturally be of little interest, probably show up somewhat more disadvantageously than they deserve.

QUALITY OF EDUCATIONAL OPPORTUNITIES

An intelligent appraisal of the assets and liabilities of the educational system of any community cannot be made without giving attention to the quality of education provided. Data presented thus far have dealt with questions of quantity: Are the children in school? What proportion? For what part of the year? What levels and what kinds of education are provided? Questions relating to what is taught in these schools and how well it is taught are obviously equally pertinent.

The problem of determining the quality of education is complex and difficult. It involves all the differences education makes upon the lives of children, the determination of which could obviously not be undertaken in this study. The best that could be done was to examine certain administrative practices and derive certain fiscal measures which are known vitally to affect the character of public education. Such factors do not indicate the social outcomes of the educational processes directly, but they do imply what these outcomes are.

STATUS OF TEACHERS

It is generally agreed that the factor of greatest consequence to a child's school education is his teacher. The salaries paid determine to a considerable degree the quality, training, and fitness of the persons employed as teachers. The data presented (fig. 124) are based on county-wide averages, in which salaries of both urban and rural, elementary and high school teachers are included. Salaries of principals and supervisors are also included. Communities paying extremely low or high wages to teachers in a county do not, therefore, stand out.

There is some relationship between the average annual salary paid to the teachers of a given county and the length of the school term. Counties maintaining long school terms generally tend to pay high salaries to teachers. Variations in monthly salaries therefore, would, be somewhat less marked than the annual salaries shown in figure 124. But it should be borne in mind that persons are drawn to and held in an occupation by the total living it affords rather than by monthly income. Teachers have to live whether schools are in session or not. It should also be noted that the school term maintained and the salary paid are less cause and effect, one of the other, than they are indices of inability or failure to provide educational opportunities. State policies and laws also are likely to influence either one or both of these factors.

The data do supply general indices of the wage situation, however, affording some idea of salaries and

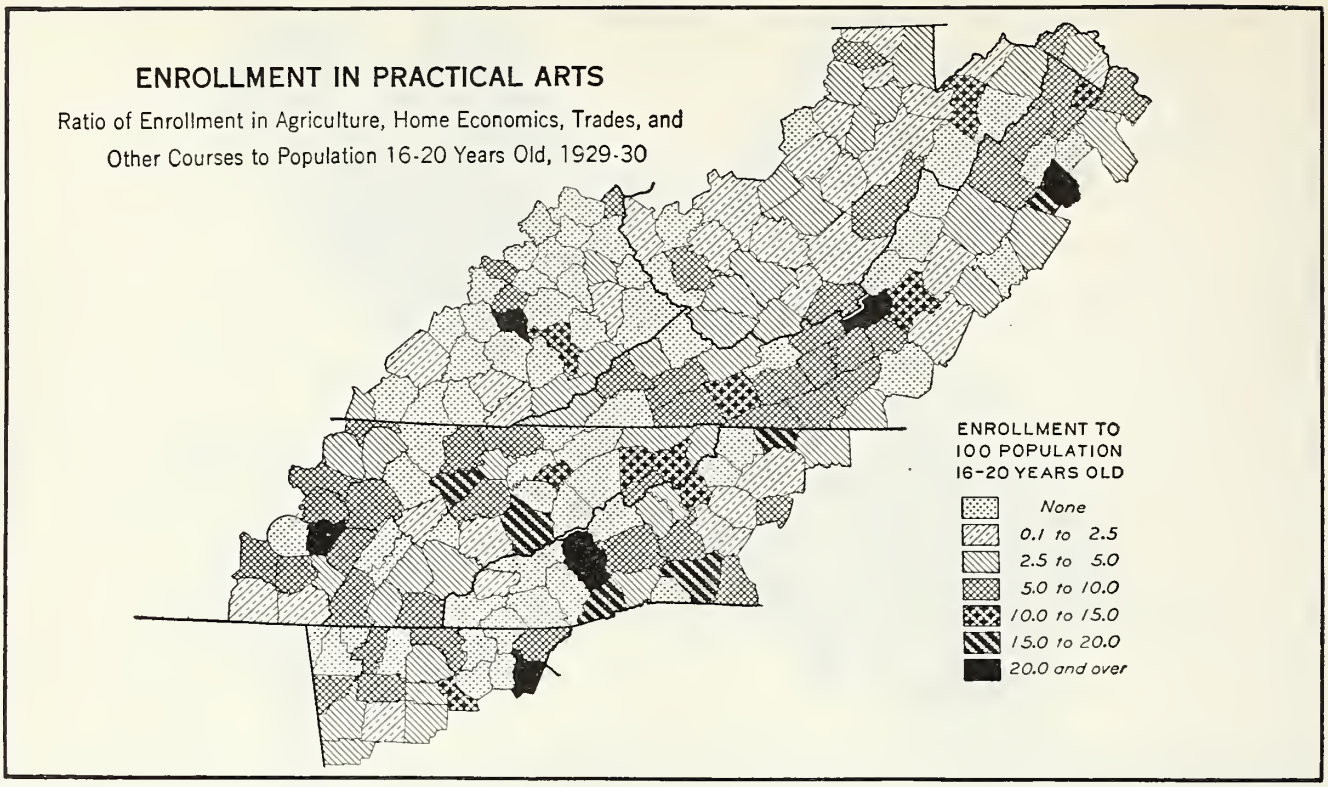

FIGURE 122.—Since most of the schools that provide practical instruction in such fields as agriculture, home economics, and the trades receive Federal aid under the provisions of the Smith-Hughes and similar laws, enrollment in these Federal-aid activities indicates fairly closely the extent of this type of instruction. Many counties, especially those with only a few small high schools, provide no education of this kind. The pupils who received such instruction in 1929–30 comprised 10 percent or more of the population 16 to 20 years old in only 22 of the counties. (Based on data from Extension Service, U.S. Department of Agriculture.)

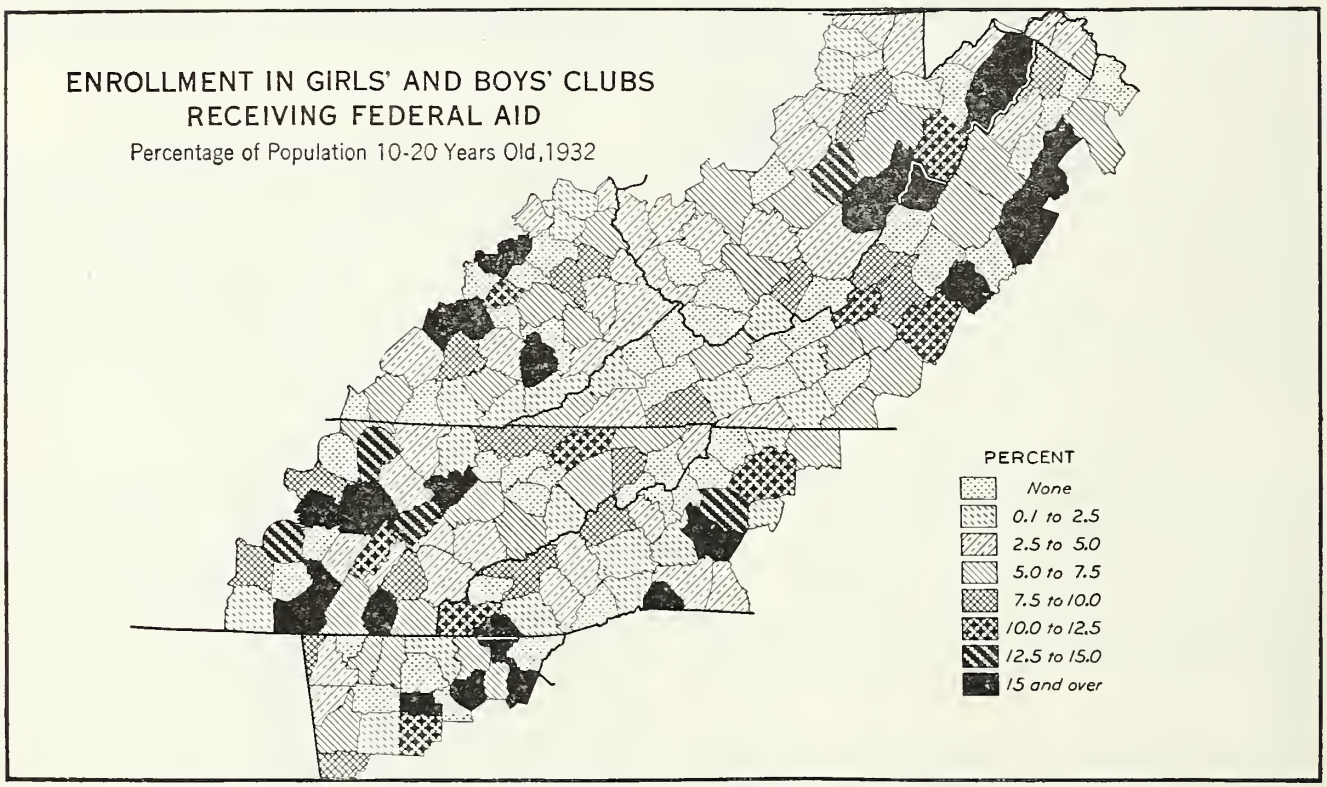

FIGURE. 123.—Activities of the type provided by the 4-H clubs sponsored through the United States Department of Agriculture would seem to be especially helpful in teaching the people of the region to cooperate and to improve their homes and agricultural practices. But according to the data presented in this figure, nearly 50 counties had no 4-H clubs in 1932. In comparatively few counties was the enrollment in such organizations equal to 15 percent of the population 10 to 20 years old. (Based on data from Extension Service, U.S. Department of Agriculture.)

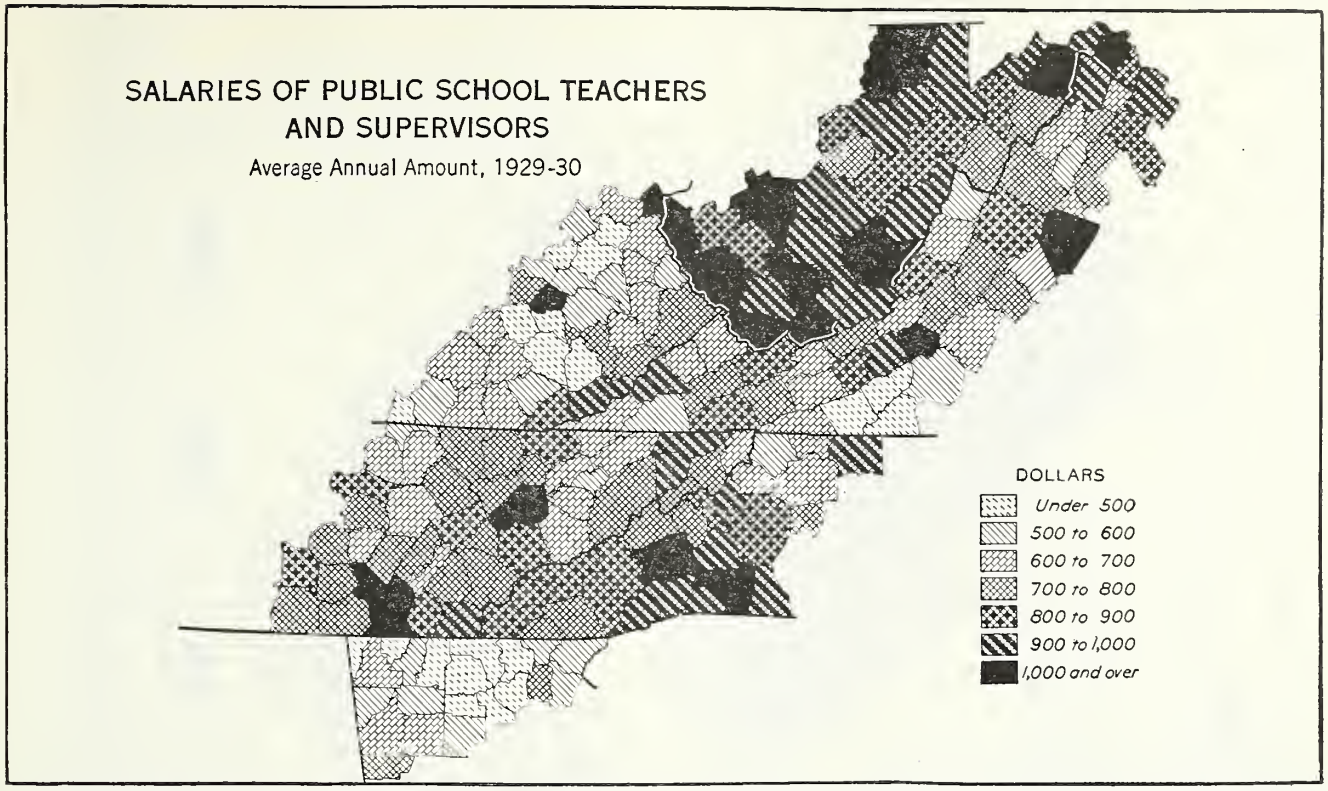

FIGURE 124.—Salaries paid to teachers and supervisors in public schools are determined by such factors as per capita income, density of population, and popular attitude toward education. Policies of fiscal aid from State sources also are involved. Wide variations exist among counties. In most counties of West Virginia and North Carolina higher salaries were paid in 1929–30 than in counties of adjoining States. The very low salaries in many counties of Kentucky and Georgia largely reflect the poor economic conditions in the more mountainous areas. (Based on reports of the State departments of education.)

permitting rough comparisons between counties. In connection with figure 124, it is of interest that in 1930 the average salary paid to all public-school teachers in the United States was $1,420. For teachers of city schools it was $1,771, for rural teachers it was $926.

Good salaries tend to attract persons of higher natural ability than do low salaries, but they also influence the amount of time and energy a teacher will invest in fitting herself for her task. Next to natural ability a teacher's performance is probably most effectively conditioned by the amount and kind of preparation she receives. Data on this point were limited to information concerning extent of training only (fig. 125). Again the data are in terms of averages for all types and classes of schools. But it may be seen that in some parts of the region, especially in Kentucky and Georgia, comparatively few of the teachers have received a training equivalent to graduation from high school.

The data from which figure 125 were prepared revealed that in some counties many teachers were employed who had only 1 or 2 years of high-school education, and in a few cases only grade school. College graduates were found chiefly in city or other large high schools. Counties in which other educational conditions are poor also show large percentages of teachers with poor training.

It has been fairly definitely established that most of the improvements in the quality of instruction resulting from experience in teaching are derived within the first 3 or 4 years. Naturally, teachers who are beginners, especially if they have had little training before entering upon their complex duties, have much to learn. All are likely to learn something from a trial-and-error procedure even though they may not be supervised. Under careful supervision, such as is provided in some counties and especially in the larger cities, much improvement results from experience. It is particularly important, therefore, to note the percentage of new teachers. The data of figure 126 may be thought of as indicating the instability of the teaching staff and as showing the prevalence of the type of teaching often characterized by trial-and-error performance; those in figure 127, on the other hand, may be thought of as indicating the tendencies toward professional growth and security.

BUILDINGS AND EQUIPMENT

Another factor that conditions the quality of education provided in the region is that of school buildings and equipment. The only figures indicating the adequacy and condition of the school plant, which could be obtained and reduced to a single index for each county, were the values that school authorities assign to school property. County and other school superintendents annually report to their respective State departments of education the present value of grounds, buildings, equipment, library books, and all other public-school property. These values were totaled for each county and the results were divided by the total number of teaching positions (fig. 128).

The total number of pupils served might have been used as a basis for securing comparability of figures. But since there must be school grounds, buildings, and equipment to accommodate every school room no matter how many or how few pupils there are, it was believed that a per-teacher basis would result in a more accurate measure of adequacy of school plant. Counties in which large cities are located show high averages, indicating that in computing such averages

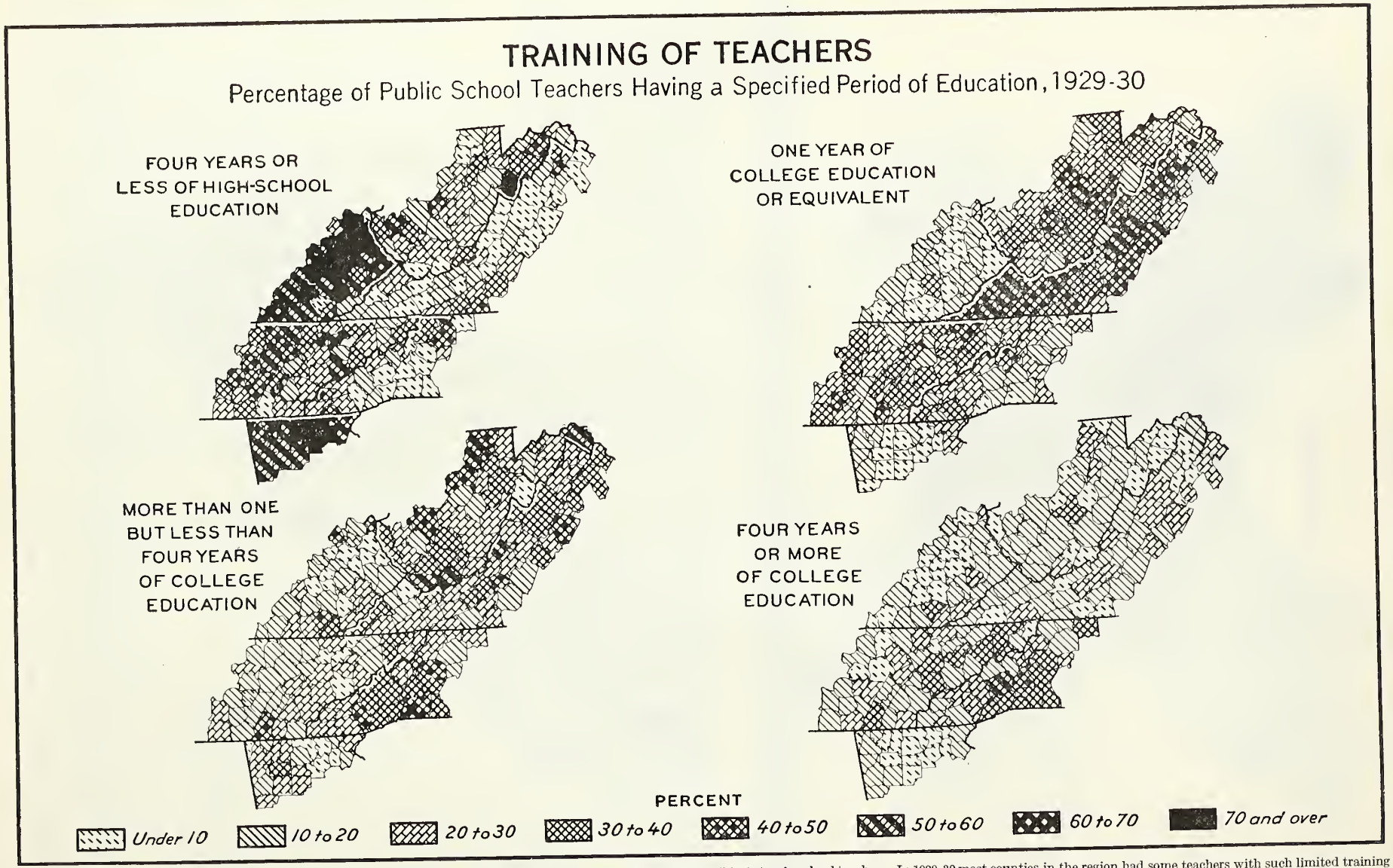

FIGURE 125.—Persons with as little as a high-school education are usually poorly prepared for the difficult and responsible duty of a school teacher. In 1929–30 most counties in the region had some teachers with such limited training and in two States, Kentucky and Georgia, such teachers were in the majority. One year of college training indicates the beginning of, and 2 or 3 years in college the approach to, a preparation accepted as standard for elementary teachers. Teachers with 1 to 3 years of college education, or the equivalent, included a large percentage of all teachers in most counties in Virginia and West Virginia. Graduation from college indicates standard preparation for teaching in high school. Teachers with 4 years of college education or more comprised a large part of all teachers in several counties in North Carolina. In Tennessee the percentage of teachers with only 4 years of high-school education or less was large in many parts of the Northwestern Cumberland Plateau and the percentage with 4 years of college education or more was large in some of the counties in the Appalachian Valleys. The data for Georgia are for the year 1927; for West Virginia, 1931. (Based on reports of State departments of education.)

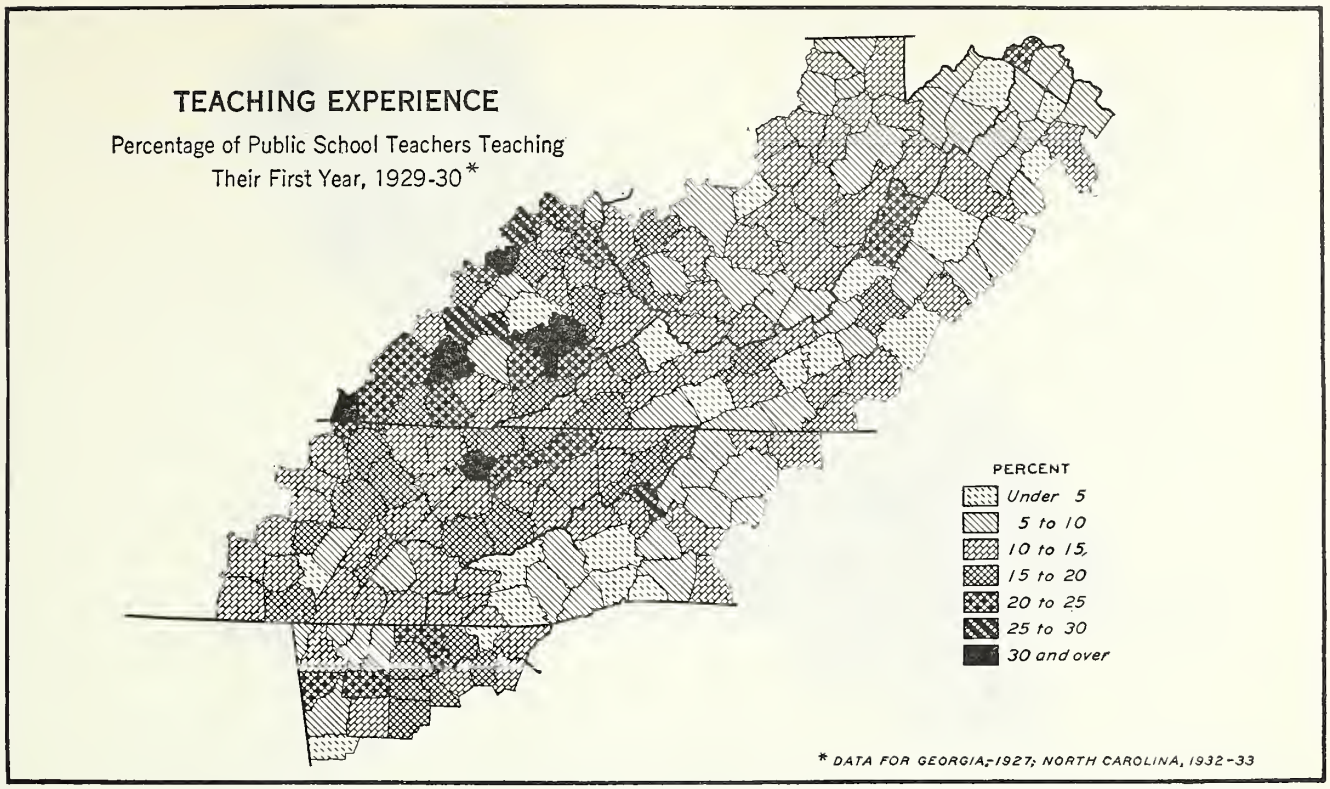

FIGURE 126.—The percentage of teachers teaching for their first year indicates both the probable turnover in the teaching staff and the proportion of schoolrooms in which the teachers are novices. In 6 counties, 5 of them in Kentucky, approximately one-third of the teachers were new to teaching in 1929–30 and in 20 others, of which 11 were in Kentucky, between 20 and 30 percent were beginner teachers. The data for Georgia relate to the year 1927; North Carolina, 1932–33. (Based on reports of State departments of education.)

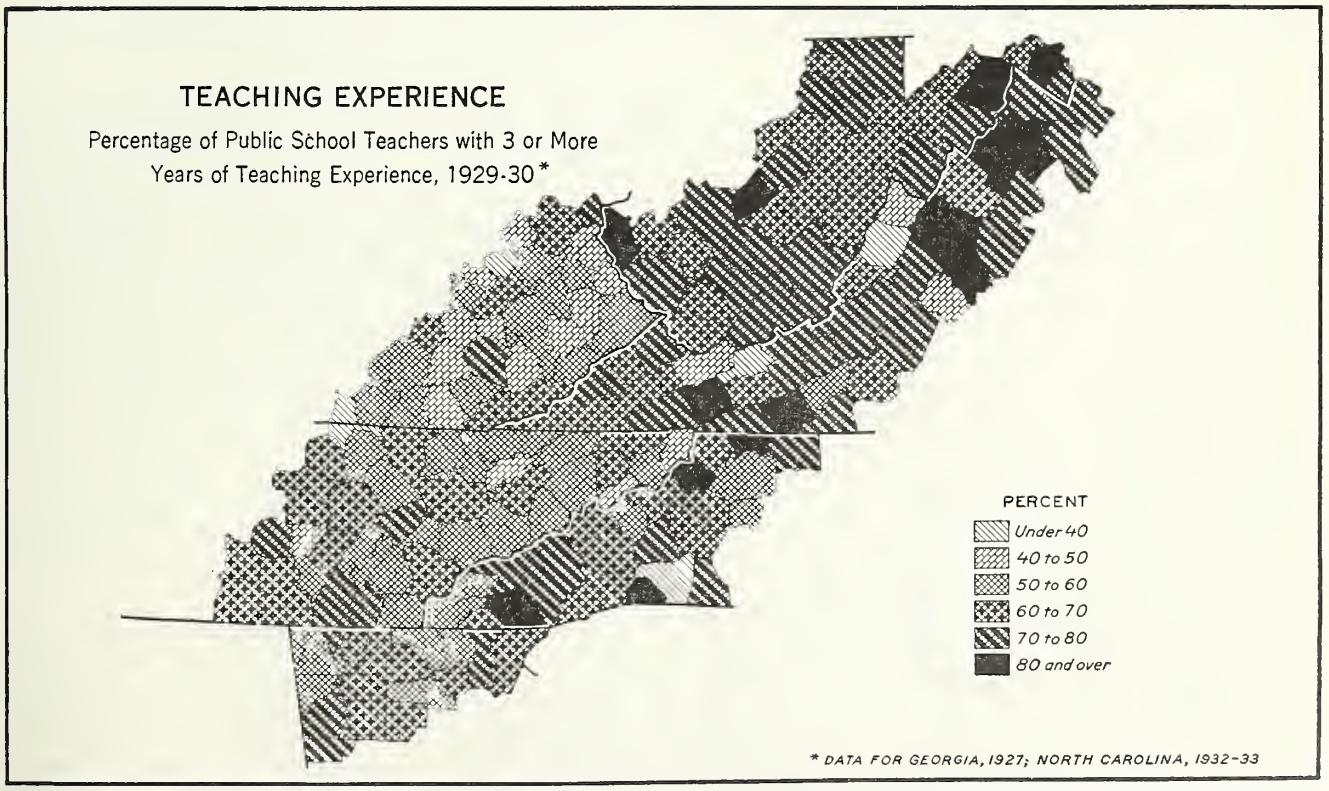

FIGURE 127.—The data of this figure are related conversely to those in figure 126. Teachers with 3 or more years of experience in teaching have served a period of apprenticeship, have presumably gained some knowledge and skill in teaching, and, in general, are qualified to give a relatively high grade of service to the schools. Local and State policies and teachers' salaries exert a strong influence on tenure of teachers. The data for Georgia relate to the year 1927; North Carolina, 1932–33. (Based on reports of State departments of education.)

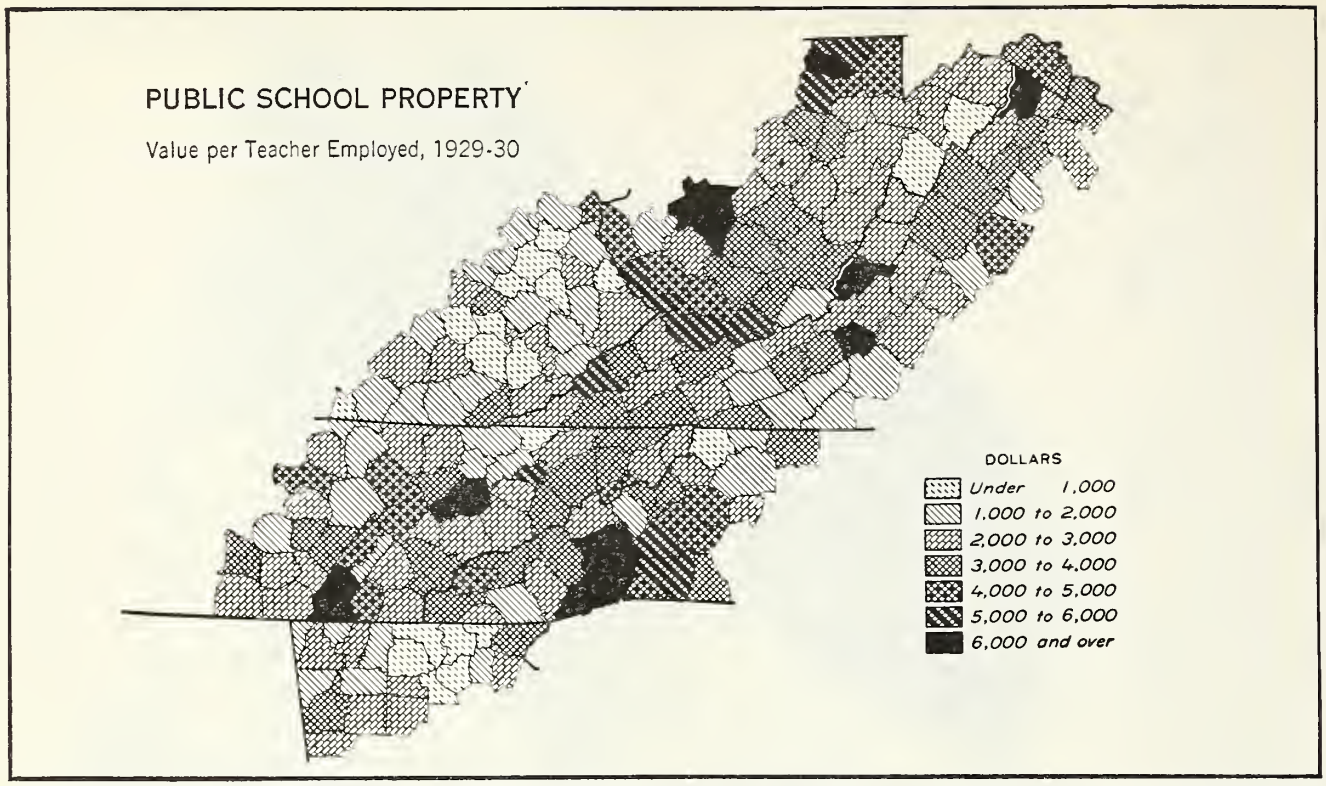

FIGURE 128.—In 3 of the more mountainous counties of Georgia the average value of school property per teacher was below $350 in 1930 and in 4 counties of Kentucky, below $600. On the other hand, there were 20 counties in the region with averages above $5,000. In some of the more backward communities, especially in the more mountainous areas, children are housed in some of the poorest school buildings to be found anywhere in the United States. Furniture and teaching equipment are often very meager if not entirely absent. (Based on reports of State departments of education.)

the poor building and equipment conditions in isolated school communities in these counties are overshadowed by the excellent conditions prevailing in the cities.

SCHOOL FINANCES

The major factor limiting both the quantity and the quality of the education provided, in most communities, is the availability or nonavailability of funds for schools. Public schools are supported by taxation. Since most school taxes are levied upon property in the locality or county, the value of such property is an important index of a county's ability to support schools. The values of all personal property, real estate, and public utilities were obtained from county or State tax authorities and the total was divided by the number of teachers employed in the county. When only assessed values were available the ratios of assessed values to true values were obtained and true values computed. The data presented (fig. 129), therefore represent, insofar as the figures obtained are dependable, the average taxable wealth per teacher or classroom in each county. Property owned by both white and colored persons was included. Negro teachers were included in the computations, since these data could not be obtained separately for whites.

Whereas the taxable wealth per teacher determines rather definitely the funds that can become available for school support, the amount actually expended must be ascertained to determine how well a county supports its public schools. Data were compiled therefore to show the total annual expenditures for all school purposes, including administration, instruction, operation of school plant, upkeep, fixed charges, interest, transportation—in fact, all school costs except expenditures for new buildings and equipment. The total costs for each county were then computed on a per-teacher basis to make them comparable one with another (fig. 130).

Education is more and more coming to be considered the obligation of the State rather than of the local community or the county. Grants from State funds (fig. 131) are made to the counties and to individual school systems to encourage them in various improvements of school plants and services. Some attempts are also made toward equalizing local ability to support schools. As was indicated above (fig. 129) great differences exist among the counties of a State in taxable wealth. Rather than compel counties economically poor to depend upon their own meager resources, State governments grant assistance. The percentage of school expenditures coming from State sources on the whole, are small, varying from less than 10 percent in West Virginia to about 35 percent in Georgia. Thus far, funds coming from State sources do not help greatly to equalize burdens of public education in these States. Statistics on State subventions could not be separated for white and colored schools.

A small part of the money spent for education comes from the Federal Government. It is given for specific purposes, however, such as instruction in agriculture, home making, trades and industries, and extension work through 4-H clubs, county agent activities, home demonstration work, and the like. Thus far Federal funds have not been used to equalize local ability to support schools. In most cases participation in such funds requires matching from local and State sources. Too often this puts these services on a

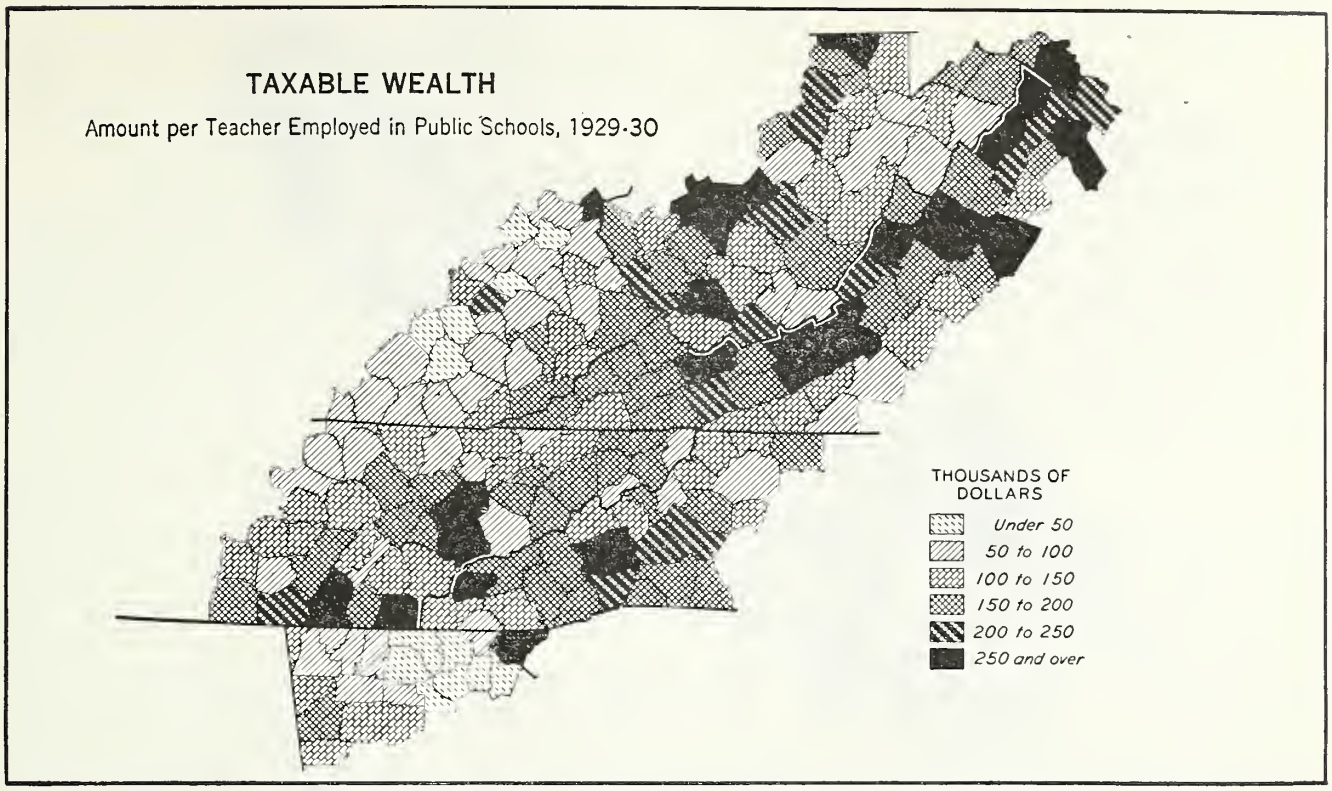

FIGURE 129.—The taxable value of property per teacher or schoolroom varies greatly among the 205 counties, largely because of differences in the natural resources and the development of those resources. Of particular importance are the presence or absence of public utilities, mining properties, and the like. The more wealthy counties without levying burdensome taxes, can provide good schools, pay adequate salaries, and employ capable teachers. Insofar as the poorer counties have to depend upon their own tax resources they can only meagerly provide for these things. (Based on reports of State departments of education.)

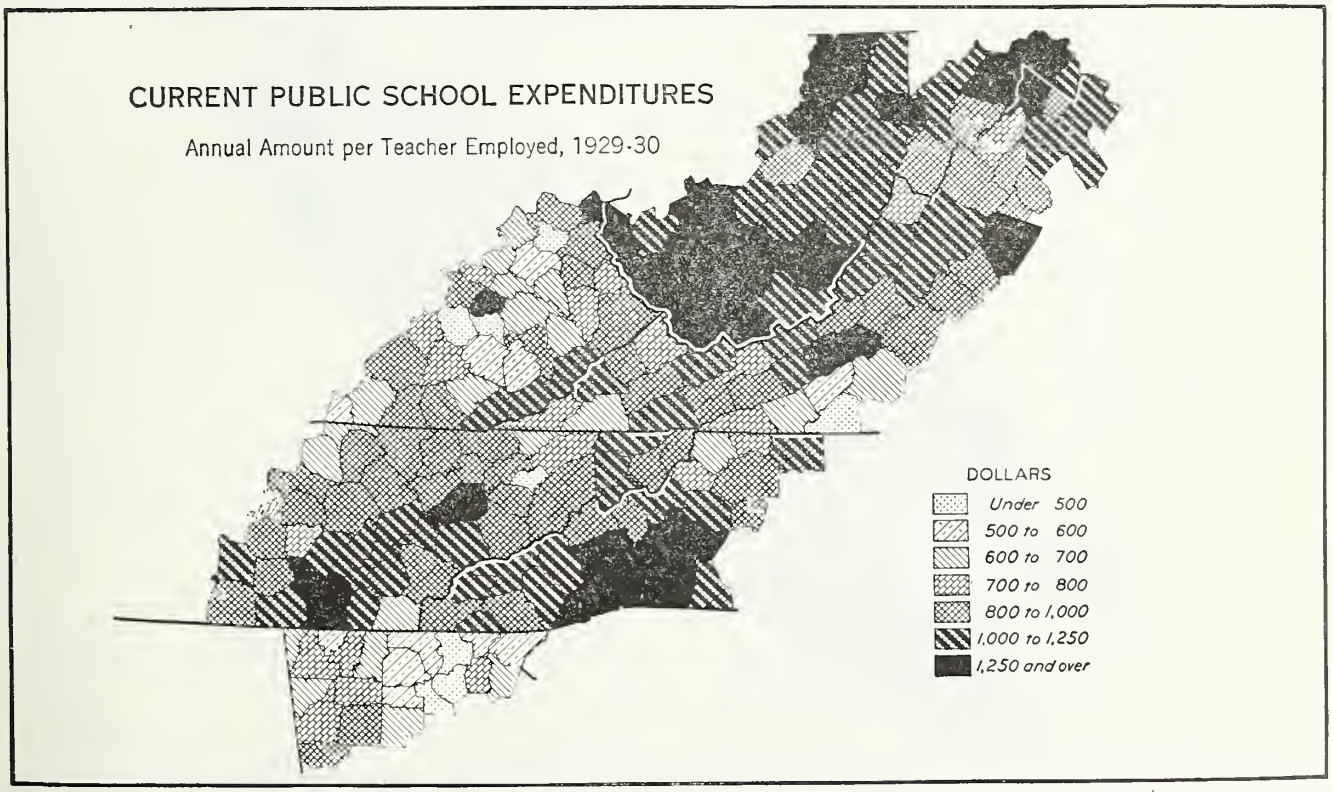

FIGURE 130.—In some counties an average of less than $400 per teacher was spent during the year 1929–30 to maintain schools, including payment of teachers' salaries (fig. 124); others spent an average of more than $1,800 per teacher. The expenditures bore a fairly close relationship to the value of property assessed for taxation per teacher (fig. 129) but there is abundant evidence that some counties levied heavier taxes than others. Counties in which less than $500 was spent per teacher probably had many schools that were inadequately supported. (Based on reports of State departments of education.)

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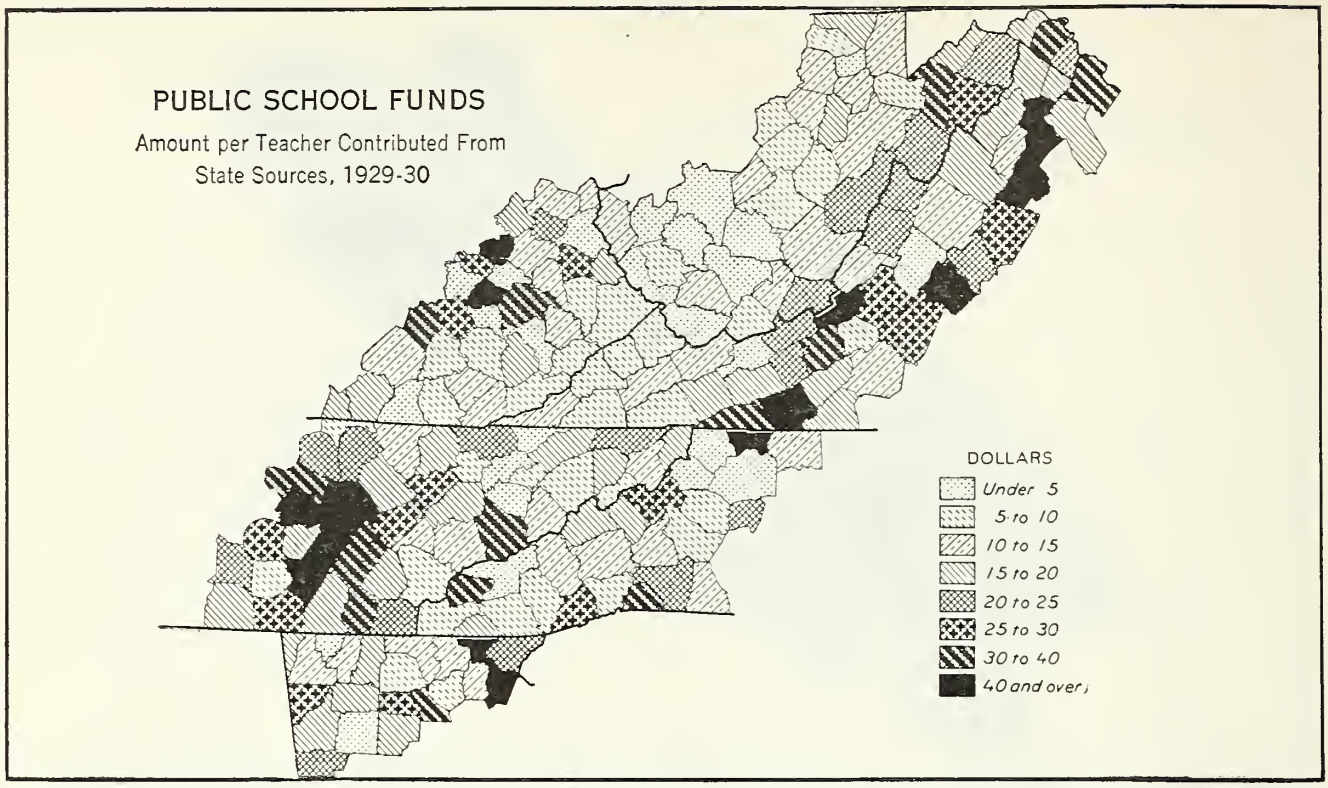

FIGURE 131.—State contributions to school support are largely a matter of State policy. Since 1929–30, the year to which these data relate, some of the States, notably North Carolina and West Virginia, have revised their laws, greatly increasing State contributions. Comparison with figure 129 reveals, to some extent, the relationship between local ability to support public schools in 1929–30 and the extent to which responsibility is assumed by the State for equalizing educational opportunities. Of course, States seek through subsidies to accomplish many purposes other than such equalization. (Based on reports of State departments of education.)

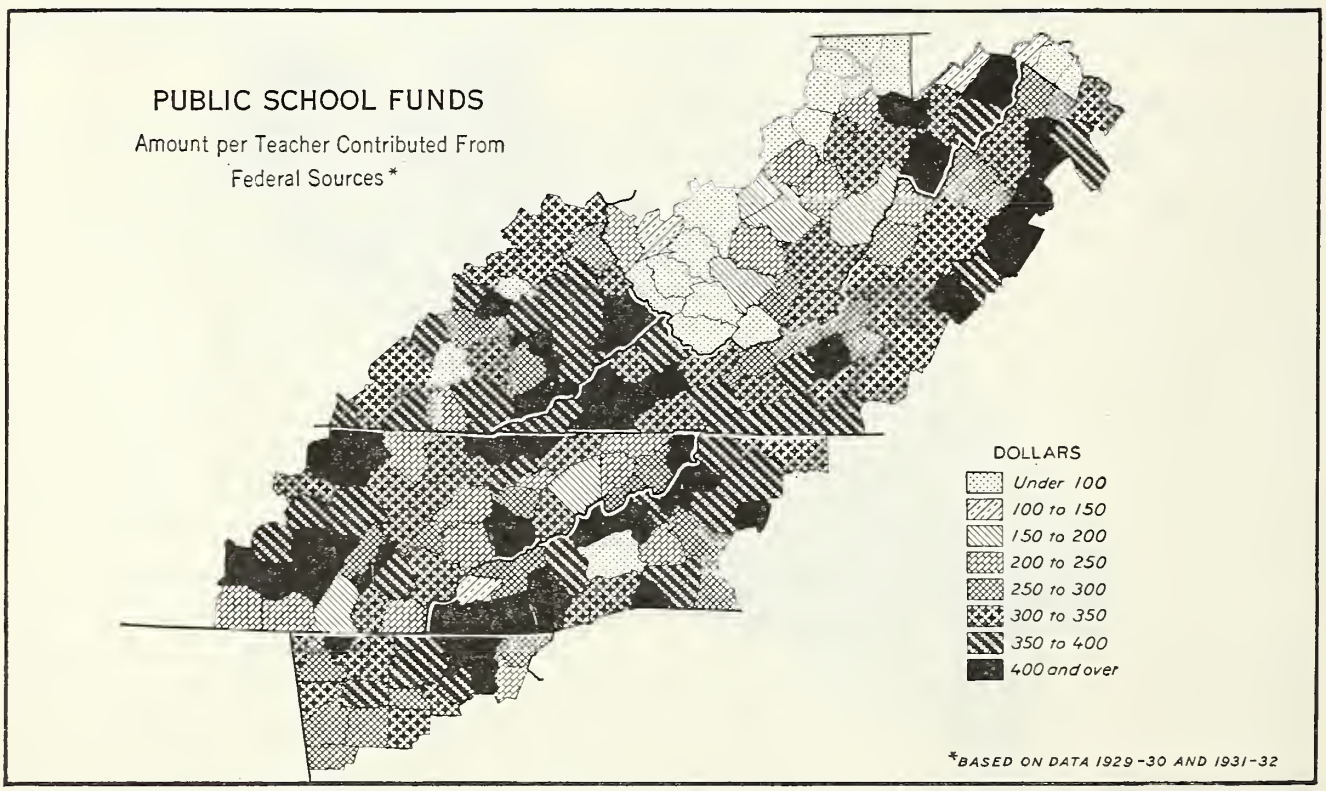

FIGURE 132.—Federal contributions to education are given for the purpose of stimulating specific types of practical education and therefore bear comparatively little relationship to the amount of taxable wealth or to State policies, except that, in most cases, they have to be matched from local or State funds, or both. The location of the larger high schools and the initiative on the part of local leadership are the chief factors determining their allocation. The data are for 1930 supplemented by figures for the year 1932. (Based on reports of State departments of education.)

luxury basis which the poorer counties and local communities cannot afford, however much they might be needed. Data for figure 132 include all Federal appropriations for education except those made to colleges and experiment stations.

LOCATION AND ACCESSIBILITY OF SCHOOLS

To get a close-up view of the school situation in some of the most mountainous parts, detailed data were gathered to show the location and accessibility of the schools in selected counties. Data are here presented (figs. 133 to 138) for one county in each State of which the region is a part, namely, Macon, N.C., Leslie, Ky., Lumpkin, Ga., Johnson, Tenn., Buchanan, Va., and Grant, W.Va. These counties were chosen from five named in each State by State school officers as representing the most difficult situation, educationally, due to mountainous conditions. Ruling out of these lists counties containing large cities, those showing concentration of population due to mining or other nonagricultural industries, and those having much level or fertile farm land resulted in the selection of a county that is believed to have the most acute problems resulting from mountainous conditions in each State.

Since it is commonly charged that the more isolated mountain communities fail to provide schools for their children, it was thought fitting to indicate just how many and what kind of schools are provided, how far they are apart, what provisions are made for transportation when no schools are available, and whether schools are provided through public or private funds. A great many additional facts showing distances children live from their schools, and the effects of these distances upon school attendance and progress were also gathered but they proved too complex for graphic presentation.

Obviously there is a maximum distance beyond which children cannot reasonably be expected to walk to school. This maximum is dependent to a considerable degree, upon climate and upon the topography of the country as well as upon the age of the child. Distance is also a factor in determining the interest of a community in its school. When schools are remote from the homes and have few contacts with them, parental interest lags, the work attempted is not understood, and support and attendance are poor. City-school surveys have generally fixed one-half mile as the maximum distance a child should walk to school. Rural educators and compulsory education laws have fixed 1½ to 2 miles as the maximum distances children should reasonably be expected to walk.

In figures 133–138 contour lines indicate the topography. Schools are located in these figures as nearly accurately as county superintendents could place them. A circle is drawn around each on a 2-mile radius, thus marking all points lying within 2 miles of the schools as the crow flies. Actual walking distances in many cases are much farther than 2 miles, because mountain roads wind in and out with valleys and creeks. Where bus routes are maintained they are distinguished by separate symbols to show whether elementary pupils, high-school pupils, or both elementary- and high-school pupils, are transported. Accessibility areas 1½ miles on either side of such routes are indicated. Schools and transportation routes for Negroes are indicated separately. Symbols showing privately owned schools, schools under joint private and public ownership, and public schools are properly differentiated. The grade level of work offered and the number of teachers employed in each school are shown as indicated in the legends.

These individual county surveys reveal, generally speaking, that in these counties the number and location of schools are such as to provide nearly all pupils, except those in the very mountainous sections, with access to some sort of elementary education. In the very mountainous sections, however, it is not uncommon to find distances considerably in excess of 2 miles from school. Under mountain-road and weather conditions, this is farther than children, especially the younger ones, can walk. Although the population is very sparse in the very mountainous sections, especially those forming parts of State and national parks, practically all sections that have fertile plateaus and coves, however small, serve as homes for isolated families.

The general attitude of school authorities seems to be that since there is very little taxable wealth in these isolated sections, the county cannot afford to maintain schools for them. The number of children among isolated families at any single point is often very small, but their total number is considerable. Poor roads prevent the operation of school busses, and in many other ways it is a most difficult problem, economically, to bring education to these homes. Appropriations for board, school dormitories, itinerant teachers, and possibly even correspondence lessons could undoubtedly be advantageously employed to supply schooling to the children of these isolated families. A policy that considers such children, no matter how small their number, to be beyond the pale of the public schools can scarcely be justified.

Because of road and weather conditions it has become a common practice in these selected counties to begin the annual term of school in midsummer, close for 2 weeks or more as occasion demands during the time crops are gathered, and then continue school until the first of the year. Six months often mark the length of the term. School attendance is irregular; overageness is common. Many of the schools in remote sections are in poor repair and lacking in equipment. Some of them are church buildings and similar structures, privately owned but lent for school use. Secondary schools are few and scattered. The common practice is to provide one in each county, usually located at the county seat. Most of these counties do not provide free transportation for either elementary or secondary pupils. When transportation routes are maintained they follow the principal highways and prove of little help to the more isolated sections.

CONCLUSIONS DRAWN FROM EDUCATIONAL SURVEY

The data presented on the schools and education in the Southern Appalachians permit only a few general conclusions. Conditions vary too much, county with county, to warrant many generalizations. But it is possible through these picturizations of school conditions for one to compare the status of the schools of one county with those of neighboring counties, with counties in the various parts of the same State, or with counties in other States. Relationship may also be noted between the several aspects of education in any given county or between education in general and other social and economic conditions of each county. But

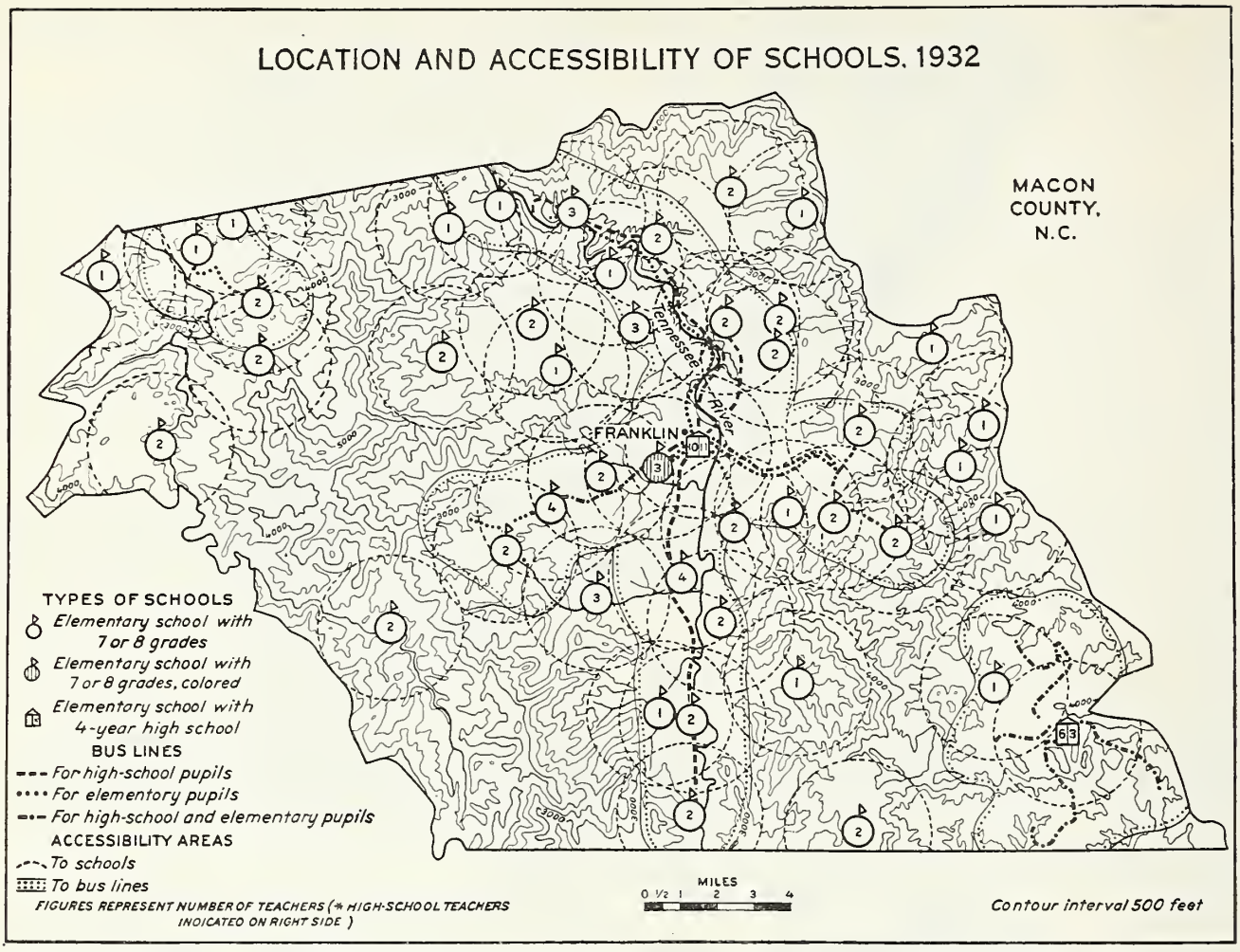

FIGURE 133.—Macon County is fairly representative of several of the mountainous counties in North Carolina. In it are a number of isolated localities that are more than 2 miles from the elementary schools. Many other localities, especially in the northeastern part of the county, are inaccessible to high schools. Generally speaking, schools are grouped fairly closely together in the lowland and plateau districts. Transportation is furnished to many pupils but principally in the more populous parts of the county.

there are many limiting factors which must be held in mind when such comparisons are undertaken.

Since all the statistics upon which the several maps were based were measures of general tendencies (usually averages), extreme conditions were largely covered up. It is these extreme conditions which, if they could have been shown, would more clearly have revealed the strong points and weaknesses of the systems of education and would have made it easier to suggest where and how improvements could be effected. For example, contrary to the common opinion that disproportionately large numbers of educable children of elementary school age are out of school, the percentages (fig. 108) show that this is not true as a whole. The individual county investigations indicated, however, that in the more mountainous counties there are fairly large sections that have no schools, although isolated homes do exist in such sections. The total number of children out of school in a given county may be comparatively small, but for the specific families affected the failure of the school system is 100 percent.

County-school authorities will find it interesting and instructive to compare the status of the county for which they are responsible with other counties, with respect to the conditions portrayed by the several maps. With comparatively little supplementary knowledge of related local factors they should be able to find explanations for many of the strengths and weaknesses revealed by these data. They should thus be in better position to encourage policies conducive to the maintenance of the former and to overcome the latter. The data also throw into relief the presence or absence of certain State policies governing education. In some cases attention to these will achieve far-reaching results.

Most of the difficulties revealed clearly relate to economic conditions. Communities in which there are too few schools or in which schools are poor almost invariably have little taxable wealth. The ideal of providing an equitable educational opportunity to every child no matter where he lives obviously comes into constant conflict with the problem of unequal distribution of wealth. The correlative of this ideal—that taxes must be gathered wherever the wealth is and schools supported wherever the children are—is gaining currency in public thought, but thus far it is decidedly limited by district, township, county, or State boundaries. In some communities adequate schools cannot be provided unless local tax moneys are supplemented from more general tax sources.

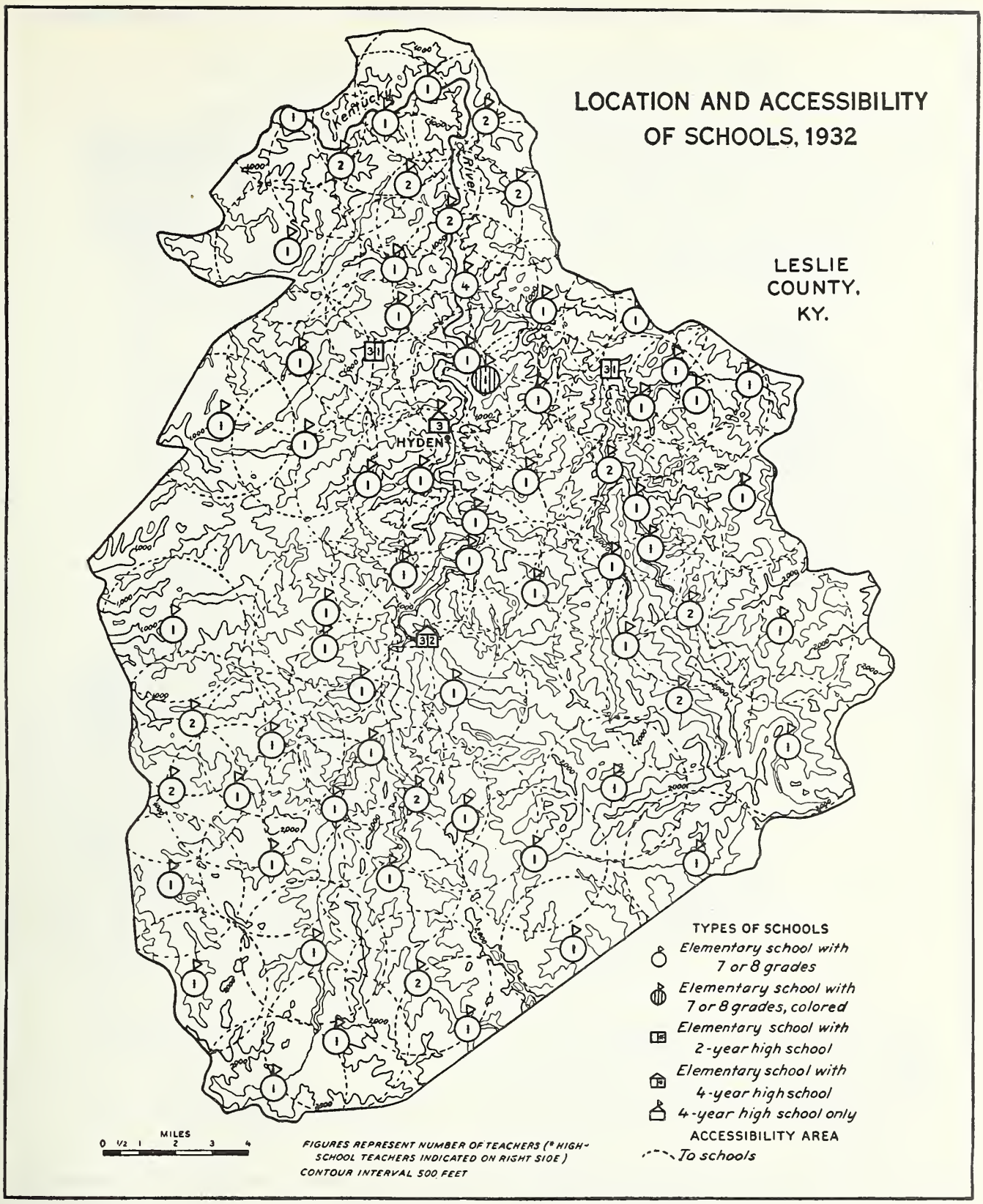

FIGURE 134.—Leslie County is one of the most economically and socially retarded counties in eastern Kentucky. The elementary schools are fairly evenly distributed over the county so that only a few localities are more than 2 miles from school, although children frequently have to travel farther than 2 miles to school because of the unfavorable topography. Four years of high-school work is offered at two points and 2 years at two other points, but these points are all comparatively near the center of the county and no transportation is provided to them.

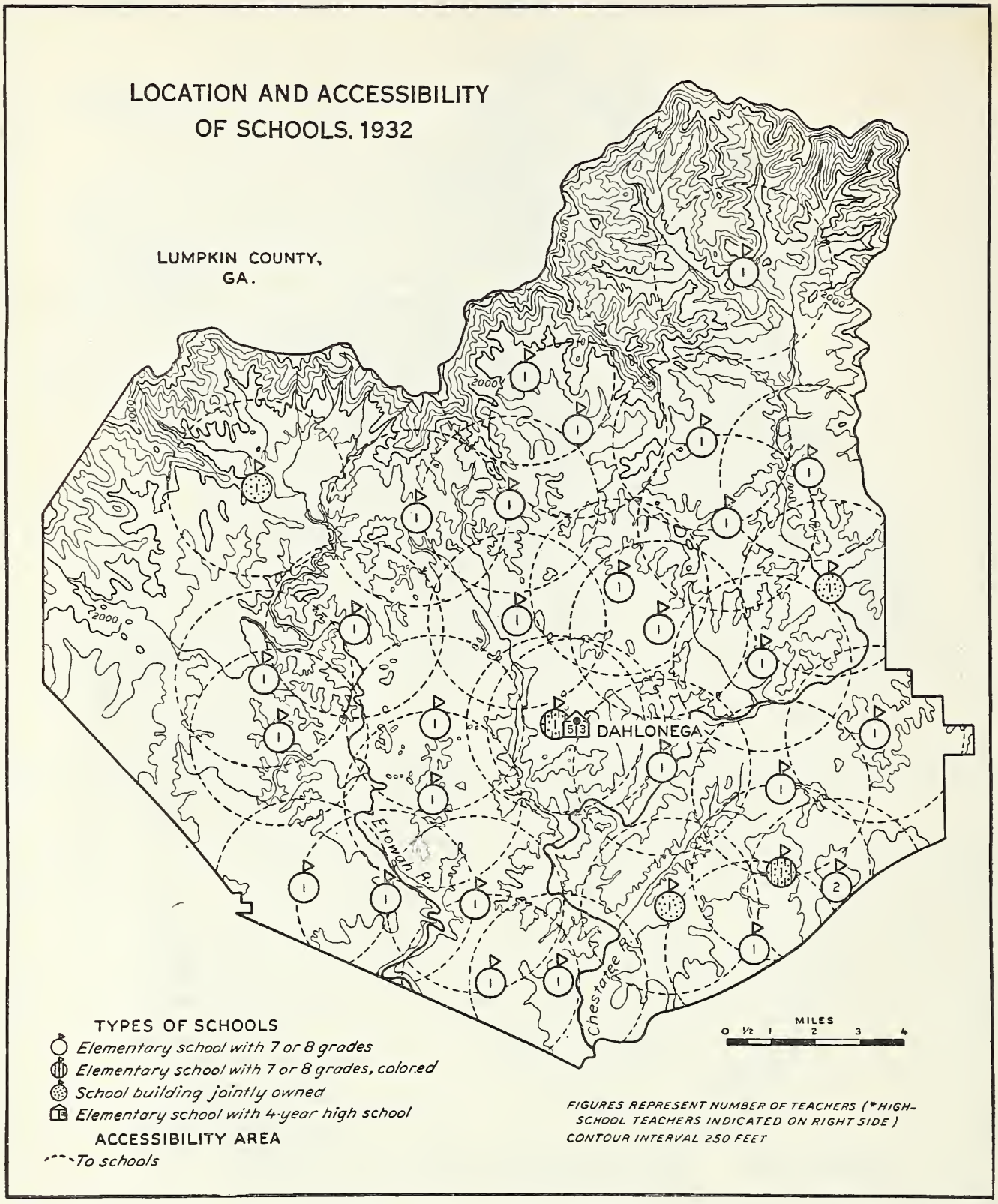

FIGURE 135.—Lumpkin County is typical of a group of contiguous Georgia counties in which school conditions are very poor. Except for the village of Dahlonega, the schools employ but one teacher each. As a group, the schools are in a very poor state of repair and almost devoid of equipment. Four of them are fitted only with church benches. There is only one high school and no transportation is provided to it. The county also has North Georgia College, located at Dahlonega. Along the northern and western boundaries schools are scattered and, although the county is not heavily populated, county authorities report that schools are inaccessible to a number of isolated families.

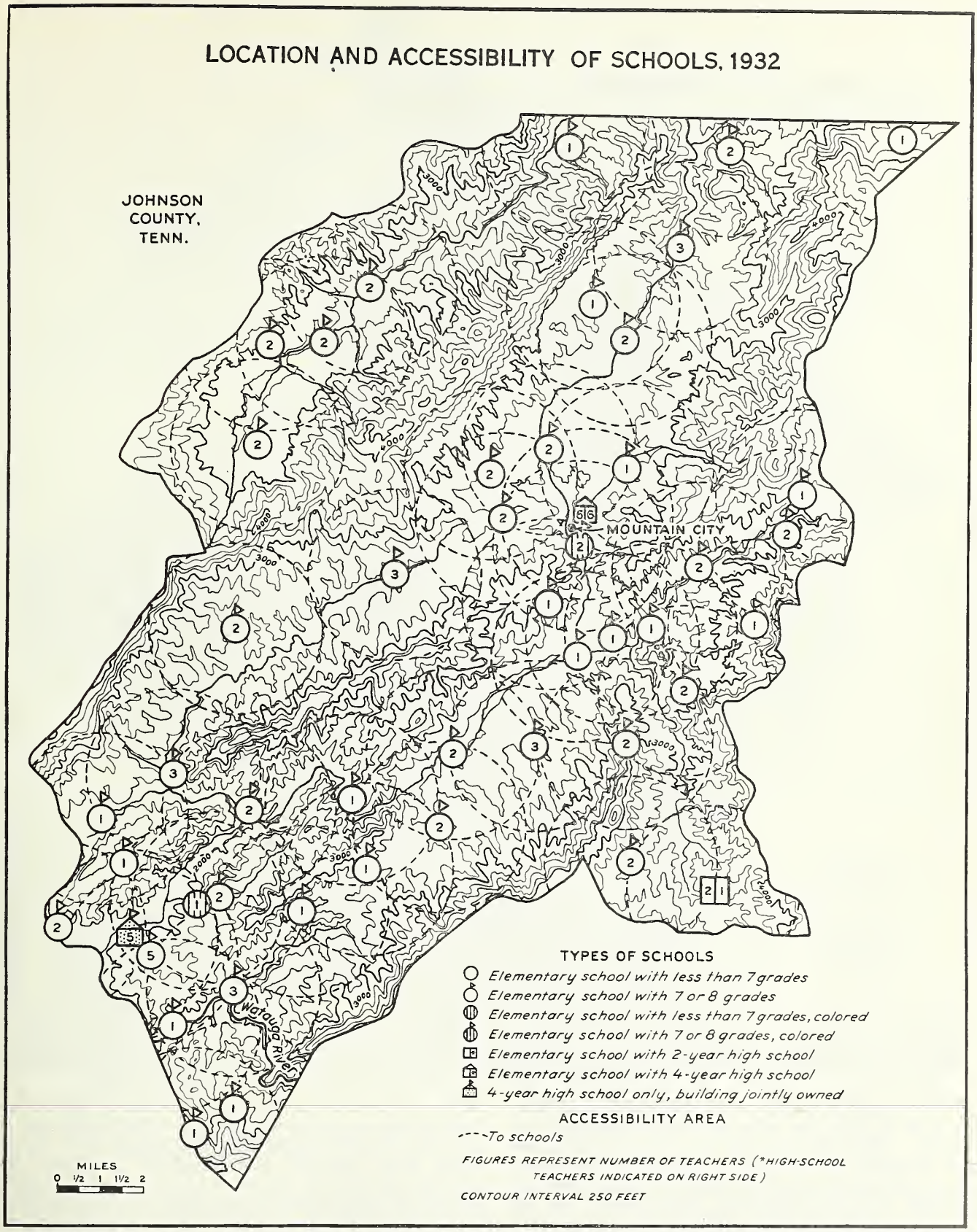

FIGURE 136.—Johnson County is typical of many mountain counties in the Blue Ridge. The schools are located in the central valleys, leaving many lateral mountain valleys and plateaus more than 2 miles from school. There is only one standard public 4-year high school in the county. Wautauga Academy, under private control but maintained jointly by the county, also offers 4 years of high-school work. One other public school provides 2 years of secondary work. No transportation is provided for either elementary or secondary pupils.

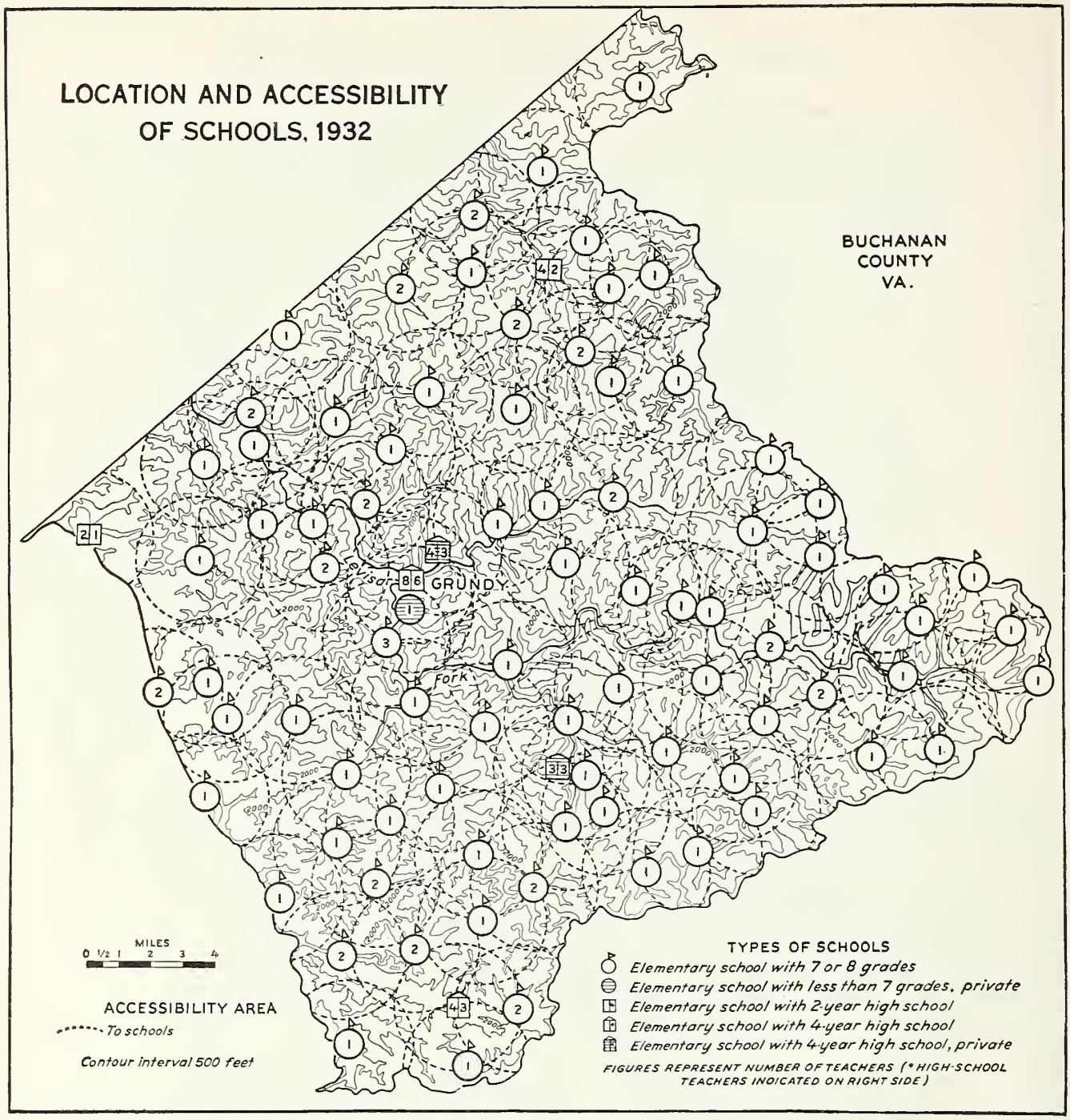

FIGURE 137.—Buchanan County is a large, sparsely settled county. The elementary schools are fairly evenly distributed over the county and leave comparatively few localities beyond 2 miles from school. There are 2 public 4-year high schools and 2 public 2-year high schools in the county. There are 3 schools under private control; 1 gives primary work only; the others offer both elementary and secondary work. One of the latter is in a part of the county having no other high school; the other merely competes with the county high school. No transportation is furnished, leaving many children beyond walking distance from high schools.

There are some cases where local school authorities fail to do all they can with the funds available or obtainable. There is some evidence, too, that when isolated localities are too poor to support a school such taxes as are raised in such localities are sometimes used elsewhere without recognizing responsibility for the education of the children who are thereby unfairly deprived. In such cases the limited local funds should be supplemented rather than diverted. No child, because of such conditions, should be deprived of an education. It would seem to be sound social policy either to prevent people with children of school age from living remote from school or to find some way to provide education, even if doing so entails wide departures from common administrative practices. Financial aid toward board is sometimes given pupils instead of transportation; dormitory schools have been found successful; the use of itinerant schools or teachers suggests possibilities; experiments in making self-administrative lesson materials available to children living at isolated points has been found also to have possibilities.

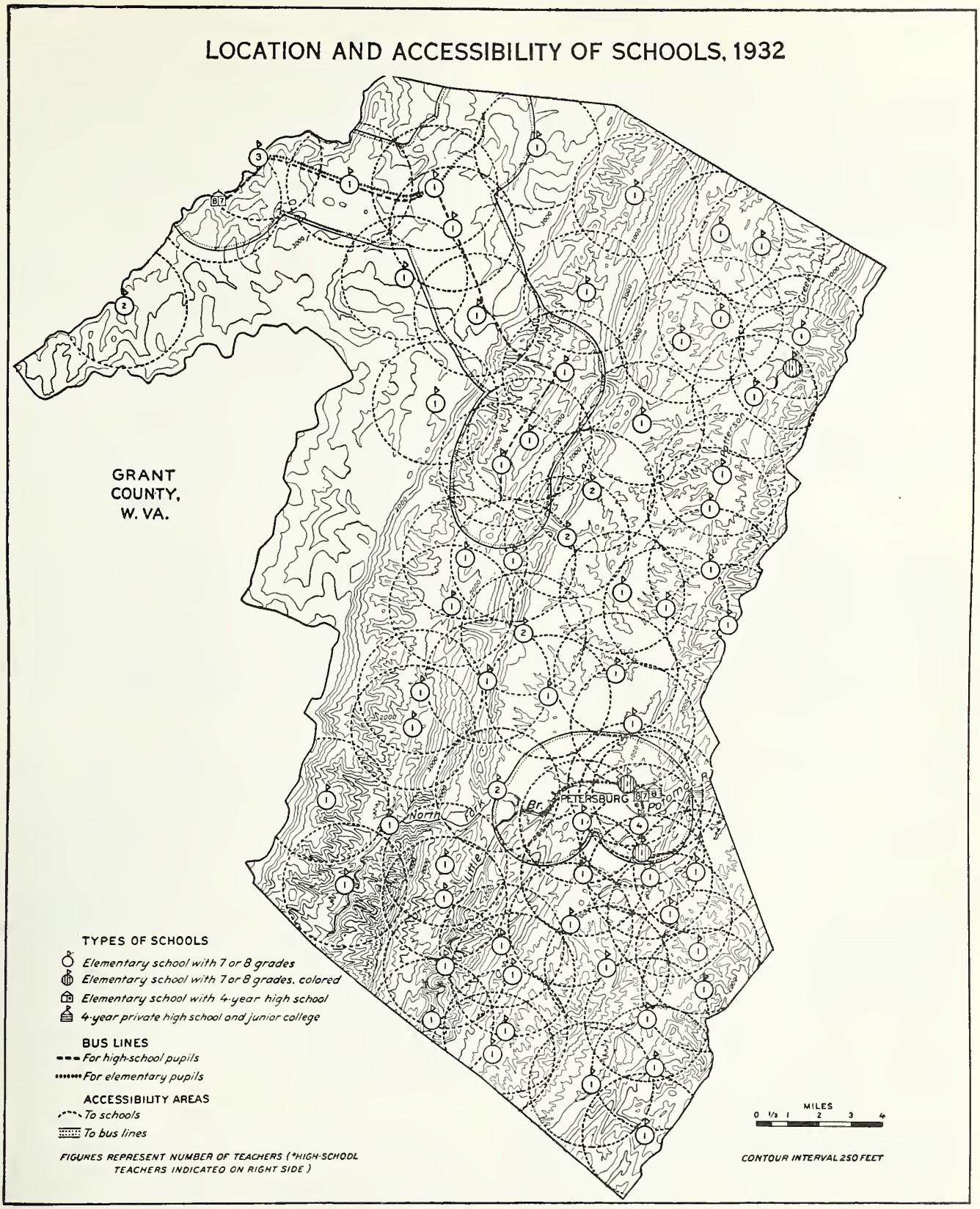

FIGURE 138.—Grant County is typical of much of the Central Appalachian Ridges. The southern part is thickly dotted with schools. The coves and valleys, though close together measured as the crow flies, are separated by high ridges, thus necessitating many schools. From Petersburg northward, topography is more favorable and schools are more scattered. The western part of the county is a high plateau, thinly populated. There are two public high schools with transportation routes serving the central portions of the county. Border areas are inaccessible to high schools, and in the western part, to elementary schools.

POPULATION DISTRIBUTION AND CHANGES

By T. B. Manny, *senior agricultural economist, Division of Farm Population and Rural Life, Bureau of Agricultural Economics*

INTRODUCTORY CONSIDERATIONS

Changes in the number and distribution of the population in a given region over several years often present important clues regarding the economic resources and other assets or liabilities of that region. This section of the study includes a series of maps, charts, and tables dealing with population changes between 1900 and 1930. Unfortunately, some important population data available for the last census cannot be presented for previous periods because of lack of comparability in census classifications. This limitation applies chiefly to the rural-farm and rural-nonfarm classifications of 1930. A little-used classification, that of the "country" population, has been employed to overcome the difficulty, at least in part, for it is possible to segregate a country-population group for each census enumeration included in the present study.

Many of the changes indicated on the following pages of this section assume greater significance when compared with the trends discussed in other sections of the publication.

TOTAL POPULATION

Changes in total population from 1900 to 1930 and the density of the total population in 1930 are shown graphically in figures 139–147. Total population data (tabulated by counties) for each of the subregions are given in table 21.

All but one of the subregions show net gains for each decade though the rates of gain vary considerably. The greatest gains over the entire 30-year period occurred in the Northeastern Cumberland Plateau where the population increased 140 percent and in the Upper Ohio Hills where the increase was 101 percent. On the other hand, the Northern Piedmont Plateau lost 10 percent and the Central Appalachian Valleys gained but 14 percent. The subregions that gained most in total population are those containing the larger cities, and those in which coal-mining and other nonagricultural industries have expanded.

These figures do not tell the whole story of the migrations that have occurred. The birthrate in most, if not all, the 205 counties, excepting only those containing the largest cities, is relatively high. Without a considerable net migration out of most of these subregions, the gains in population over the 30-year period would probably have been decidedly larger than the census data indicate has actually occurred. Just what proportion of the population in 1930 of each of those subregions where gains are clearly in excess of the natural increase came from nearby subregions and what proportion came from more remote subregions is impossible to determine from the available data. This movement must have been fairly large in at least the Northeastern Cumberland Plateau and the Upper Ohio Hills.

The principal losses in total population from 1900 to 1930 occurred in five widely separated groups of counties (fig. 140). Their agricultural opportunities vary from better than average as in the Northern Piedmont Plateau to far below average as in the counties of the Blue Ridge in Georgia (figs. 66 and 67). These counties have few if any other industries while the nonagricultural industries in nearby counties have served as a magnet in drawing people from counties that do not have such alternative opportunities for employment.

The number of counties losing in population increased with each decade following 1900. A large part of the decrease was probably the result of greater opportunities elsewhere but a part was also due to the exhaustion of local timber resources and to limited agricultural possibilities. The shutting down of less profitable and worked-out coal mines may have had some influence in the decline in population from 1920 to 1930 in a few counties in West Virginia (fig. 146).

The map showing distribution of total population for 1930 (fig. 147) indicates wide variations in population density. Urban centers, coal-mining localities, and places where textile mills or other factories have been established are by far the most thickly-settled parts of the region. In the Central Appalachian Ridges, the Northwestern Cumberland Plateau, and the most rugged parts of the Blue Ridge, the population is much more sparse.

Table 21.—*Total population in the Southern Appalachians, by physiographic divisions and subregions, 1900, 1910, 1920, and 1930*

Physiographic division and subregion	Total population in—			
	1900	1910	1920	1930
	Number	*Number*	*Number*	*Number*
Eastern division: Blue Ridge	456,029	495,683	537,266	615,968
Central division:				
Central Appalachian Valleys	201,988	210,053	216,975	230,844
Central Appalachian Ridges	150,115	168,571	178,558	189,310
Appalachian Valleys of Southwest Virginia	231,158	272,621	298,883	345,099
Appalachian Valleys of East Tennessee	451,373	514,554	587,607	722,358
Southern Appalachian Valleys	143,479	163,369	173,207	197,075
Total	1,178,113	1,329,168	1,455,230	1,684,686
Western division:				
Allegheny Plateau	249,513	339,880	391,701	451,549
Northeastern Cumberland Plateau	426,714	592,548	806,511	1,024,009
Northwestern Cumberland Plateau	147,740	167,757	183,399	190,349
Total	823,967	1,100,185	1,381,611	1,665,907
Eastern fringe:				
Northern Piedmont Plateau	70,595	68,729	66,480	63,572
Central Piedmont Plateau	221,619	238,600	248,170	265,049
Southern Piedmont Plateau	104,817	107,554	119,378	149,818
Total	397,031	414,883	434,028	478,439
Western fringe:				
Upper Ohio Hills	146,973	190,579	245,860	295,428
Highland Rim	201,821	219,296	227,818	236,173
Total	348,794	409,875	473,678	531,601
All subregions	3,203,934	3,749,794	4,281,813	4,976,601

Compiled from the census (*50*), by counties.

RURAL-FARM AND RURAL-NONFARM POPULATION

The distribution of the rural-farm and rural-nonfarm population groups in 1930 is shown in figures 148 and 149. Before discussing the differences in the distribution of these groups, some explanation of terms is necessary in addition to the brief statements appearing under the maps.

By no means all of the people living on farms are solely dependent upon agriculture for their livelihood. Many farm operators, as well as members of their families, work part or full time in other industries

(figs. 55 and 68). The wage earners continue to live on farms, partly because of lower living costs resulting from the use of home-grown foods and from the burning of fuel obtainable on these farms or in the vicinity at practically labor cost, and partly because these farms were their homes before they began to work elsewhere. Rents and taxes are usually substantially lower than in the towns or cities where some of these industrial workers might otherwise live. With reasonably good roads and short distances to travel, the cash cost of transportation to and from work is comparatively low.

A considerable number of the rural-nonfarm families, although not living on tracts large enough or of sufficient agricultural productivity to classify as farms, do produce significant quantities of foods for their own use and secure many of the other low cost-of-living advantages enjoyed by the farm families. But, as a group, rural-nonfarm families are more dependent upon sources of income other than agricultural for their livelihood. In most of the mine and mill villages (classified as rural, if unincorporated, regardless of size, or if under 2,500 persons but incorporated) few of the inhabitants, at least prior to 1930, made any pretense of producing food; they bought everything they needed, often at company-owned stores. Others, living practically in the open country, are similarly dependent upon money incomes to keep them going. Some of the rural-nonfarm group are classified as persons gainfully employed in agriculture, but they do not live on farms. Others are retired farmers dependent upon income from lands, often close by, that they have rented out. However, the number of persons in the rural-nonfarm population of this region who depend directly upon farming as their sole or chief source of income seems to be relatively smaller than obtains in many other parts of the country.

Thus, although the rural-farm and rural-nonfarm classifications show important differences in population distribution based upon whether the people in rural areas live on farms, these classifications are by no means mutually exclusive with respect to the principal sources of cash income or even of noncash income represented by home-grown foods or fuel and other items of family living secured from and consumed on the place.

Although the rural-farm population of the Southern Appalachians (fig. 148) is distributed much more evenly than the rural-nonfarm population, some differences in density are observable. The concentration of rural-farm population is great in the Southern Piedmont Plateau, the Appalachian Valleys of East Tennessee, and the Highland Rim. The rural-farm population is relatively sparse in a majority of the counties comprising the Central Appalachian Ridges, the Allegheny Plateau, and the Northwestern Cumberland Plateau. The numerical data, tabulated by minor civil divisions, will be found in table 22.

The rural-nonfarm population (fig. 149) reaches the highest concentration in coal-mining localities, many of which if incorporated would be classed as urban by the census. The mine villages, or mine camps as they are often called, are usually situated in the narrow valleys. Where such mining communities are sufficiently numerous, the general outline of the valleys can be traced on the maps, as for example in a few counties in southeastern Kentucky and southwestern West Virginia. Suburban developments around the five largest cities of the region are likewise indicated by a distinct concentration of the rural-nonfarm population around such urban centers though the presence of many coal-mine villages partially obscures the suburban situation around Charleston.

The distribution of population in the Southern Appalachians shows considerable lack of adjustment to resources. The point may be illustrated by contrasting the situation in various subregions.

In that part of the Central Appalachian Valleys included in the study and known as the Shenandoah Valley, population increased 14 percent between 1900 and 1930. Nearly every county in the Valley gained slightly in population or lost only slightly during the period. Adjustment of population to resources occurred through development of manufacturing and commerce. The rural population increased less than 1 percent; the urban population increased 87 percent. The number of farms increased 4 percent. The small increase in population between 1900 and 1930 indicates that probably there was considerable emigration which also probably made for a better adjustment between population and resources.

TABLE 22.—*Rural-farm, rural-nonfarm, and urban population in the Southern Appalachians, by physiographic divisions and subregions, 1930*

Physiographic division and subregion	Rural		Urban	Total [1]
	Farm	Nonfarm		
	Number	*Number*	*Number*	*Number*
Eastern division: Blue Ridge	395,839	186,076	78,250	660,165
Central division:				
Central Appalachian Valleys	85,490	74,076	58,914	218,480
Central Appalachian Ridges	99,770	89,927	23,531	213,228
Appalachian Valleys of Southwest Virginia	124,598	81,799	109,598	315,995
Appalachian Valleys of East Tennessee	271,580	149,255	337,551	758,386
Southern Appalachian Valleys	90,671	45,128	52,707	188,506
Total	672,109	440,185	582,301	1,694,595
Western division:				
Allegheny Plateau	146,543	260,373	83,667	490,583
Northeastern Cumberland Plateau	328,212	502,401	78,317	908,930
Northwestern Cumberland Plateau	116,311	80,313	8,036	204,660
Total	591,066	843,087	170,020	1,604,173
Eastern fringe:				
Northern Piedmont Plateau	33,703	21,717	0	55,420
Central Piedmont Plateau	127,318	66,522	41,204	235,044
Southern Piedmont Plateau	85,501	32,957	29,712	148,170
Total	246,522	121,196	70,916	438,634
Western fringe:				
Upper Ohio Hills	73,115	124,686	178,267	376,068
Highland Rim	141,616	40,529	20,821	202,966
Total	214,731	165,215	199,088	579,034
All subregions	2,120,267	1,755,759	1,100,575	4,976,601

[1] The differences in total population figures for the subregions compared with those given in table 21 are due to the fact that the data in the latter table are tabulated by counties.

Compiled from the census (*50*), by minor civil divisions.

In contrast to the figures for Shenandoah Valley, population increased 110 percent between 1900 and 1930 in the portion of the Northeastern Cumberland Plateau in Kentucky. The increase was very great in counties where coal was mined. Most other counties showed a substantial increase. Adjustment of population to resources occurred through movement of population to mining centers and an increase in number of farms. The pull of mining and other industrial centers was sufficiently strong to cause some immigration, although there was already an adequate labor supply in the area. The labor supply in the area was not always available because of isolation and

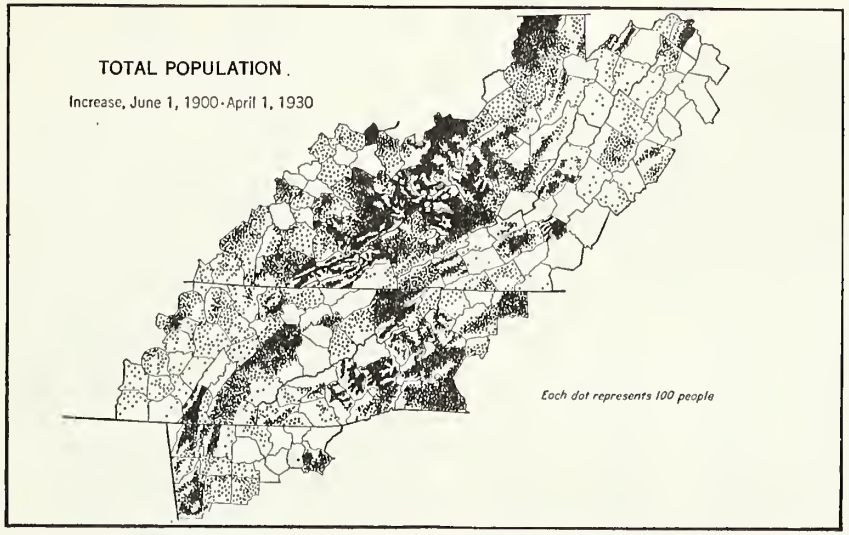

FIGURE 139.—Population increased 55 percent in the Southern Appalachians between 1900 and 1930. The increase amounted to 140 percent in the Northeastern Cumberland Plateau, 101 percent in the Upper Ohio Hills, and 81 percent in the Allegheny Plateau. The relatively large increases in these three contiguous subregions were closely associated with the development of coal mining (figs. 48 and 49).

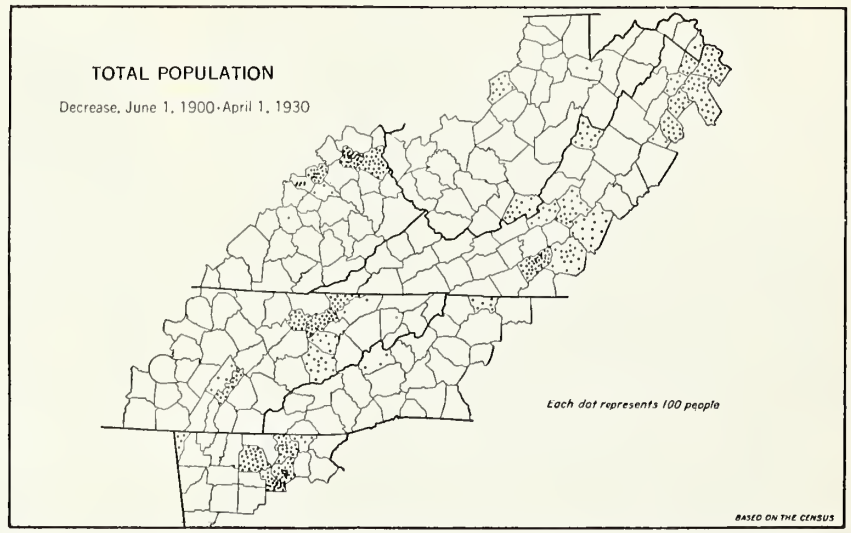

FIGURE 140.—Population decreased in practically one-fifth of the 205 counties between 1900 and 1930. The decreases were chiefly where agriculture and forestry predominate. Some of the counties in which there were decreases adjoin counties in which mining and manufacturing have made rapid growth, so that much of the loss in the former was probably due to migration induced by opportunities for employment in the latter.

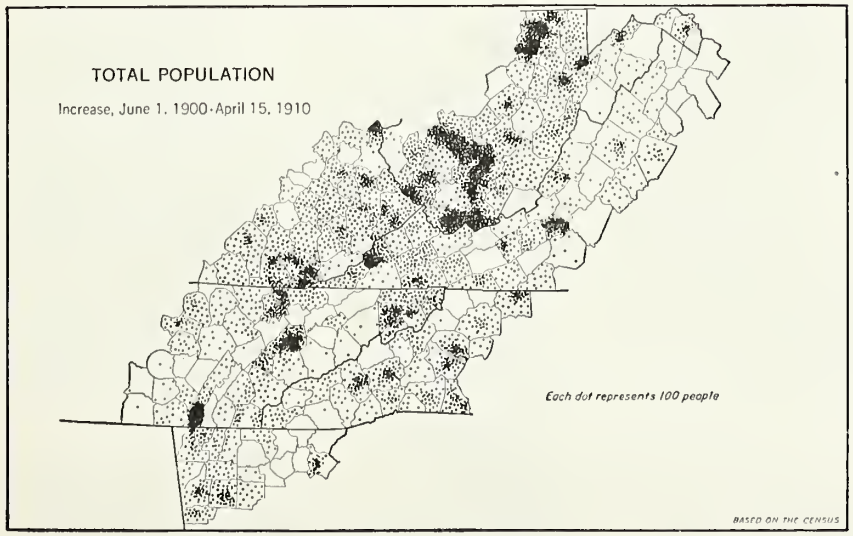

FIGURE 141.—Between 1900 and 1910, population in the region increased 17 percent. The increases were 30 to 40 percent in the Northeastern Cumberland and Allegheny Plateaus and the Upper Ohio Hills, and 18 percent or less in other subregions. Although population increased in many counties where farming and forestry were the principal occupations, the larger increases were in the coal-mining areas of West Virginia and in the several cities.

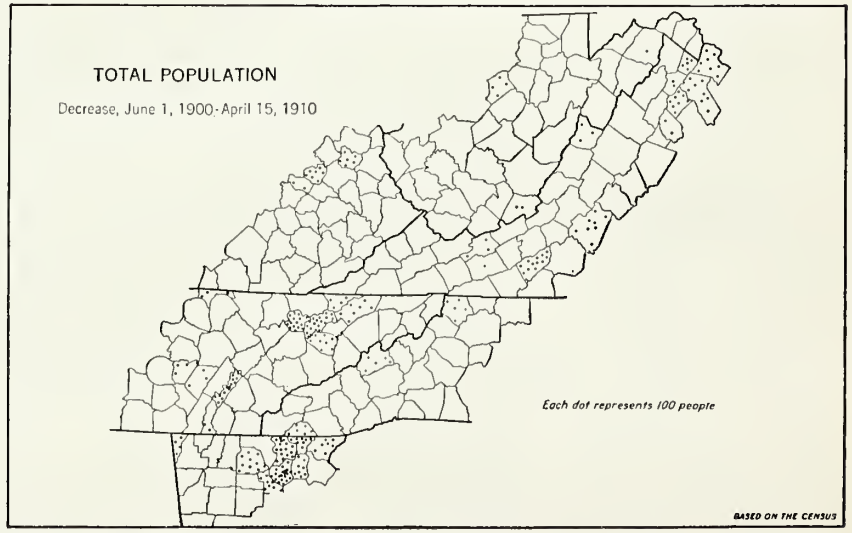

FIGURE 142.—Nearly one-fifth of the counties in the region lost in population between 1900 and 1910. Most of these were counties which lost in population from 1900 to 1930. The three groups of counties showing the principal decreases—one in Northern Piedmont Plateau, the second in the Appalachian Valleys of East Tennessee, and the third in the southern tip of the Blue Ridge—lost principally to accessible industrial and urban centers.

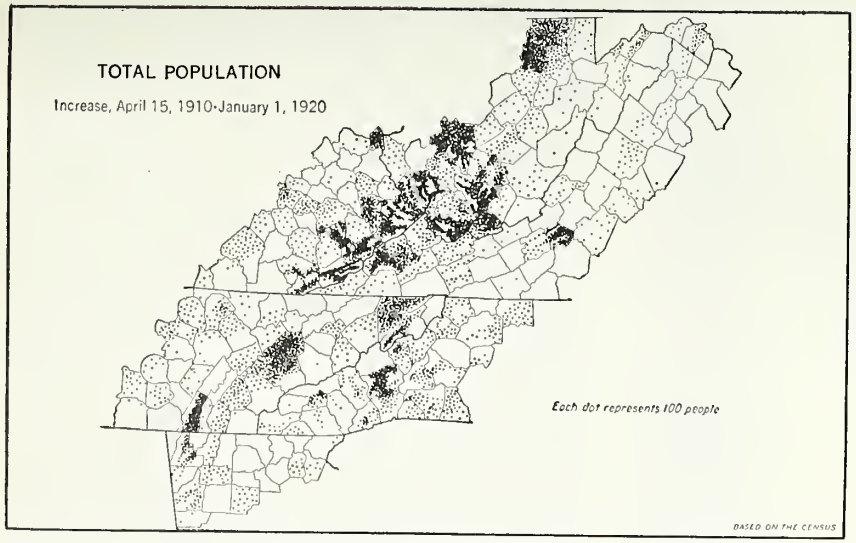

FIGURE 143.—In the period 1910–20, as in the previous decade, the larger increases in population were in the coal-mining areas and in the cities. But the increases were less wide-spread and more highly concentrated in cities and villages than during the preceding decade. Population increased 36 percent in the Northeastern Cumberland Plateau, 29 percent in the Upper Ohio Hills, and 15 percent or less in other subregions.

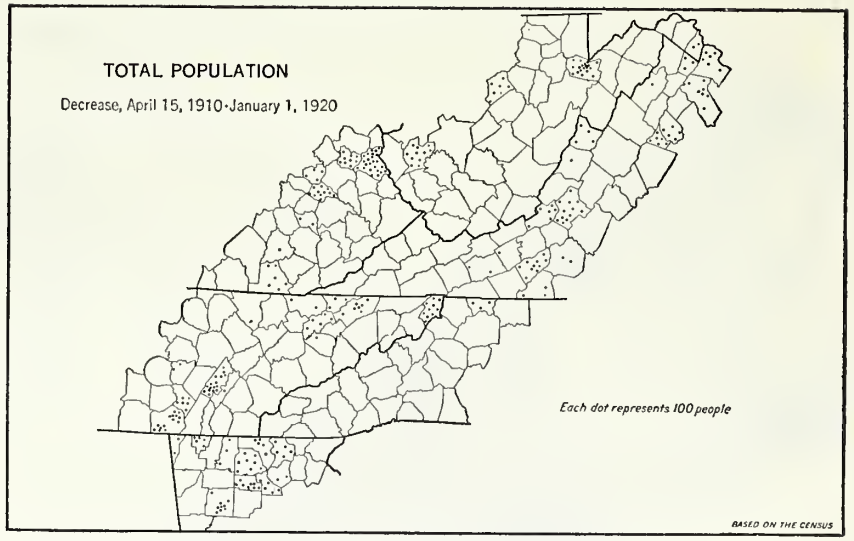

FIGURE 144.—Population decreased in more than one-fifth of the counties from 1910 to 1920. Most of the decreases were small but quite widely scattered over the region. Decreases occurred in practically one half of those counties that lost in population in the preceeding decade. Population in the Northern Piedmont Plateau decreased during the decade, although in the region as a whole population increased 14 percent.

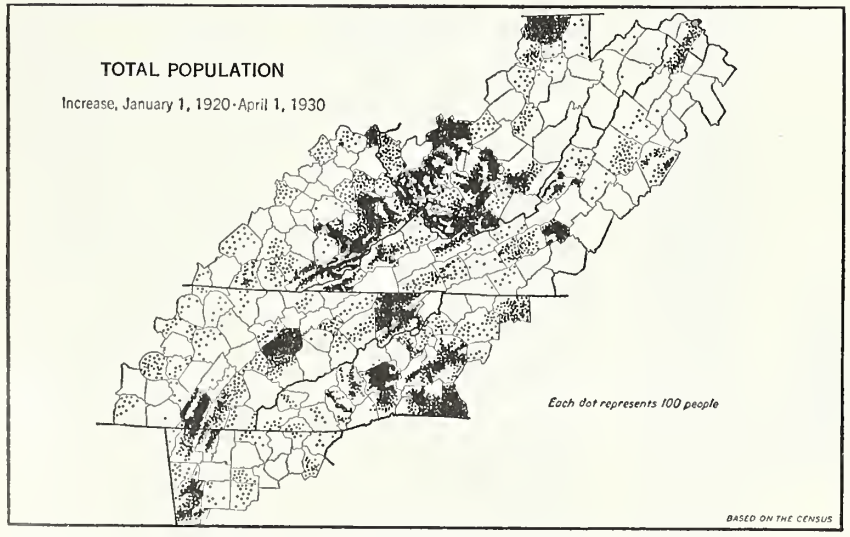

FIGURE 145.—Between 1920 and 1930 the most pronounced gains in population, as during the two preceding decades, were in the coal-mining areas and in the rapidly developing industrial centers of other areas. Increases during the decade amounted to 27 percent in the Northeastern Cumberland Plateau, 25 percent in the Southern Piedmont Plateau, 23 percent in the Appalachian Valleys of East Tennessee, and 20 percent or less in other subregions.

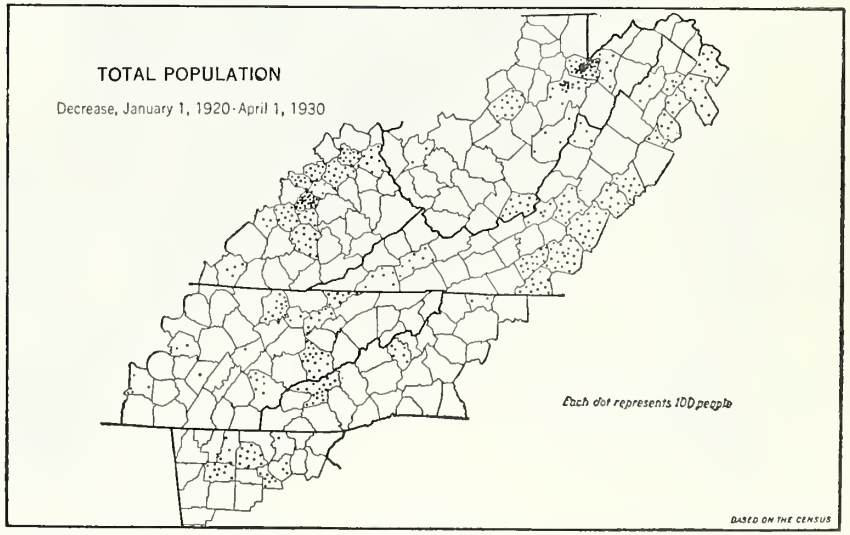

FIGURE 146.—In the period 1920–30, population decreased in 57 counties. Twenty-six of these counties showed a loss in population during the preceding decade and 13 counties a loss during each of the two preceding decades. The population of the Northern Piedmont Plateau, which had decreased in each of the two preceding decades, continued to decline between 1920 and 1930.

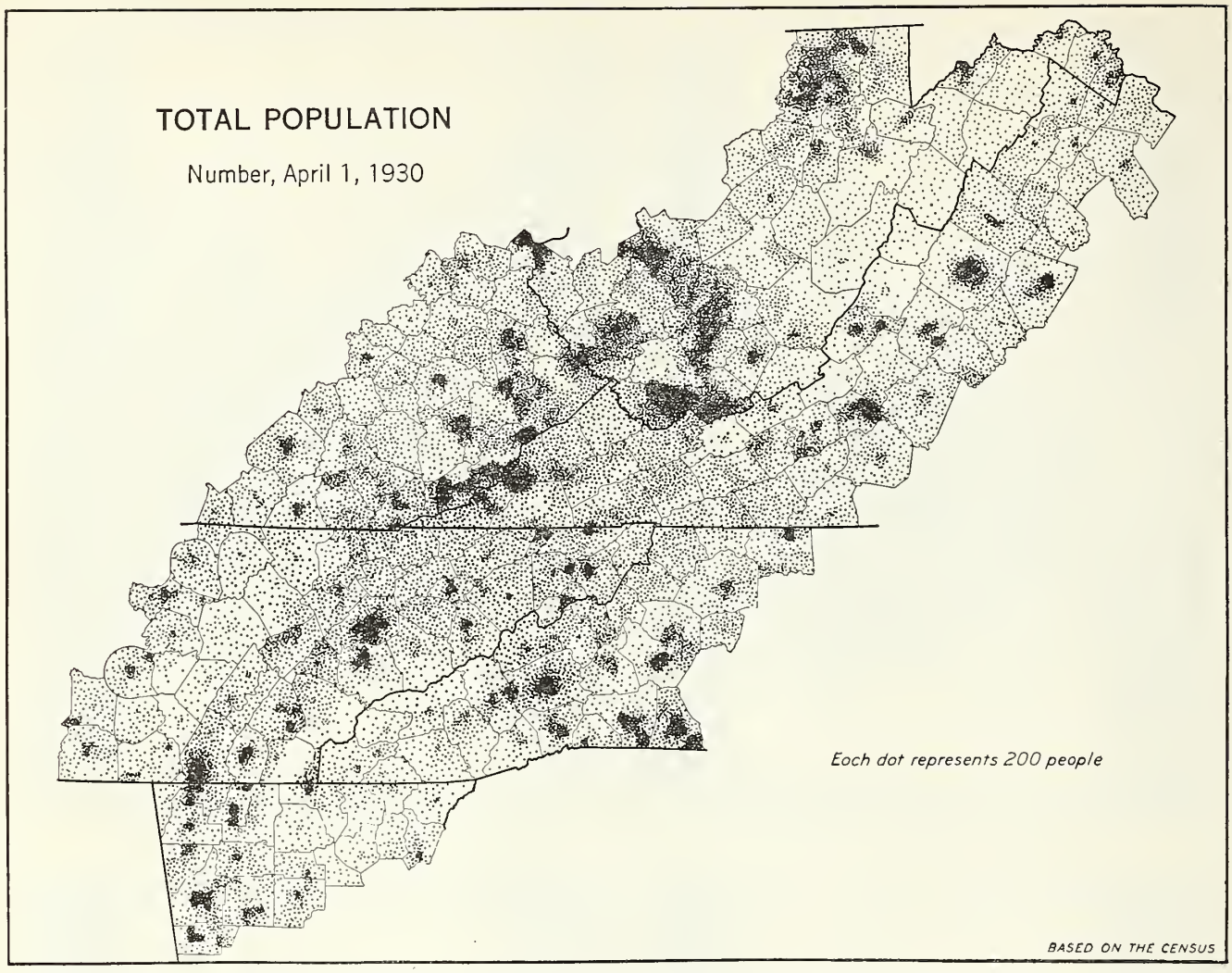

FIGURE 147.—Since 1900, the rapid increase in population of coal-mining, other industrial, and urban centers, has tended greatly to increase the differences in distribution and density of the population in the Southern Appalachians as a whole. In 1930, the population was especially dense in those parts of the Allegheny and Northeastern Cumberland Plateaus and the Upper Ohio Hills, where there was coal mining. Although many small parts of these subregions are sparsely settled and, for the most part, there are few opportunities for farming, the population of the three subregions in 1930 was approximately 1,776,000 (table 22), an average of 75 persons per square mile. This density of population was exceeded only in the Appalachian Valleys of East Tennessee. In contrast, the density of population of the Northwestern Cumberland Plateau and the Central Appalachian Ridges in 1930 was 28 persons per square mile. The total population of the region on April 1, 1930, was practically 5,000,000, an average of 58 persons per square mile. The average for the United States was 41 persons per square mile.

was, for the most part, unskilled. In two counties, Elliott and Lawrence, the pull of mining and other industries from nearby counties was sufficiently strong to cause a decrease in total population. Number of farms in the area increased 12 percent.

Some adjustments of population to resources undoubtedly took place within the Shenandoah Valley and within the portion of the Northeastern Cumberland Plateau in Kentucky during the 1900–30 period, but no such adjustment occurred between the two areas. There is no coal in the Shenandoah Valley, but in most other major respects its economic resources and opportunities are greater than those of the Kentucky portion of the Northeastern Cumberland Plateau. The opportunities for agriculture are certainly much greater in the former than in the latter, yet the increase in number of farms between 1900 and 1930 was greater in the latter than in the former.

Other subregions also illustrate the tendency of population to multiply where economic resources are relatively poor. In general, physical conditions and economic resources are superior in the Appalachian Valleys and Ridges to those in the Cumberland and Allegheny Plateaus, but population increased 43 percent between 1900 and 1930 in the former compared with 102 percent in the latter. In the Blue Ridge population increased 35 percent during the whole period, although resources are meager.

The lack of balance between population and resources in the region is the result of several factors. Social as well as economic considerations affect the movement of population. Environmental factors influence the movement of population, particularly of farmers. In areas in which economic opportunities are relatively great, as in the Shenandoah Valley, the standard of living tends to be high. In such areas the natural increase in population is relatively slow, children are well educated and, as a result, are able to take advantage of opportunities offered elsewhere. In areas in which economic opportunities are relatively small, as in the Kentucky portion of the Northeastern Cumberland Plateau, the standard of living tends to be low. In such areas the increase in population is relatively rapid, educational opportunities are poor,

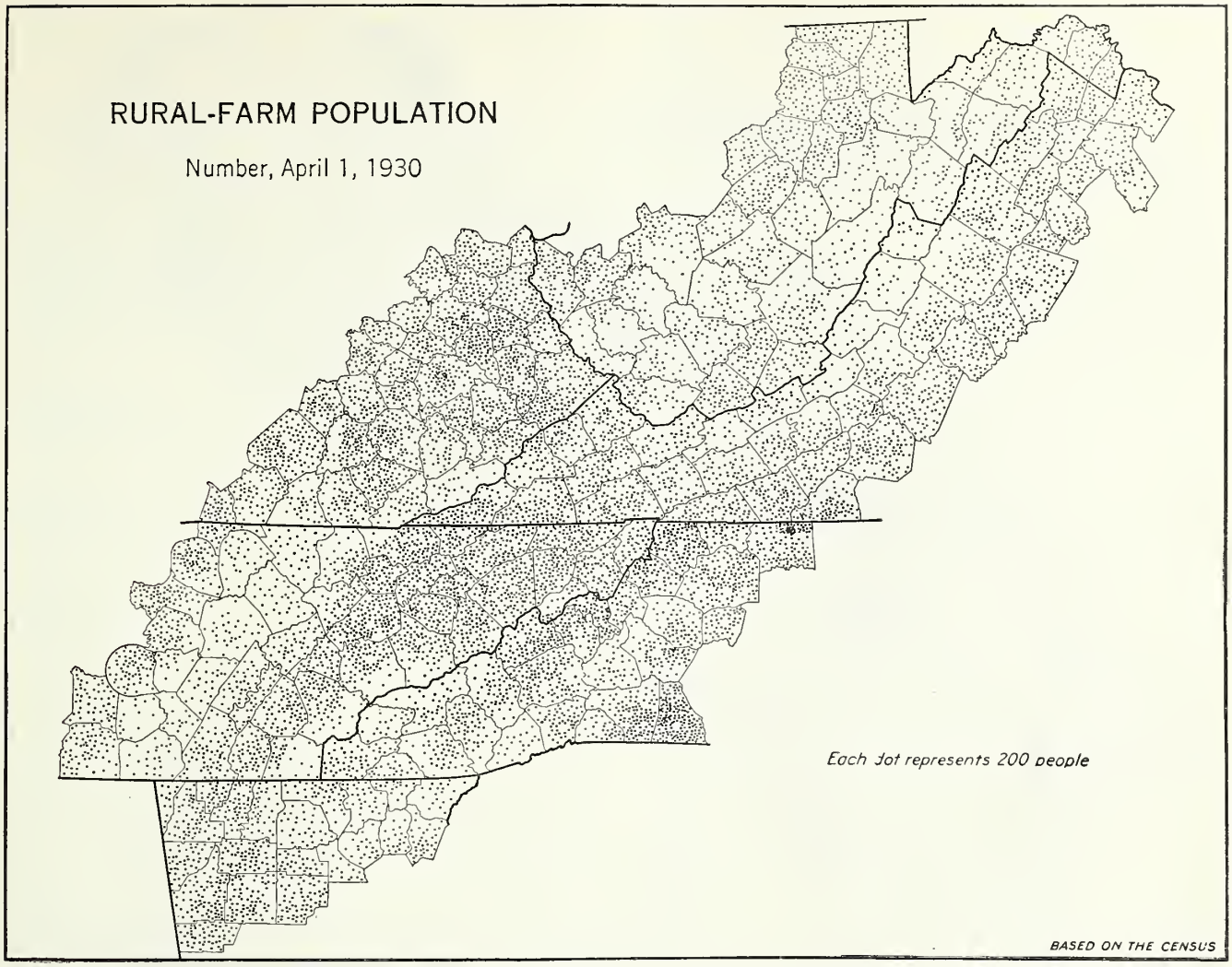

FIGURE 148.—The rural-farm population consists of all persons who live on farms (as defined by the census) who are situated outside of incorporated places having 2,500 persons or more. The number of persons living on farms who are excluded thereby, is small. The population is much more uniformly distributed in this than in other population groups, as might be expected from the relative uniformity of distribution of farms (fig. 22) in comparison with units of other industries (pp. 85-86). The rural-farm population, however, comprises only 31 percent of the total population (fig. 147) in the Allegheny and Northeastern Cumberland Plateaus and Upper Ohio Hills and 36 percent of the total in the Appalachian Valleys of East Tennessee compared with 62 percent in the Highland Rim, the Northern Piedmont Plateau, and Blue Ridge. In the region as a whole, the rural-farm population was 43 percent of the total population.

and as a result young people cannot so readily take advantage of opportunities elsewhere.

Changes in physical and economic conditions tend to cause a lag in the adjustment between population and resources. Decreases in the number of persons living on farms, due to depleted soils or unprofitable commercial production in competition with more favored areas, come about slowly. Many farm people, especially in the older generation, are loathe to leave familiar scenes and faces and will make painful reductions in their standards of living, if necessary, hoping that better times in the future will compensate them for their sacrifices. Readjustments of the rural-nonfarm population necessitated by the semipermanent or permanent closing down of industries that have provided local employment, such as abandoning exhausted coal mines, are also slow and painful processes. Although the factors that have led to and have perpetuated a lack of adjustment between population and resources in the past may become inoperative in the future, at present they present a challenge to society.

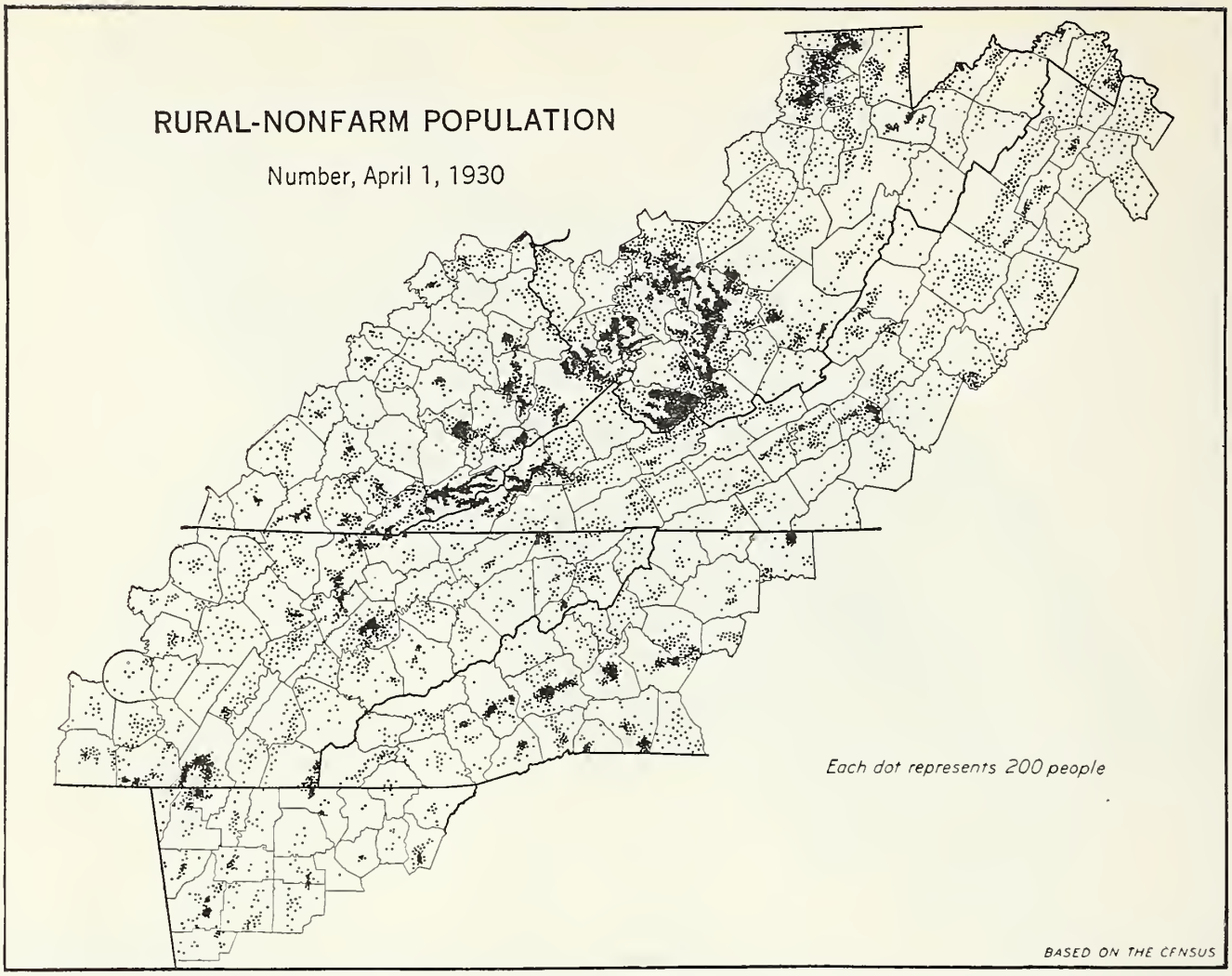

FIGURE 149.—The rural-nonfarm population consists of all persons living outside of incorporated places of 2,500 persons or more, but not living on farms. It includes those living in unincorporated towns and villages, in crossroad hamlets, and in the open country elsewhere than on farms. Its distribution is much less uniform than either the total population or rural-farm population. The highest concentration occurs in the coal-mining areas, where places thickly populated are not incorporated, in rural industrial communities, and in suburban developments surrounding the larger urban centers. In the three subregions where the most coal is mined—the Allegheny and Northeastern Cumberland Plateaus and the Upper Ohio Hills (fig. 49)—50 percent of the total population was classed as rural-nonfarm in 1930. In other subregions the rural nonfarm population comprised from 20 to 42 percent of the total. In the region as a whole, rural-nonfarm population comprised 35 percent of the total population.

COUNTRY POPULATION

In the absence of data for the rural-farm and rural-nonfarm population groups prior to 1930, the country-population classification is presented as the best statistical alternative. It includes all persons living in unincorporated territory. Since comparatively few farms are located within the limits of incorporated places, the country population includes substantially all the farm population.

The changes in the country population from 1900 to 1930 and the distribution of the country population in 1930 are shown graphically in figures 150–158, and the numerical data for the subregions, tabulated by counties, are given in table 23. During this 30-year period, country population increased 27 percent in the region as a whole. The Northeastern Cumberland Plateau made the largest relative gain (105.3 percent) and the Northern Piedmont Plateau lost most heavily (15.7 percent). The Central Appalachian Valleys also lost slightly and two other subregions gained less than 5 percent each.

The net increases in country population for the entire region and for the subregions that recorded gains are proportionally less than the corresponding gains in total population. One of the two subregions that lost in country population also lost in total population but the rate of decrease for the total was somewhat less. The other subregion that lost in country population made a small gain in total population. Some of this difference can be charged to expansions of corporate boundaries and to the incorporation of additional centers, both of which remove persons from the country classification without any necessary population loss for identical areas; but most of it seems to have been due to population shifts in the direction of localities offering better opportunities for farming or other occupations.

The number of farms in the region was 16,800 less in 1930 than in 1910 and the number of persons per farm during this period probably decreased somewhat as well. On this basis, there appears to have been a decrease between 1910 and 1930 of approximately 100,000 in the number of persons living on farms in the Southern Appalachians. The country population in

TABLE 23.—*Country population in the Southern Appalachians, by physiographic divisions and subregions, 1900, 1910, 1920, and 1930*

Physiographic division and subregion	Country population in—			
	1900	1910	1920	1930
	Number	*Number*	*Number*	*Number*
Eastern division: Blue Ridge	418,714	431,436	445,464	473,438
Central division:				
Central Appalachian Valleys	153,250	148,853	148,887	147,166
Central Appalachian Ridges	125,333	134,904	132,261	140,303
Appalachian Valleys of Southwest Virginia	181,600	197,468	200,109	215,664
Appalachian Valleys of East Tennessee	353,252	364,369	353,877	368,598
Southern Appalachian Valleys	114,315	122,739	127,979	127,880
Total	927,750	968,333	963,113	999,611
Western division:				
Allegheny Plateau	210,557	253,396	287,375	328,994
Northeastern Cumberland Plateau	387,850	512,558	655,859	796,387
Northwestern Cumberland Plateau	139,394	149,895	160,865	164,414
Total	737,801	915,849	1,104,099	1,289,795
Eastern fringe:				
Northern Piedmont Plateau	65,065	62,917	60,573	54,859
Central Piedmont Plateau	201,831	214,606	216,353	216,431
Southern Piedmont Plateau	87,790	89,506	94,462	106,277
Total	354,686	367,029	371,388	377,567
Western fringe:				
Upper Ohio Hills	113,791	130,565	140,375	154,523
Highland Rim	185,490	189,031	190,488	190,251
Total	299,281	319,596	330,863	344,774
All subregions	2,738,232	3,002,243	3,214,927	3,485,185

Compiled from the census (*50*), by counties.

1930, therefore evidently includes a distinctly larger proportion of persons who were relying upon employment in nonagricultural industries as sources of livelihood for themselves and their dependents than obtained in the earlier census years.

The increases in country population by 10-year intervals from 1900 to 1930 are chiefly in counties where coal mining and manufacturing have been expanding. Conversely, the largest decreases in country population, except those occasioned by expansions of incorporated areas, occurred for the most part in counties and subregions where such industrial developments have not taken place.

The distribution of the country population in 1930 (fig. 158) is largely a composite of the rural-farm and rural-nonfarm groups but differs in that it excludes the populations of incorporated places of 2,500 or less that are included in the rural classification. The white spots in the center of densely-populated areas are incorporated cities (fig. 160.) This distribution map is particularly significant from the standpoint of rural local government for it indicates, roughly at least, the "volume of business" confronting the units concerned—chiefly counties and some special school districts. In the more densely settled areas surrounding the cities, the country population may be using at least some of the local governmental services of these cities without paying any direct tax in return, but in these areas this greater concentration also makes for lower per capita costs in rendering many governmental services. For sparsely settled areas, the question may be raised as to whether existing units of local government are large enough to provide the necessary services at either a reasonable per capita cost or a reasonable cost per dollar of assessed value of property.

In extreme cases, it may be impossible for some counties, that have little taxable wealth and scattered populations to provide even the minimum services that are required by law without some forms of State aid. Consolidation of two or more such counties might help in some instances. In other instances where local resources are insufficient to finance local government, conditions might be improved by zoning certain localities against permanent residence and providing in these zoned areas only such governmental services as are needed for the type of land use involved, the cost to be met by the owner or owners (public or private) of the land.

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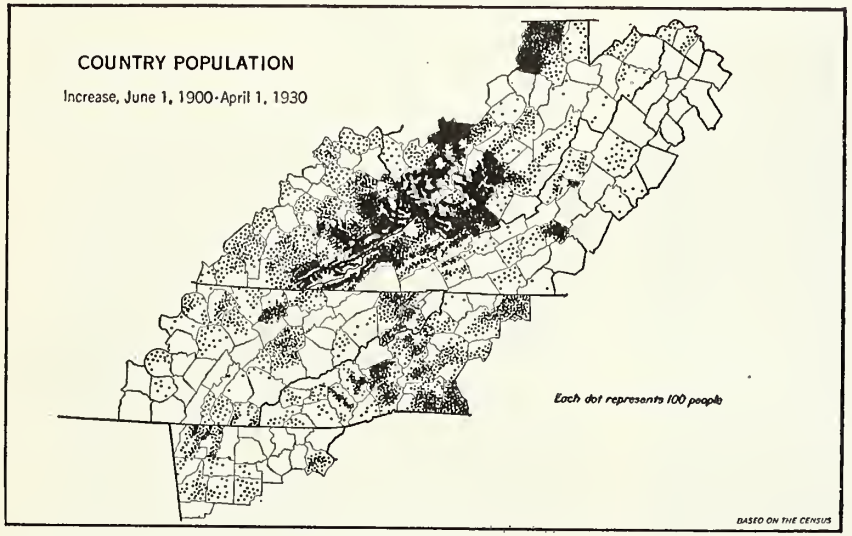

FIGURE 150.—The country population includes everyone living outside of territory incorporated as cities, towns, and villages. Thus it embraces both the rural-farm and rural-nonfarm groups except those living in small incorporated places. Over the 30-year period, 1900-30, the population of this group increased 27 percent. Approximately 76 percent of the increase was in the Upper Ohio Hills and the Allegheny and Northeastern Cumberland Plateaus.

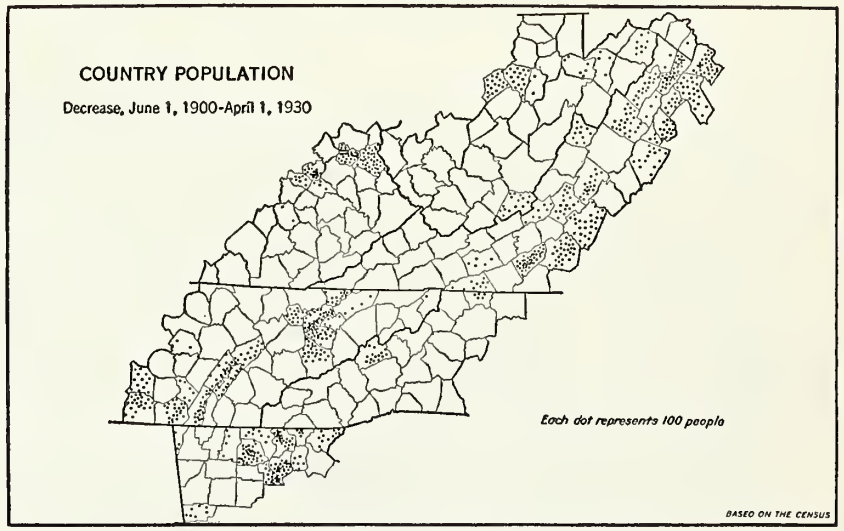

FIGURE 151.—In the main, decreases in country population from 1900 to 1930 occurred in the same counties in which losses were also recorded for the total population (fig. 140) but the losses in country population were greater in practically every case. Some of the losses are "false" due to the incorporation of formerly unincorporated localities or to territorial expansions of previously incorporated places.

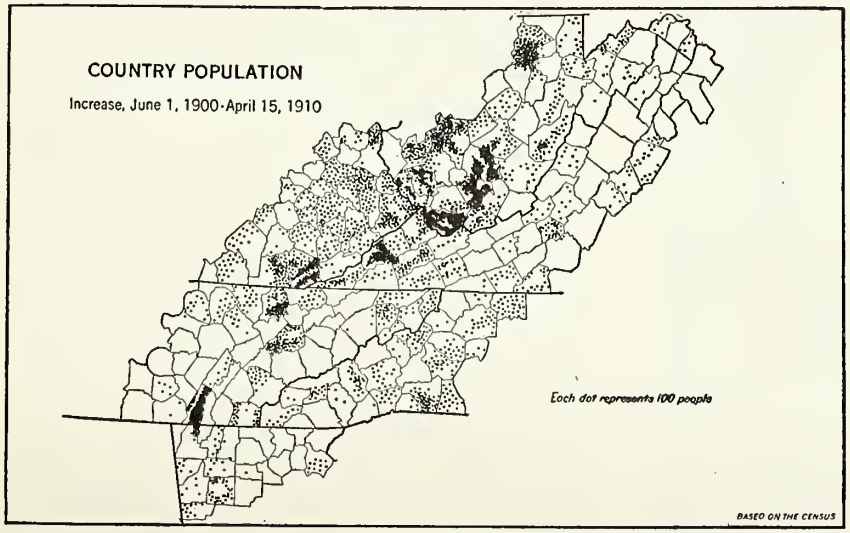

FIGURE 152.—Country population increased 10 percent in the Southern Appalachians between June 1, 1900, and April 15, 1910. The increase was most pronounced in the coal-producing counties and, to a lesser extent, in suburban developments, near such cities as Charleston, Chattanooga, Knoxville, and Roanoke. Elsewhere the increase in country population was closely associated with the increase in number of farms (fig. 16).

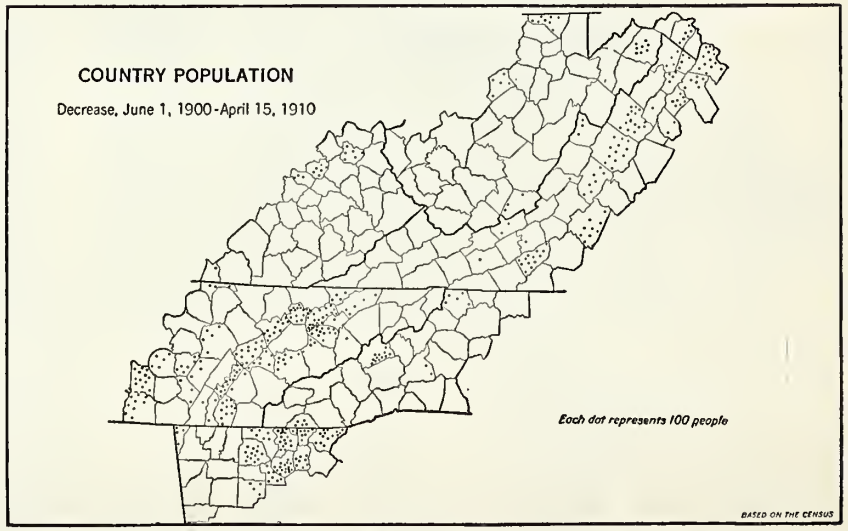

FIGURE 153.—The most pronounced decreases in country population between 1900 and 1910 occurred in the southern tip of the Blue Ridge in Georgia and in the Appalachian Valleys of East Tennessee. Many of the counties that lost in country population in these areas also lost in total population during the same period (fig. 142). Net decreases in country population occurred in the Northern Piedmont Plateau and the Central Appalachian Valleys.

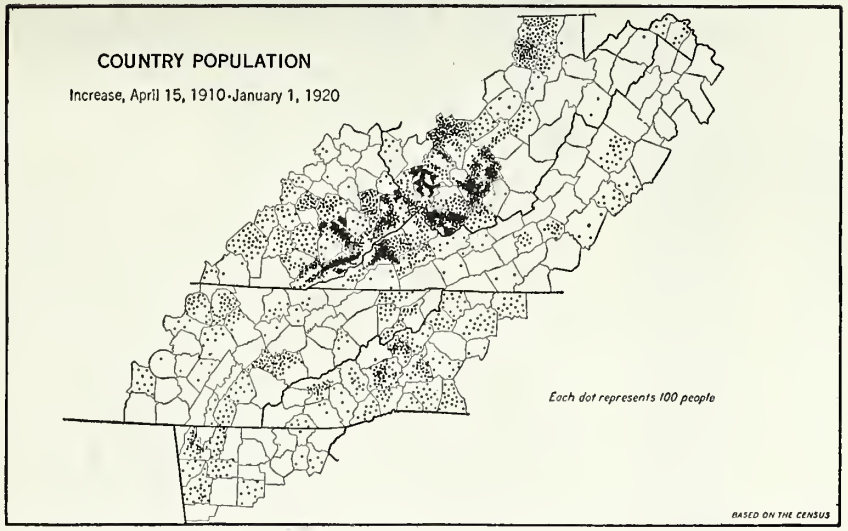

FIGURE 154.—From April 15, 1910, to January 1, 1920, the most pronounced increases in country population occurred in counties in which the coal-mining industry was still expanding. Eighty-eight percent of the net gain of 7 percent in country population during the decade was in the three subregions with the most coal mining, the Upper Ohio Hills, the Allegheny and Northeastern Cumberland Plateaus.

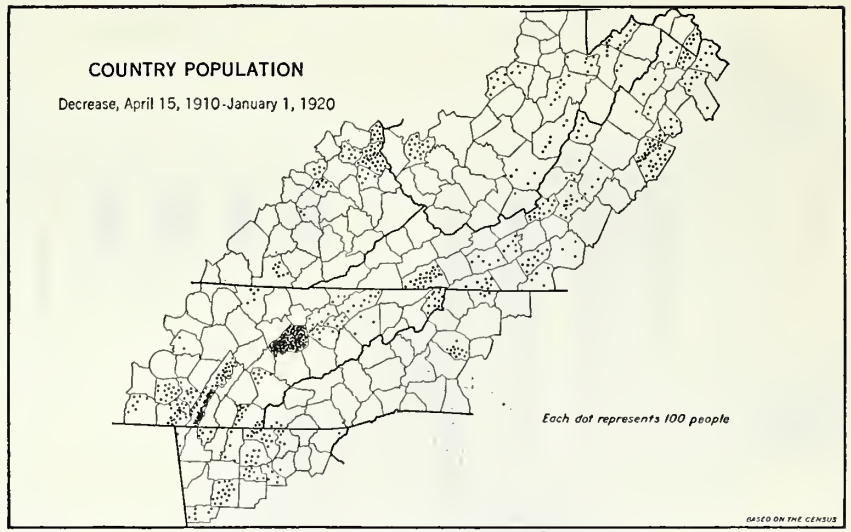

FIGURE 155.—Expansion of the city limits of Knoxville accounts for most, if not all, of the large loss in country population between 1910 and 1920 in Knox County. Most of the losses in other counties were associated with a loss in total population (fig. 144) and with a decrease in number of farms (fig. 19).

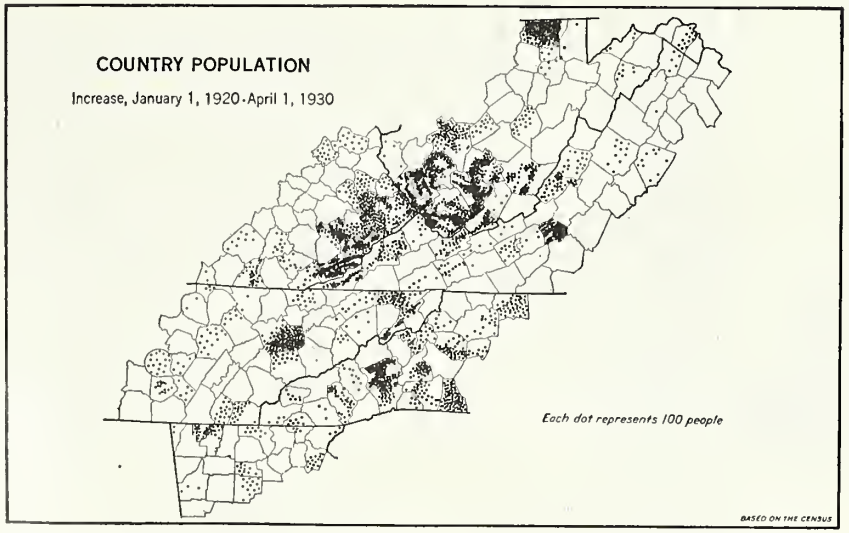

FIGURE 156.—Many counties where coal mines are numerous continued their earlier gains in country population during the period 1920-30; consequently, the gains in the three principal coal-producing subregions were 73 percent of the total increase of 8 percent. In other subregions, decided gains were made in the suburban communities around Asheville, Knoxville, and Roanoke, and in several counties in North Carolina, Tennessee, and Georgia, where textile mills and other industries are located.

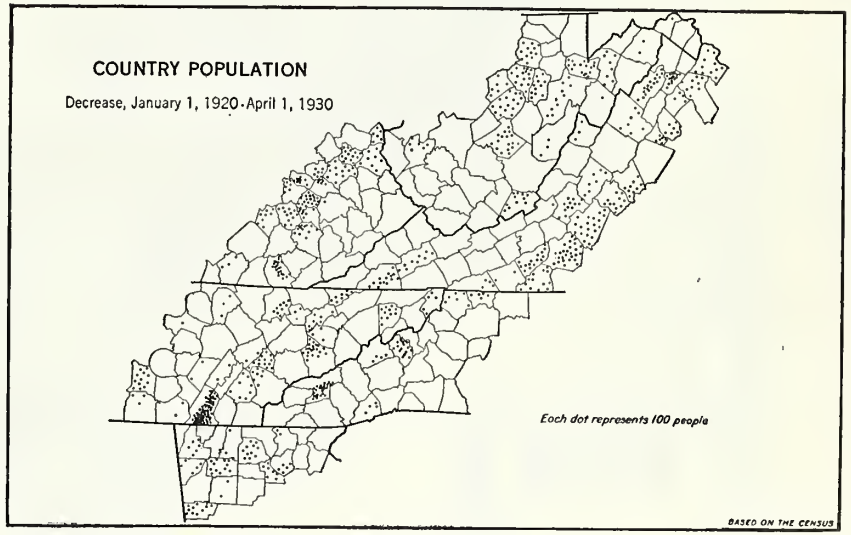

FIGURE 157.—The country population decreased in more than two-fifths of the counties in the region between 1920 and 1930. Except for a few counties, notably Hamilton County, Tenn., the decreases were in strictly rural counties where there are either limited local resources or relatively greater opportunities in accessible industrial centers. Country population declined in four subregions—the Central and Southern Appalachian Valleys, the Northern Piedmont Plateau, and the Highland Rim.

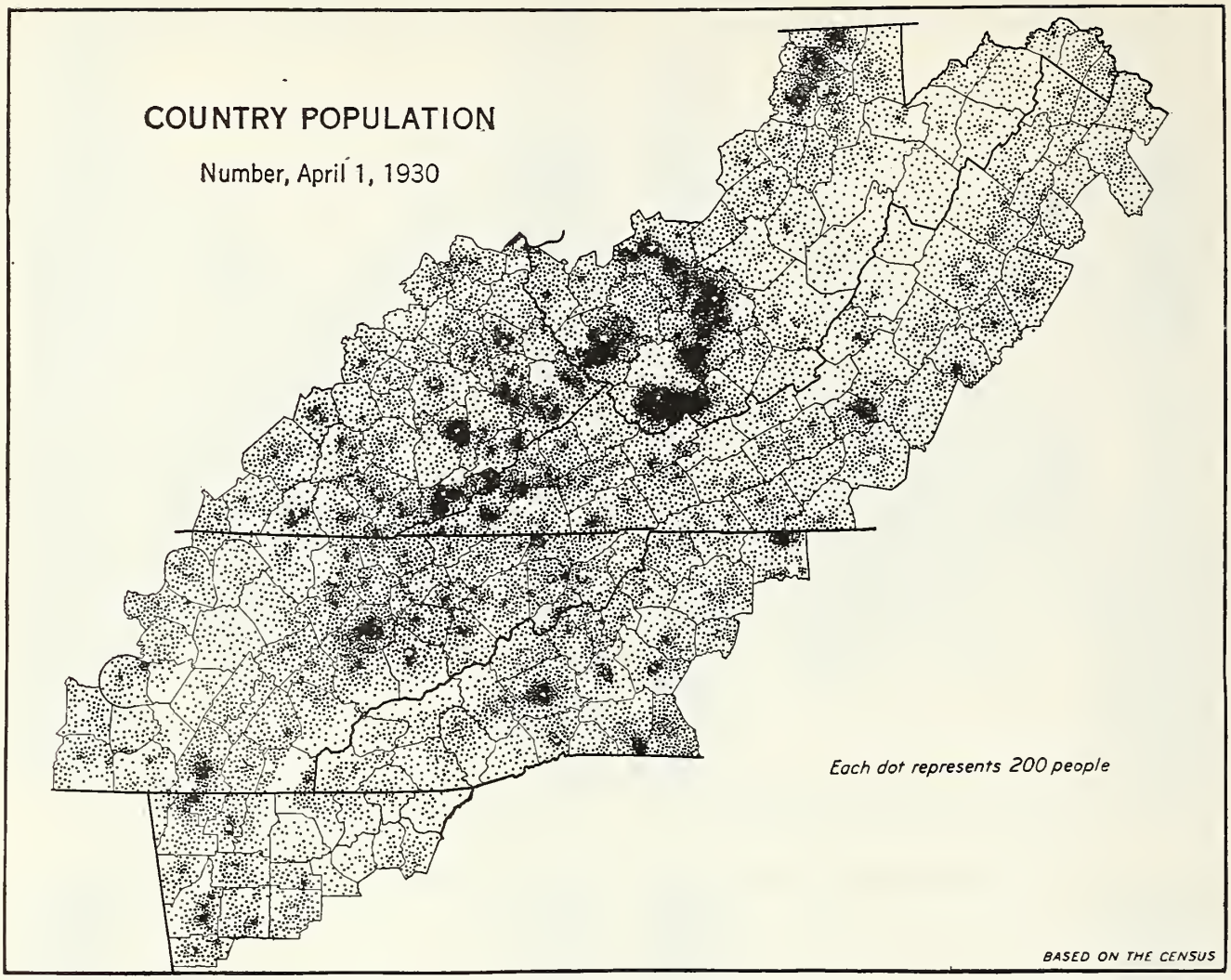

FIGURE 158.—The country population of the Southern Appalachians totaled approximately 3,500,000 on April 1, 1930, or 70 percent of the total population. Outside of the coal-mining areas the country population decreases in density the greater the distance from the larger cities and towns. In areas where coal mining is important, a large country population is usually found. This condition obtains because coal-mining camps or villages, especially those which are company-owned, are rarely incorporated. A similar situation exists in a number of textile-mill villages of the region, though frequently these mill villages are located just outside the corporate limits of a town in order to enjoy many town advantages. About 1¾ million of the country population are in the more mountainous subregions—the Blue Ridge, and the Cumberland and Allegheny Plateaus. The density of country population in these subregions was 43 persons per square mile in 1930, compared with 37 persons per square mile in the Appalachian Valleys and Ridges, and 40 persons per square mile in other parts of the region.

POPULATION OF INCORPORATED PLACES

The growth of incorporated villages, towns, and cities of the Southern Appalachians is shown in figure 159. This chart should be read as follows: The total number of persons in all incorporated places where populations were under 2,500 each in 1900, increased by approximately 122 percent between 1900 and 1930.

The general trend for the 30-year period is clear. The larger the incorporated place was at the beginning of the century, the more rapidly it tended to grow. There are some exceptions among the specific municipalities included in each size classification but the total gains offset the losses in the manner indicated.

Some differences in rates of growth are observable by census periods. During the period 1900–10 all the classes increased at not very different rates. From 1910 to 1920 the largest places experienced a considerably more rapid rate of growth than did the smaller ones. In the most recent census period (1920–30) a fifth population classification has been added to include cities where populations in 1920 exceeded 50,000. The two classes containing the largest cities outstripped the others in percentage gains, but towns where populations were between 2,500 and 5,000 in 1920 made somewhat more rapid gains in the 10 years following than did towns of under 2,500 people or small cities of 5,000 to 10,000 people.

The relative size and geographic distribution of incorporated places in 1930 are shown in figure 160. Ten counties had no such places within their borders. Problems of municipal sanitation, fire protection, street paving, and other local improvements, law enforcement, and the desire to provide better schools usually urge incorporation for densely settled areas. These incorporated places are not uniformly distributed throughout the Southern Appalachians. The population of incorporated places (tabulated by counties) for the several subregions was lowest in the Northern Piedmont Plateau, where 8,713 were enumerated, and highest in the Appalachian Valleys of East Tennessee, where 353,760 were living in such places. In 6 of the subregions the population of incorporated places totaled 100,000 or more, and in 6 subregions fewer than 50,000 persons were living in incorporated places (table 24).

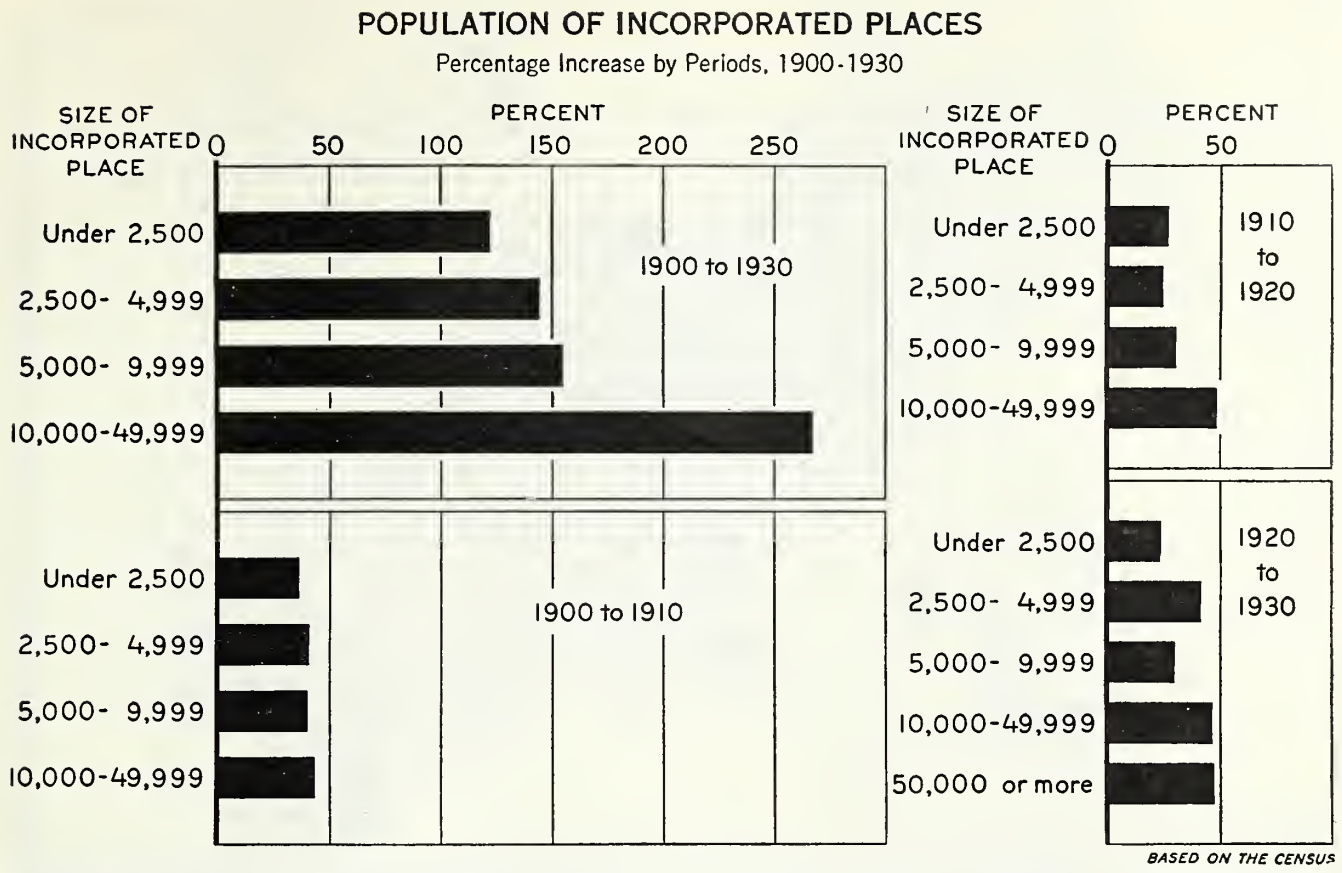

FIGURE 159.—The above classification of incorporated places is by their size at the beginning year of each period. Only identical places are compared. In the case of consolidations of two or more places, their combined population at the beginning of the period was used to determine the class assignment. The data clearly indicate that the smaller places, on the whole, have grown less rapidly than the larger ones during each period. The increase in population of incorporated places of all sizes was much more rapid than the increase in total population (figs. 139–147).

TABLE 24.—*Population of incorporated towns in the Southern Appalachians, by physiographic divisions and subregions, 1900, 1910, 1920, and 1930*

Physiographic division and subregion	Incorporated towns in—			
	1900	1910	1920	1930
	Number	*Number*	*Number*	*Number*
Eastern division: Blue Ridge	37,315	64,247	91,802	142,530
Central division:				
Central Appalachian Valleys	48,738	61,200	68,088	83,678
Central Appalachian Ridges	24,782	33,667	46,297	49,007
Appalachian Valleys of Southwest Virginia	49,558	75,153	98,774	129,435
Appalachian Valleys of East Tennessee	98,121	150,185	233,730	353,760
Southern Appalachian Valleys	29,164	40,630	45,228	69,195
Total	250,363	360,835	492,117	685,075
Western division:				
Allegheny Plateau	38,956	86,484	104,326	122,555
Northeastern Cumberland Plateau	38,864	79,990	150,652	227,622
NorthwesternCumberland Plateau	8,346	17,862	22,534	25,935
Total	86,166	184,336	277,512	376,112
Eastern fringe:				
Northern Piedmont Plateau	5,530	5,812	5,907	8,713
Central Piedmont Plateau	19,788	23,994	31,817	48,618
Southern Piedmont Plateau	17,027	18,048	24,916	43,541
Total	42,345	47,854	62,640	100,872
Western fringe:				
Upper Ohio Hills	33,182	60,014	105,485	140,905
Highland Rim	16,331	30,265	37,330	45,922
Total	49,513	90,279	142,815	186,827
All subregions	465,702	747,551	1,066,886	1,491,416

Compiled from the census (*50*), by counties.

The proportion of the population of all incorporated places living in towns and cities of 2,500 persons or more increased from 61.2 percent in 1900 to 73.8 percent in 1930, another evidence of urbanization. In each subregion during this time, moreover, the population of incorporated places, compared with the country population, increased at a much greater rate.

The location and size of the larger cities indicate that towns that depend mainly upon serving local farmers are not likely to become cities unless other industries are developed nearby. Manufacturing, coal mining, distribution, and transportation are a further stimulus to urban growth as are the commercial, financial utilities, and professional services arising from larger aggregates of population.

SIZE OF RURAL FAMILIES

In comparing figures 161 and 162, the contrast in average size of rural-farm and rural-nonfarm families is obvious. In the entire region, the number of persons per family in 1930 was 5.1 for the rural-farm population, 4.7 for the rural-nonfarm population and 4.4 for the urban population. These figures are somewhat above the average for private families in each class since the residents of institutions, and other so-called quasi-family groups are included in the population totals. The relative differences, however, would not be changed greatly if such quasi-family groups were eliminated from the calculations.

Among the rural-farm population the size of families in the rugged, isolated, and economically-handicapped counties tends to be large compared with the size of families among farm people living in the valley counties where economic opportunities are greater. The spread of urbanization has been more pronounced in

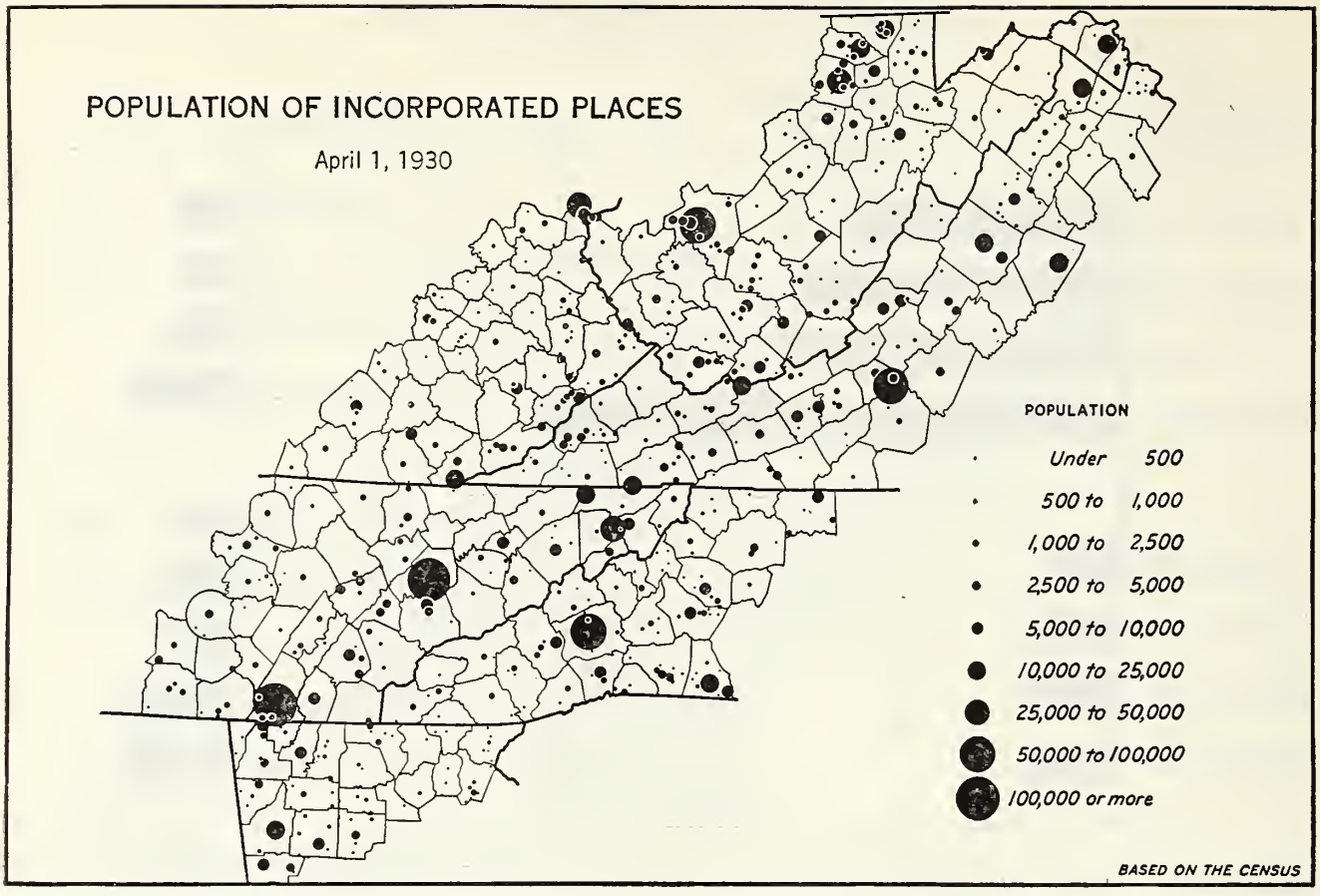

FIGURE 160.—The population of incorporated places comprises the 30 percent of the total population not classed as country population in figure 158. Except for Asheville and Charleston, the large cities of the region are in the broader valleys rather than in the more mountainous sections. In the mountainous subregions—the Blue Ridge, the Allegheny Plateau, and the Northeastern and Northwestern Cumberland Plateaus—the population of incorporated places comprised 23 percent of the total population in 1930 compared with 36 percent of the total population in the same group in other subregions. In the Allegheny and Northeastern Cumberland Plateaus, however, there are several centers of dense population not incorporated. The percentage of the total population in incorporated places varied from 49 percent in the Appalachian Valleys of East Tennessee to 14 percent in the Northwestern Cumberland Plateau and Northern Piedmont Plateau. Ten counties have no incorporated places and 50 counties have only 1 apiece.

these latter counties. Among the rural-nonfarm population the size of families does not show as direct a relationship to topography, but a tendency toward larger families is evident in some of the coal-producing counties where this population group bulks large in the total.

Large families usually mean more children to provide for out of the family purse. When it is recalled that some of the counties having the most limited opportunities (fig. 65) are also those with larger-than-average size of families, the situation appears more serious. Not only does the burden of support of a large proportion of the children rest upon families with small incomes, but the counties and minor political divisions with little wealth have to provide larger schools and other facilities to care for the higher proportion of children and young people. State grants in aid may afford some relief, but the public problems arising from the rearing of large numbers of children in such areas remain acute, as has been noted in the section on schools and education (pp. 110–113).

Large farm families are also related to population mobility and to standards of living. When more young people are being reared on farms in a given area than are needed as farm operators and farm laborers, three things or various combinations thereof are likely to happen. (1) The surplus population may migrate to areas where there are greater agricultural or nonagricultural opportunities, (2) the surplus may find nonagricultural employment sufficiently close by to permit continued residence on the home farms while thus employed and (3) if this surplus population continues to live on these farms and finds employment only in local agriculture, unless changes occur in the type of farming or in the prices of farm products, either the volume of product or the value of product or both, on a per capita basis, is likely to decline. The third alternative is almost certain to mean a lower standard of living for the farm families involved, while the first two alternatives are more likely to mean at least a constant standard of living. To the extent that persons employed off their home farms contribute to the cash income of the families still living on these farms, the standard of living of such farm families may be increased.

Furthermore, the presence of surplus labor on Southern Appalachian farms or in rural-nonfarm homes has a bearing upon the location of additional factories in the region. The question arises, should new factories be built where a considerable number of their needed personnel may continue to live in their present homes, or should such factories be built in the larger towns or cities thereby stimulating greater urban concentration and a continued depopulation of rural communities?

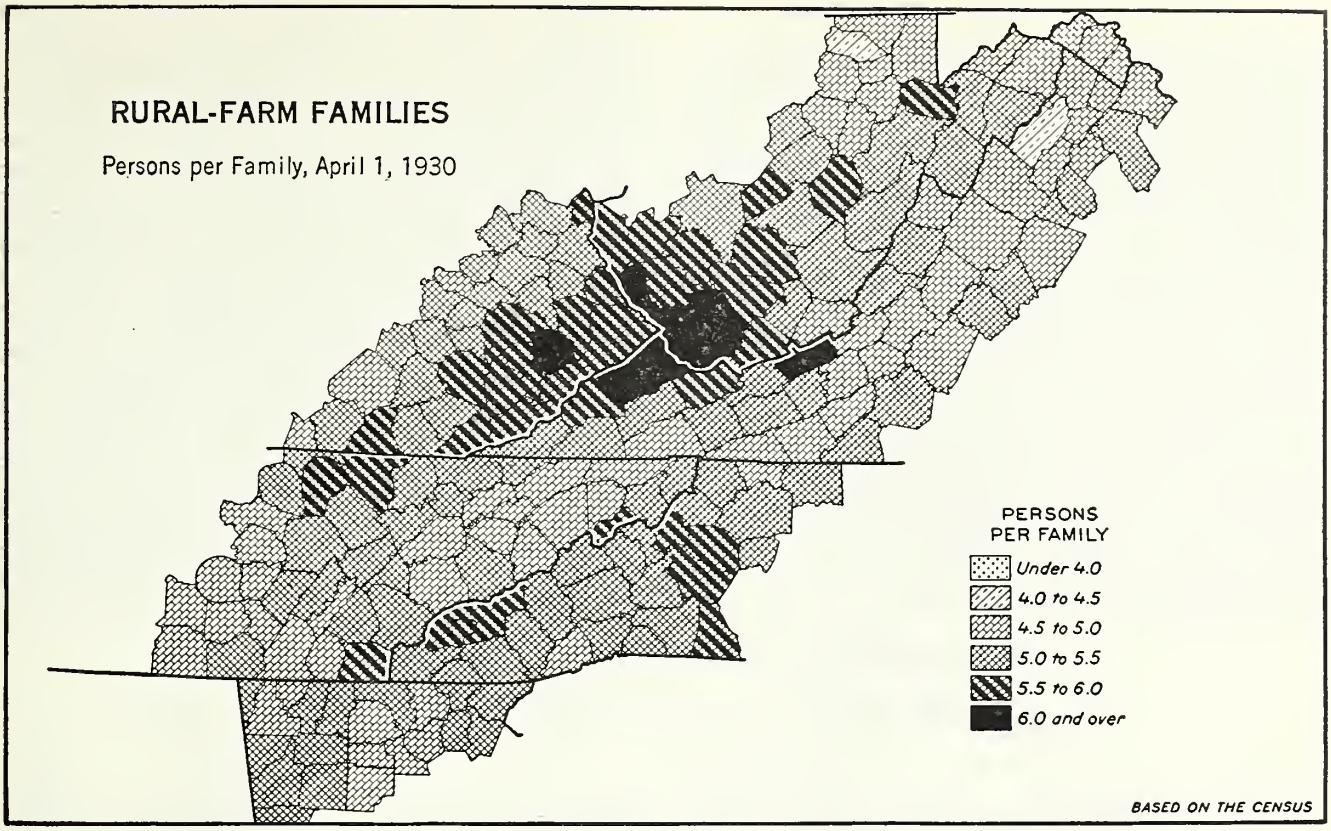

FIGURE 161.—The number of persons per family for the rural-farm population shows considerable fluctuation. In general, the number per family tends to be decidedly greater in the four subregions comprising the Cumberland and Allegheny Plateaus and the Blue Ridge than in the Appalachian Valleys. Counties in which the largest cities are situated tend to average somewhat fewer persons per farm family than do counties more remote from urban centers. Giles County, Va., had the highest average in 1930, with 6.8 persons per family and Marion County, W.Va., the lowest, with 4.4 persons.

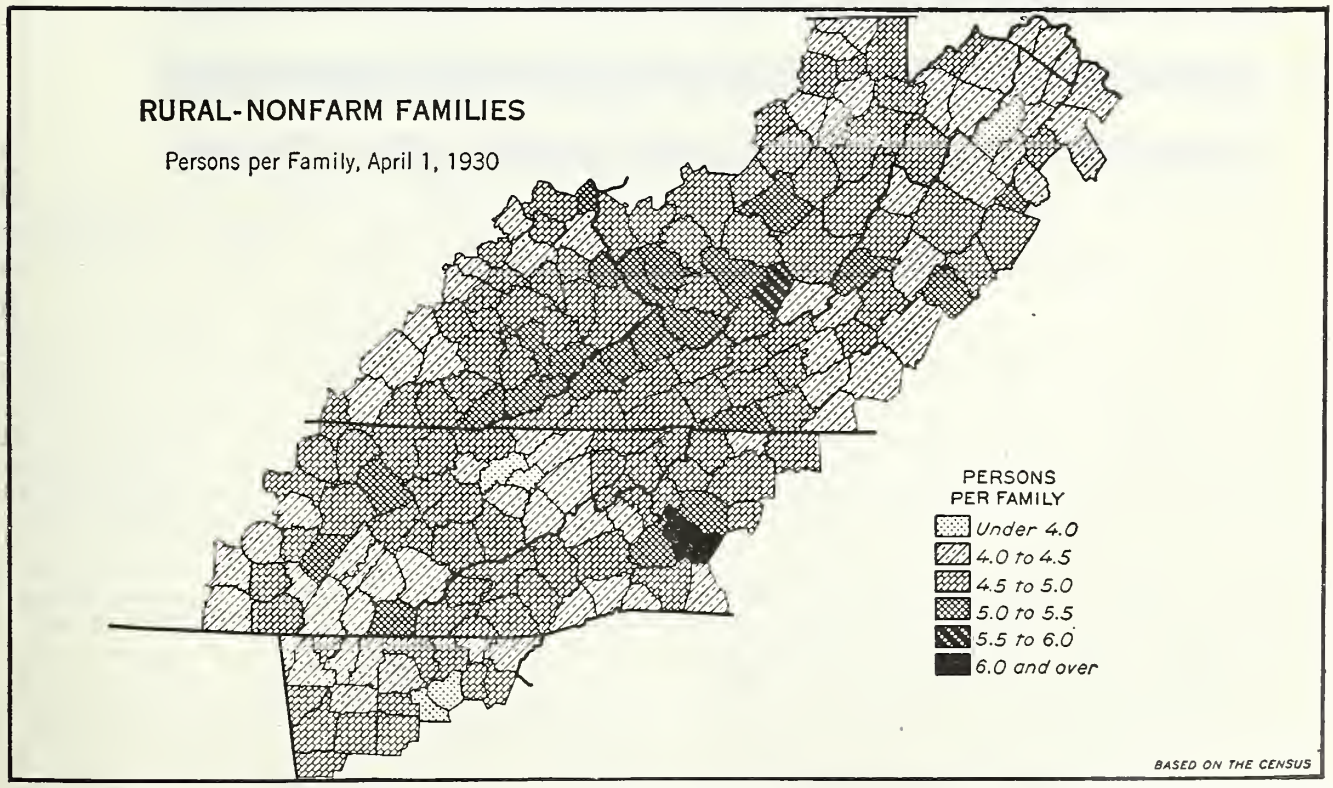

FIGURE 162.—The highest average number of persons per family for the rural-nonfarm population are found in some of the coal-producing counties of eastern Kentucky, the western tip of Virginia, and the southwestern part of West Virginia. A few Blue Ridge counties are high in this respect, but more of these are comparatively low. Burke County, N.C., had the highest average in 1930, with 6 persons per family and Dawson County, Ga., the lowest, with 3.5 persons. The average is below that for the rural-farm population (fig. 161).

RURAL POPULATION UNDER 21 YEARS OF AGE

The age distribution of any population group gives some evidence as to its rate of increase or decrease, assuming no mobility. The only population classification by age that can be carried uniformly for the rural sections of the Southern Appalachians for the 4 census years under study is the rural population. It includes all persons living outside of incorporated places of less than 2,500.

The percentage of the rural population that is under 21 years of age has decreased slightly with each succeeding census since 1900, the total drop being from 55.3 percent in 1900 to 52.6 percent in 1930 (fig. 163). Part of this change has been the result of more young folks leaving home while yet in their teens, and part has been the result of a declining birthrate. Both of these, and perhaps other factors responsible for decreases have been more or less obscured by declines in the death rate. A 2.7 percent decrease in the proportion of persons under 21 years of age over a 30-year period is indicative of a relatively stable age distribution for this rural portion of the total population.

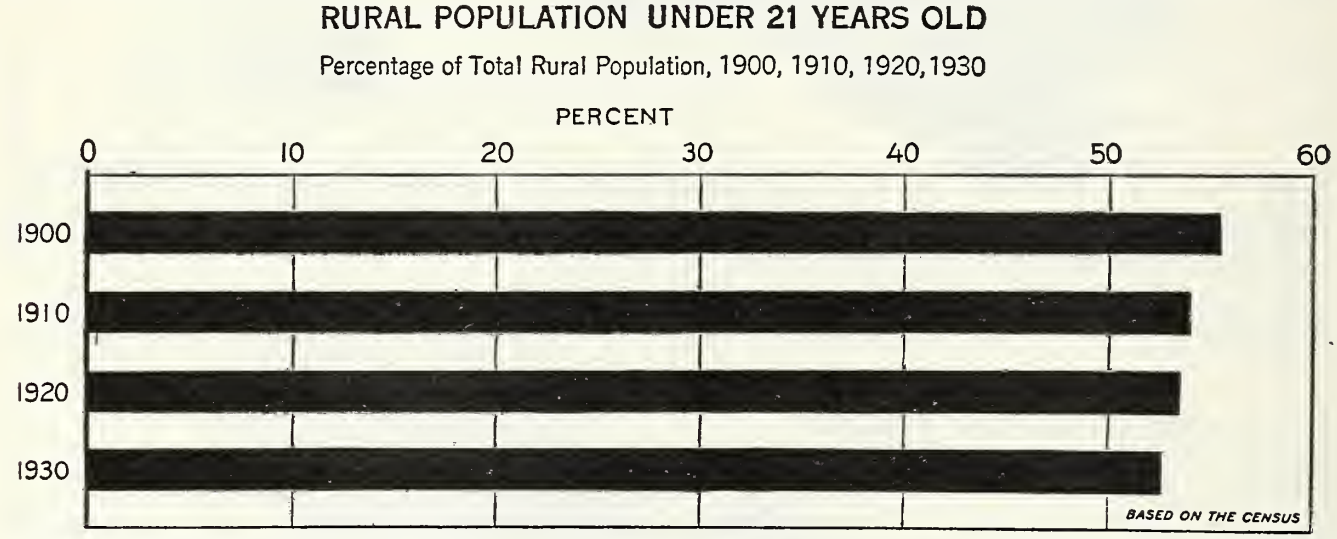

FIGURE 163.—The percentage of the rural population under 21 years of age has decreased slightly each census year from 1900 to 1930. The decrease over the 30-year period was especially slight compared with a decrease from 46.3 percent of the total population in United States in this age group in 1900 to 40.5 percent in 1930. Not only have the young people comprised a large percentage of the rural population in the region in the past but they continue to do so, particularly when compared with the same age group in the entire country.

The proportion of the urban population under 21 years of age in the region decreased from 48.9 percent in 1900 to 42 percent in 1930. The rate of decrease is thus considerably larger for this population group than for the rural population group of the same age. It is partial evidence of the changing rates of natural increase for the urban and rural populations. But even the lower proportion of persons under 21 years of age for the urban population of the Southern Appalachians exceeds the proportion for the United States as a whole. These percentages were 46.3 in 1900 and 40.5 in 1930. The rate of decline in the percentage of the population under 21 years of age was slightly less in the country as a whole than in the urban population and considerably greater than in the rural population of the region.

The foregoing figures also give a very crude picture of rates of natural increase for the urban and rural populations. Other data give some added justification for the belief that the largest cities in the Southern Appalachians will not be able to maintain their present population levels unless their falling birthrates are offset by migrations from other areas. Birthrates in rural areas seem to be sufficiently high to produce some surplus population. This difference in natural increase raises the basic question of whether the surplus population of many rural areas now handicapped by limited natural resources is not, in view of the declining birthrates in cities, essential to national welfare.

An affirmative answer to this question suggests at least three things in land-use planning. (1) Perhaps not all areas now handicapped by limited income-producing resources and high birthrates should be turned to forest or to other land uses that necessitates relocating most of the families now living in these areas. (2) If some of these areas are to be maintained because their human product is essential in national well-being, local institutions and services that assist in the development of sound bodies and trained minds should be financed more liberally by State and Federal funds than has occurred in the past in the granting of subventions (3) As an alternative to settler relocation it may be desirable to bring in new opportunities for nonagricultural employment, such as small-scale factories, to permit people living in economically handicapped areas to augment their present low cash incomes without migrating to new and (to them) strange environments. By this means, the need for subsidies to maintain essential institutions and services would be held at a minimum, the danger of pauperization would be correspondingly reduced, and the rapid decline in birthrates—more likely to occur with wholesale relocations of these people—might be prevented to some extent.

MOVEMENT OF FARM POPULATION

Figures 164 and 165 show the movement of persons to and from farms for the period April 1, 1929, to March 31, 1930, as reported by the census. The movement of persons from farms to cities was probably

greater than the data indicate. Undoubtedly some families who had changed their places of residence in the 12-month period prior to the taking of the census were unable to report the destination (city, village, or other farm) of their predecessors or the number of persons in such families. The distribution and relative size of these movements, therefore, are more significant than is the actual number of persons involved.

The back-to-the-farm movement (fig. 164) was on the whole more pronounced in counties that were already most densely populated by farm residents (fig. 148). The movement was especially heavy near several of the larger cities, and in a number of counties in eastern Kentucky adjacent to the coal fields. Some characteristics of this movement can be seen from its distribution and magnitude. Since the landward migration was more pronounced in many of the better agricultural counties, it does not appear to have been so much one of reclaiming abandoned farms as it was a return of persons to the farms of relatives (and perhaps of friends in some instances) and, to some extent, the development of new small farms in better agricultural areas.

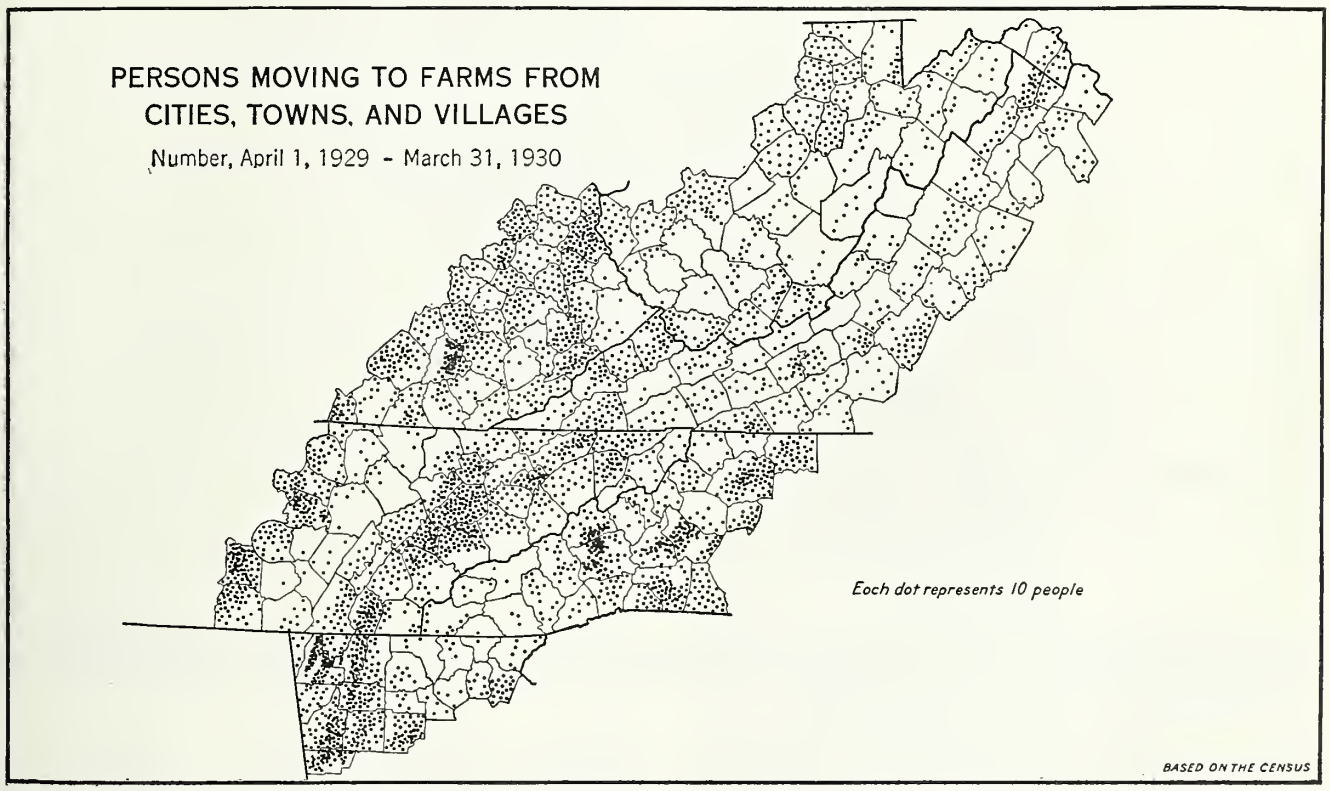

FIGURE 164.—Nearly every county in the region reported 10 or more persons moving from cities to farms during the 12 months prior to April 1, 1930. However, in most of the counties in the Appalachian Valleys in Tennessee and Georgia, the Highland Rim, the Northeastern Cumberland Plateau, and in some of the Blue Ridge counties of North Carolina this movement was decidedly larger than elsewhere. The farmward movement was least pronounced in the Allegheny Plateau and the Central Appalachian Ridges.

The relatively large movement back to farms near Asheville, Chattanooga, and Knoxville may have been, in part, an expansion of subsistence gardening or very small-scale farming as one phase of the suburban movement rather than solely a depression-born phenomenon. During much of 1929 employment was still at a high level in these cities. Some urban dwellers probably bought small acreages with the idea of combining city work with subsistence farming.

Part of the movement to farms around the larger cities, and to some extent elsewhere, also may have been due to the purchase of small tracts of land for intensive farming by former city workers whose advancing years were making steady employment increasingly difficult to obtain, even in prosperous times. Such men (especially those who were farm reared) often turn to these small plots as a desirable intermediate step between urban employment and complete retirement. Here they raise much of the foods required by the family, and they usually try to sell enough produce (especially eggs, poultry, vegetables, and small fruits) for cash in nearby markets to pay for those goods and services that their farms cannot provide directly. Good roads, cheap automobiles, electric power, and other conveniences available in most rural areas adjacent to cities and larger towns have eliminated much of the handicap formerly endured by dwellers in the open country. Home-grown foods and other means of avoiding cash expenditures contribute to reducing living costs of these families without a corresponding lowering of their standard of living.

The cityward movement of farm people is less reliably indicated, for reasons already explained (fig. 165) The rapid expansion of various industrial activities in the Appalachian Valleys of East Tennessee, and the growth of the textile industry in several Blue Ridge and Piedmont Counties of North Carolina may account, at least in part, for the relatively large number of people leaving farms in such areas. Bradley County, near Chattanooga, showing an exceptionally large cityward movement, may have experienced a similar drawing power from this urban center. It is impossible to state how much of the foregoing movement from farms to cities resulted in actual farm abandonment

and how much of it consisted of young folks leaving the home farm in search of new opportunities. In all probability the latter accounted for more migrants than the former.

SUMMARIZING FACTS

During the 30-year period covered by this population study, some pronounced changes occurred in the number and distribution of the inhabitants. The number of persons living in incorporated places increased by 1,025,714, or 220.3 percent of the 1900 total, while the number living outside of such incorporated places increased 746,953, or 27.3 percent. The incorporated places have gained much more by migrations and by the inclusion of additional territory within corporate boundaries than by a surplus of births over deaths among their own residents. Not so obvious, but equally significant, is the fact that had all persons born in the open country remained there, the increase in population for this group would have been much larger than that which actually occurred.

The chief change in many of the more isolated areas in which limited resources and other factors have hindered or precluded nonagricultural development, has been a more or less continual outward movement of people (mostly young folks) to cities and to other rural areas offering greater opportunities for profitable employment. But many people have remained behind, and others have come in; and these factors, combined with relatively high birthrates, have served to swell the total of the country population by the number indicated. Yet in this process of shifting around, many individual counties have lost in country population and others have gained much more rapidly than has the region as a whole.

A few incorporated places lost population during 1 or more of the 3 decades, but their losses are insignificant when compared with the gains made by the others. As a general tendency, the larger an incorporated place was at the beginning of the period the greater were both its numerical and percentage increases in population. A few smaller places have also made very great percentage gains. Furthermore, almost all the gains in population, both within and outside of the incorporated places, seem to be in response to expansions of nonagricultural industries.

In 1900 the entire population of the region was more dependent upon agriculture than has been the case since. Coal mining, manufacturing, transportation and communication, and trade and commerce, and professional and other services have furnished employment for increasing numbers of the people, whereas the number of farms has declined somewhat since 1910. These changes in economic activities and the population shifts that have accompanied them have also been instrumental in bringing city influences and conveniences into rural areas. Good roads, power lines, daily papers, and increased contacts with cities and city people have come to be a part of the life of many formerly isolated communities. This is not to say that city contacts and influences have penetrated the entire region with equal force or frequency. But even in the most remote settlements of the Southern Appalachians some evidences of gradual urbanization can usually be found.

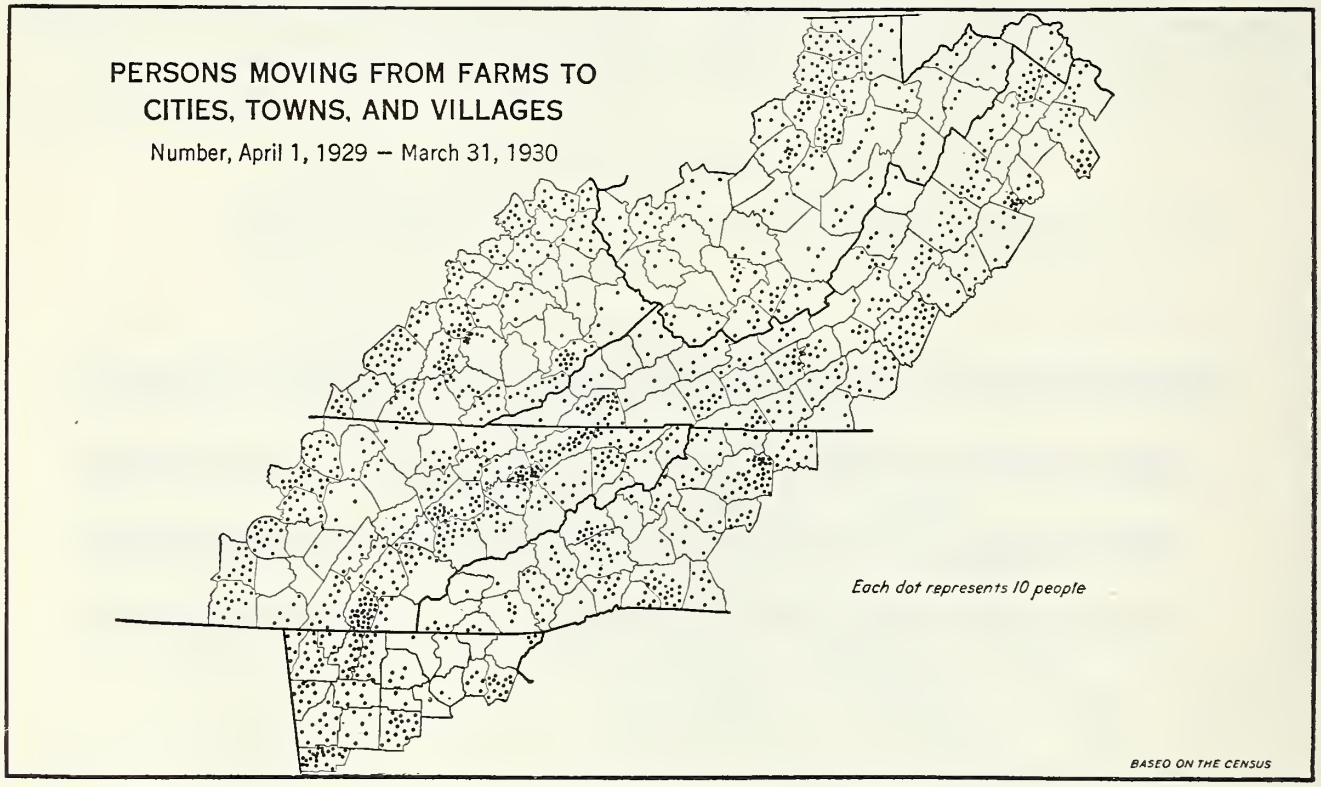

FIGURE 165.—The number of persons moving from farms to cities, although numerically much less than the movement from cities to farms, is relatively largest in about the same counties. Since the persons in families who moved from farms to cities during the 12-month period are included only if their successors on the farms they vacated, or their neighbors, reported them, the data may mean simply a greater mobility of farm population in these counties; or they may mean that omissions in movement from farms to cities are obscuring part of this urbanward migration.

VARIATIONS IN FARM-FAMILY LIVING

By Faith M. Williams, *senior economist, Division of Economics, Bureau of Home Economics*

It has long been recognized that, in general, living conditions in the Southern Appalachians are unsatisfactory. It is perhaps not so well recognized that many of the families of this region live in the comfort of well-ordered and well-equipped farm homes. It is the purpose of this section of the study to present the data available on variations in farm-family living in the Southern Appalachians and on the factors affecting these variations.

In part, variations in the living of farm families in the region are caused by differences in economic resources—in the size of the farms, in their soil and slope, in access to markets for the sale of produce, and in opportunities for industrial employment to supplement farm income—subjects discussed in previous sections. In part, the variations are caused by differences in inherited ability, in educational opportunities—discussed in the section on schools and education—and in cultural environment. Some of the families operate farms in broad valleys or on rolling hills which, in normal times, yield a comfortable income, but many, if not most of them, live in areas in which the valley slopes are very steep, the soil is shallow, and the valley floors are narrow (see section on physical conditions (p. 7), where making an adequate living takes long hours of work and great patience and skill in overcoming physical difficulties. Some of the people live on land so unsuited to farming and so remote from industry that it is impossible for them in their present situation to maintain an adequate family living.

On many farms of the Southern Appalachians, production methods in the household, as well as in the fields, have remained practically unchanged since pioneer days, although the new land and the big game which enriched pioneer life have disappeared. In many such homes recent scientific developments in human nutrition and in sanitation are entirely unknown. In other mountain homes, products of the mechanical inventions of the last century have revolutionized methods of household production during recent years and the homemaker is able to take advantage of current scientific literature as it applies to homemaking.

During the period since the World War there have been great changes in family living in many homes in the Southern Appalachians. New roads and new schools have been built and new contacts with other parts of the country have become possible. In certain parts the influence of Berea College and of some of the settlement schools has operated to improve conditions greatly, and at the same time to preserve cultural continuity. In some communities many products of the arts and handicrafts of pioneer days survive as evidence of a well-remembered past, while in others furniture and decorations of modern types have almost entirely superseded earlier patterns. In certain sections the ballads, musical instruments, and games of the eighteenth century provide a background for recreational activities that include entire communities. In other sections, automobiles, radios, and moving-picture theaters have brought in new types of recreation which absorb the leisure of the majority of the population.

There are many interesting and vivid descriptions of various aspects of southern mountain life, but statistical measures of variations in family living in the region have been secured only in recent years. The measures at present available are quite inadequate to provide a complete picture of living conditions in the mountains. The only figures that present comparable data in regard to farm-family living for the whole region are those from the United States Bureau of the Census.

FARM DWELLINGS

The value of farm dwellings in the Southern Appalachians in 1930 averaged, according to the census (*50*) $764 compared with $1,207 for all farm dwellings in the United States. The Bureau of the Census gathers no data in regard to materials, construction, size, or state of repair of farm homes. There are, however, three published reports that give some definite figures on various aspects of housing in certain counties. In addition, there are data on housing hitherto unpublished from a study of family living in Knott County, Ky., made by the Bureau of Home Economics as part of a general investigation of economic and social conditions in that county undertaken by the Department of Agriculture in cooperation with the Kentucky Agricultural Experiment Station, and from a study made in Grayson County, Va., by the Federal Bureaus of Home Economics and of Agricultural Economics in cooperation with the Virginia Agricultural Experiment Station.[27]

Most of the houses in the Southern Appalcachians are of frame construction, but many log houses, built in earlier days, survive in various states of repair. In many sections only a small proportion of the houses are painted, but the number of painted houses increases in the vicinity of the larger towns. In 8 communities near Rogersville, Tenn., a town with a population of about 1,500 persons, the percentage of farm houses painted ranged from 10 to 75 percent; in 8 communities studied in the same year near Kingsport, Tenn., a city with a population of 12,000 persons, the percentage of farm houses painted ranged from 50 to 90 percent (*1, p. 16*).

In 203 houses studied in Laurel County, Ky., (*31, p. 76*) in 1928 the number of rooms used averaged 4.5, and the number of persons per room 1.18 as compared with the minimum standard of 1 person per room usually accepted by housing experts. The average size of 340 houses studied in Madison County, N.C., in 1923 (*44*), was 4.03 rooms, and the average number of persons per room 1.24. Ten percent of the Madison County houses had walls covered with newspapers, 47 percent ceiled walls, and 10 percent plastered walls. Nineteen percent had broken window panes at the time of the investigation.

In 228 houses studied in Knott County, Ky., the number of persons per room averaged 1.53, the average size of the houses being 4.03 rooms. Two percent of the houses were reported as having plastered walls, 17 percent walls of tongue-and-groove ceiling boards, 6 percent walls of planed boards, 66 percent walls of rough boards, and 9 percent rooms with walls of differing construction. In 59 percent of these houses some

[27] This study was made by Faith M. Williams and Ilena M. Bailey.

rooms were papered with newspapers and similar material; in 9 percent some were covered with torn and dirty wall paper. Twenty-eight percent of the homemakers interviewed in Knott County reported that the roof of the house leaked.

The 331 houses included in the study in Grayson County, Va., averaged 5.26 rooms per house, with an average of 0.92 persons per room. Nineteen percent had plastered walls, 29 percent walls of tongue-and-groove ceiling boards, 20 percent walls of planed boards, 13 percent walls of rough boards, and 19 percent rooms with walls of differing construction. In 9 percent of these houses some rooms were papered with newspapers and similar material; in 12 percent some were covered with torn and dirty wall paper. In this county 22 percent of the homemakers interviewed reported that the roof of the house leaked.

The value of the houses visited in Knott County averaged $340, ranging from $20 to $7,000. In Grayson County, the average was $931, the range being from $50 to $8,000. The census data on values of farm dwellings (fig. 166) indicate that communities with housing conditions like those in Knott County occur frequently in the western and southern parts of the Southern Appalachians and communities with housing conditions similar to those or better than those in Grayson County occur frequently in the parts of the region to the north and east.

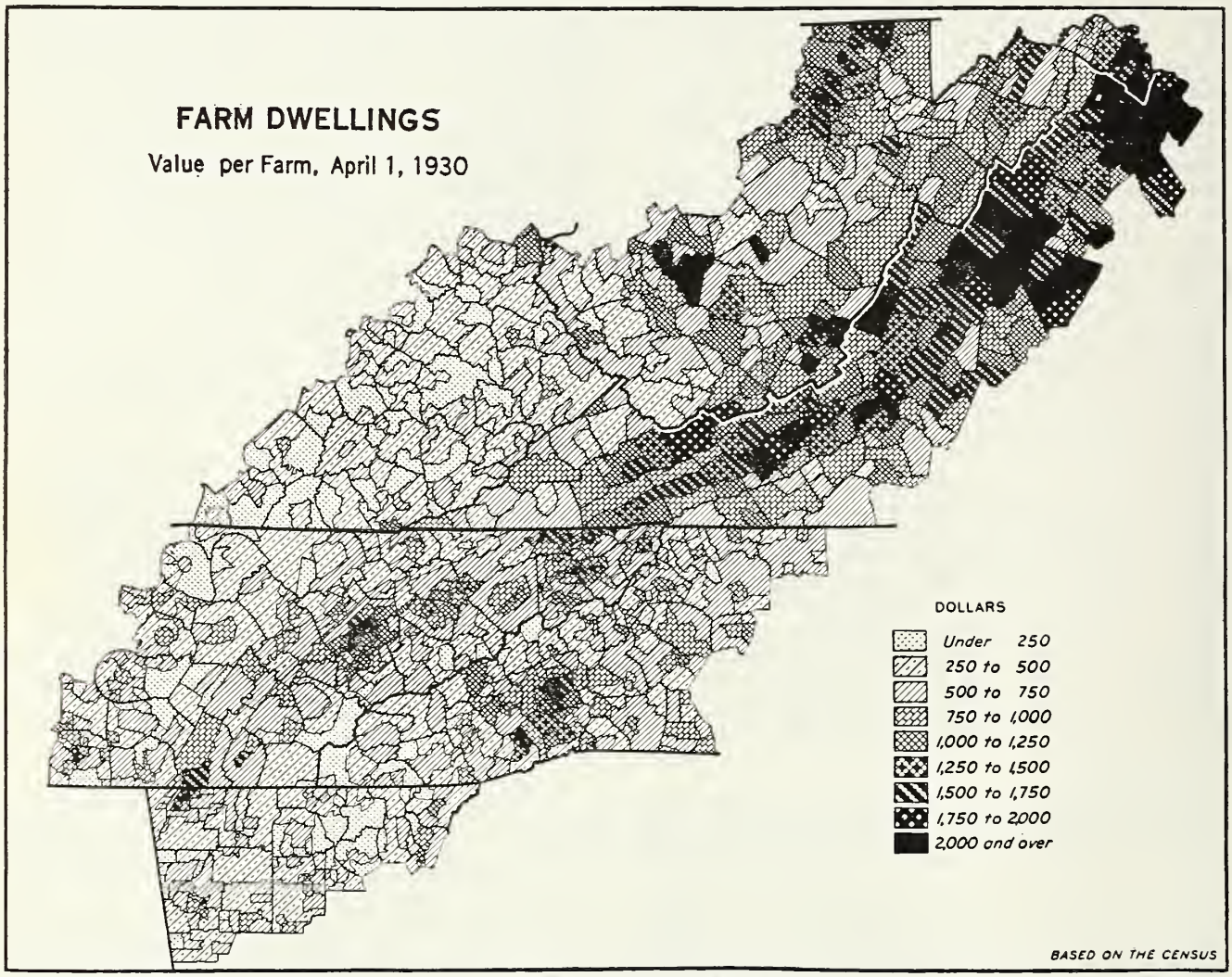

FIGURE 166.—The current value of farm dwellings in the Southern Appalachians, as estimated by farm operators for the census of 1930, averaged $764. The values assigned farm dwellings in Virginia averaged $1,353; in West Virginia, $931; in Tennessee, $627; in North Carolina, $625; in Georgia, $465; and in Kentucky, $353. The farm houses in the different minor civil divisions varied greatly in value, from an average of $60 in one division to over $8,500 in another. The districts with farm homes in the higher value groups are largely concentrated in the Appalachian Valleys in Virginia and West Virginia and near the larger urban centers in the other States. Ten percent of the 1,660 minor civil divisions in the region in which farms were reported had an average value of farm dwellings of less than $250; 33 percent, $250 to $500; 26 percent, $500 to $750; 12 percent, $750 to $1,000; 7 percent, $1,000 to $1,250; 3 percent, $1,250 to $1,500; 3 percent, $1,500 to $1,750; 2 percent, $1,750 to $2,000; and 4 percent, $2,000 and over. Figures 167–171 present examples of mountain homes ranging in value according to field estimates from less than $100 to $3,000.

HOUSING FACILITIES

Variations in family living in the Southern Appalachians are perhaps most strikingly illustrated by the figures on variations in housing facilities. In Augusta County, Va., in which the city of Staunton is located and where the mountains are divided by the Central Appalachian Valleys, there were 2,635 farms in 1930. Of these, 64 percent had telephones, 21 percent lighted their homes with electricity, 28 percent had water piped into the farmhouse, and 16 percent had water piped into a bathroom. Sixteen percent of the rural-farm families in the county had radio sets. In Martin County, Ky., there were 993 farms and no urban population. Only two of these farms had telephones or water piped into the house, and none had electricity or water piped into a bathroom. However, eight of the rural-farm families in Martin County had radio

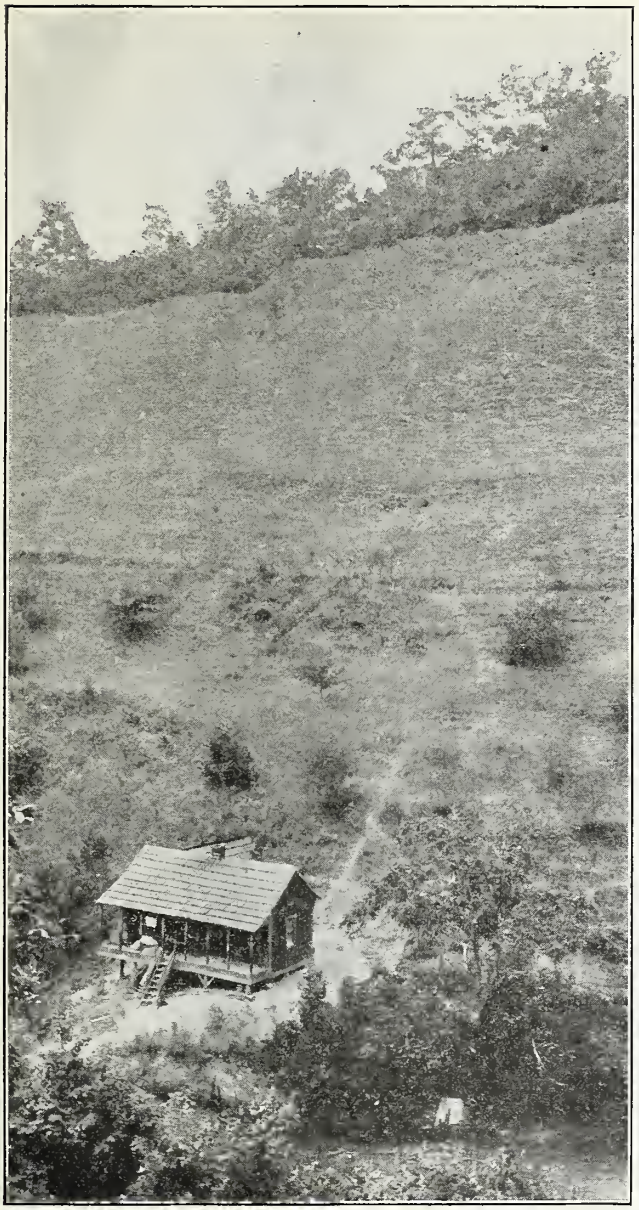

FIGURE 167.—A mountain home valued at $600, a type frequently found in the mountains. Although relatively new, it lacks the conveniences that make for efficient housekeeping. The windows are unscreened. There is no running water in the house. The three rooms are ceiled with unfinished tongue-and-groove boards; the floors are unfinished. The house is lighted with kerosene lamps. The provision for sewage disposal does not adequately protect health.

sets. Census figures on the occurrence of farms with telephones, water piped into dwellings, and dwellings lighted by electricity, and the percentage of rural-farm families having radio sets are shown in figures 172–175. In the Appalachian Counties of Virginia, 7 percent of the farms had water piped into a bathroom; of West Virginia, 5 percent; of North Carolina, 3 percent; of Georgia and Tennessee, 2 percent; and of Kentucky, 1 percent.

Figures for Bledsoe County, Tenn. (*4, p. 23*), in 1925, Summers County, W.Va. (*10*), in 1926, and Knott County, Ky., in 1930, show many families without toilet facilities of any kind, many with water supply unprotected from sewage, and many without window screens. The work of an energetic public-health official has resulted in more than half the farm families studied in Grayson County, Va., building privies of the "pit-vent" type. Only 5 percent of the farm families studied in this county were without toilet facilities, compared with 53 percent in Knott County.

Houses in the Southern Appalachians as a rule, are, heated by fireplaces, or stoves, or a combination of the two. No houses were found with central heating among those studied in Knott and Grayson Counties. In Laurel County, Ky., 2.5 percent of the houses visited had central heating, gas, or electric lights.

Figures 167–175 make it clear that variations in the money value of farm homes in the Southern Appalachians, and in their facilities, are closely connected with variations in general economic conditions described in previous sections. Community customs and education have undoubtedly modified housing and housing facilities in certain sections, but the material available on the factors conditioning differences in housing in the region does not make it possible to weigh the extent of the noneconomic factors affecting housing in the Southern Appalachians.

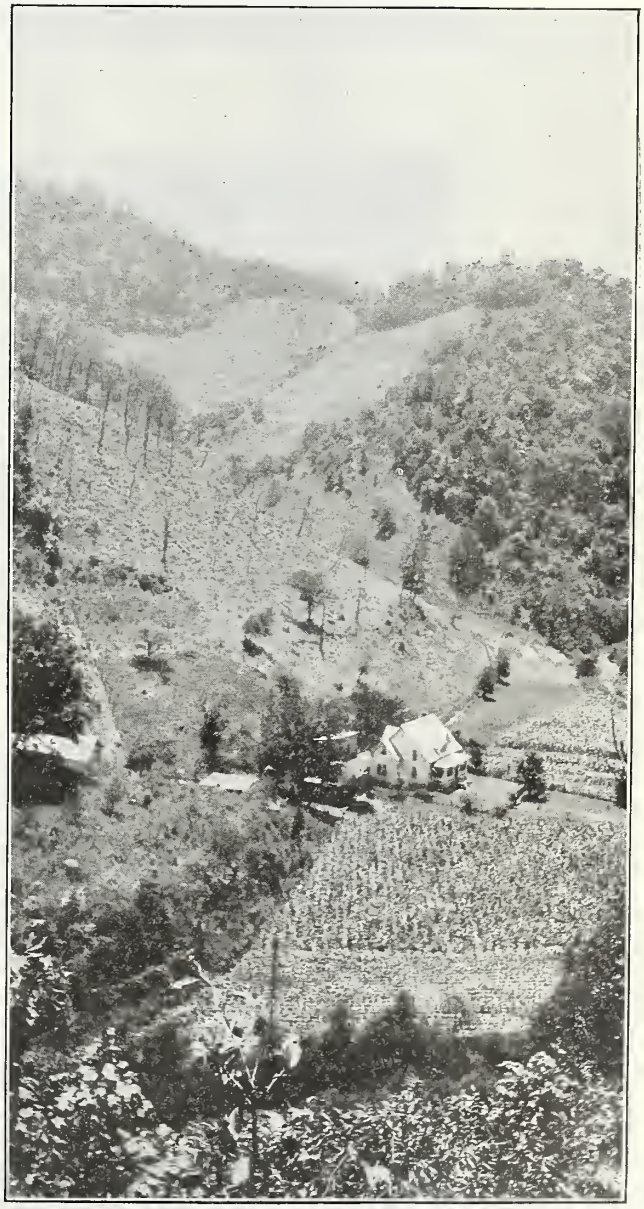

FIGURE 168.—A mountain home valued at $3,000. In this new 10-room house, the windows are screened, the kitchen has running water and a drain, the walls are papered over tongue-and-groove ceiling boards, and the floors are painted. The house is lighted by acetylene. The cellar has stone walls and a cement floor. There is a well-built privy, and the water supply is adequately protected from drainage.

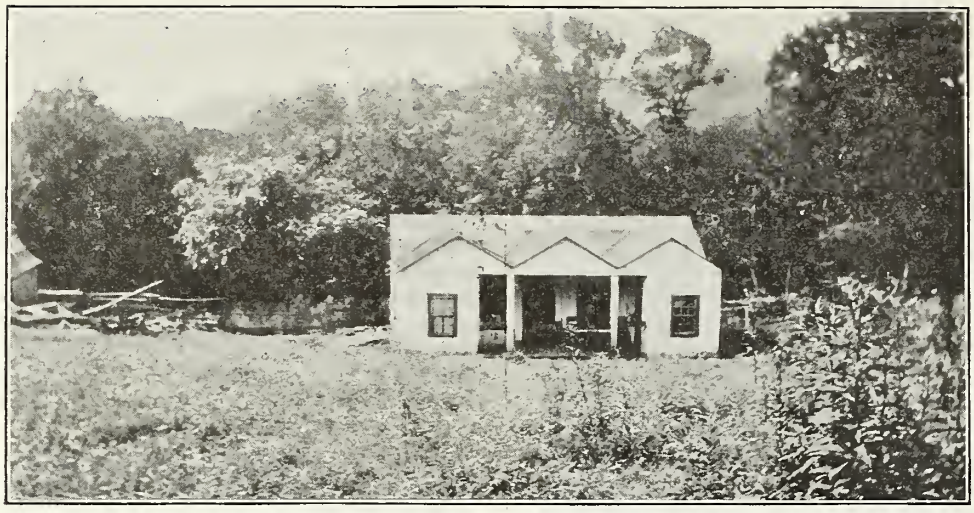

FIGURE 169.—A mountain home valued at $900.

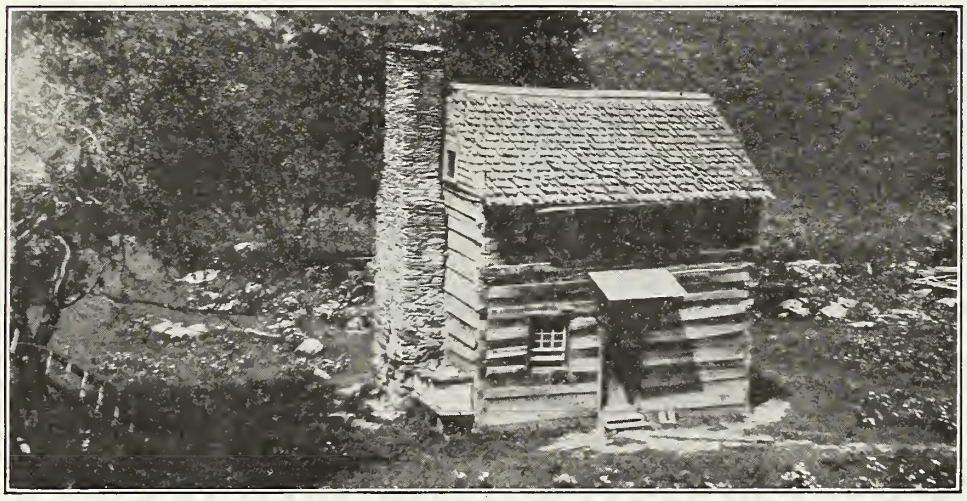

FIGURE 170.—A mountain home valued at $150.

FIGURE 171.—A mountain home valued at less than $100.

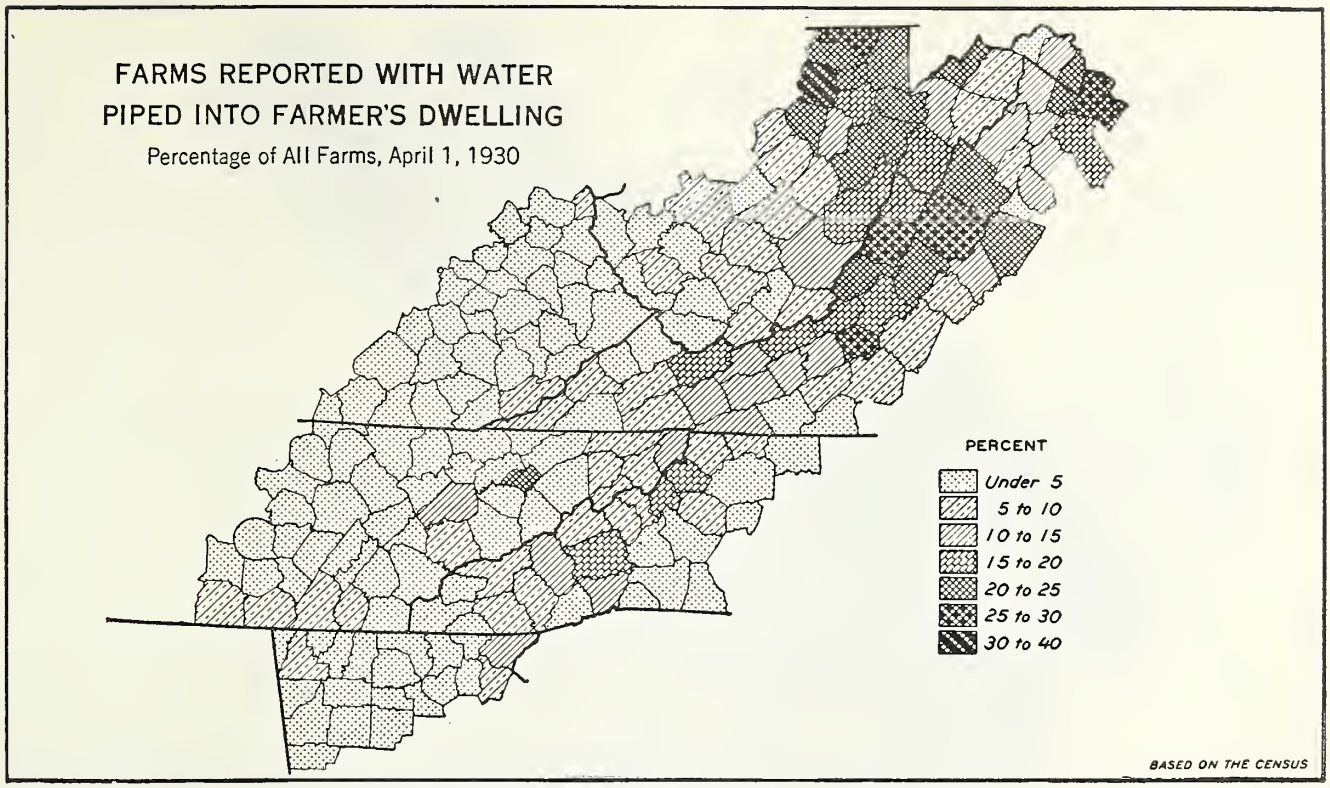

FIGURE 172.—In 1930, 7 percent of the farms in the Southern Appalachians had water piped into the home, compared with 4 percent in 1920. This gain was due, in large part, to marked increases in the counties in Virginia and West Virginia. No county reported water piped into more than 30 percent of its farm homes in 1930. Only 31 of the 205 counties had as many as 15 percent or more of their farm homes with piped water; these counties were concentrated in the Central Appalachian Valleys and in the northern part of West Virginia.

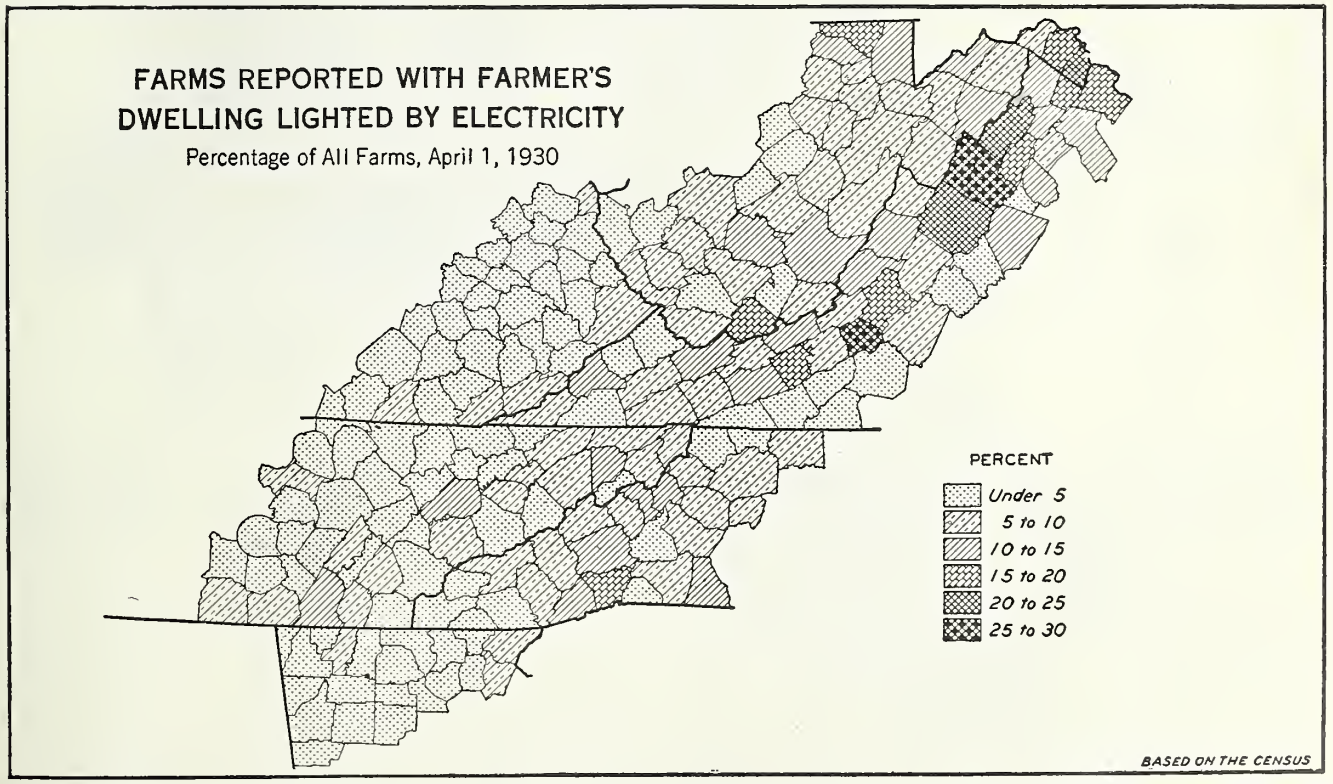

FIGURE 173.—Electricity lighted 6 percent of the farm homes in the region in 1930. In only 4 percent of the homes of farm families was either gas or electricity used in 1920. In 14 counties, 15 percent or more of all farm homes were reported lighted by electricity in 1930, but in none of these did the proportion run as high as 30 percent. These counties lie chiefly in the Central Appalachian Valleys. In one Kentucky county, not a single farm house had electricity in 1930.

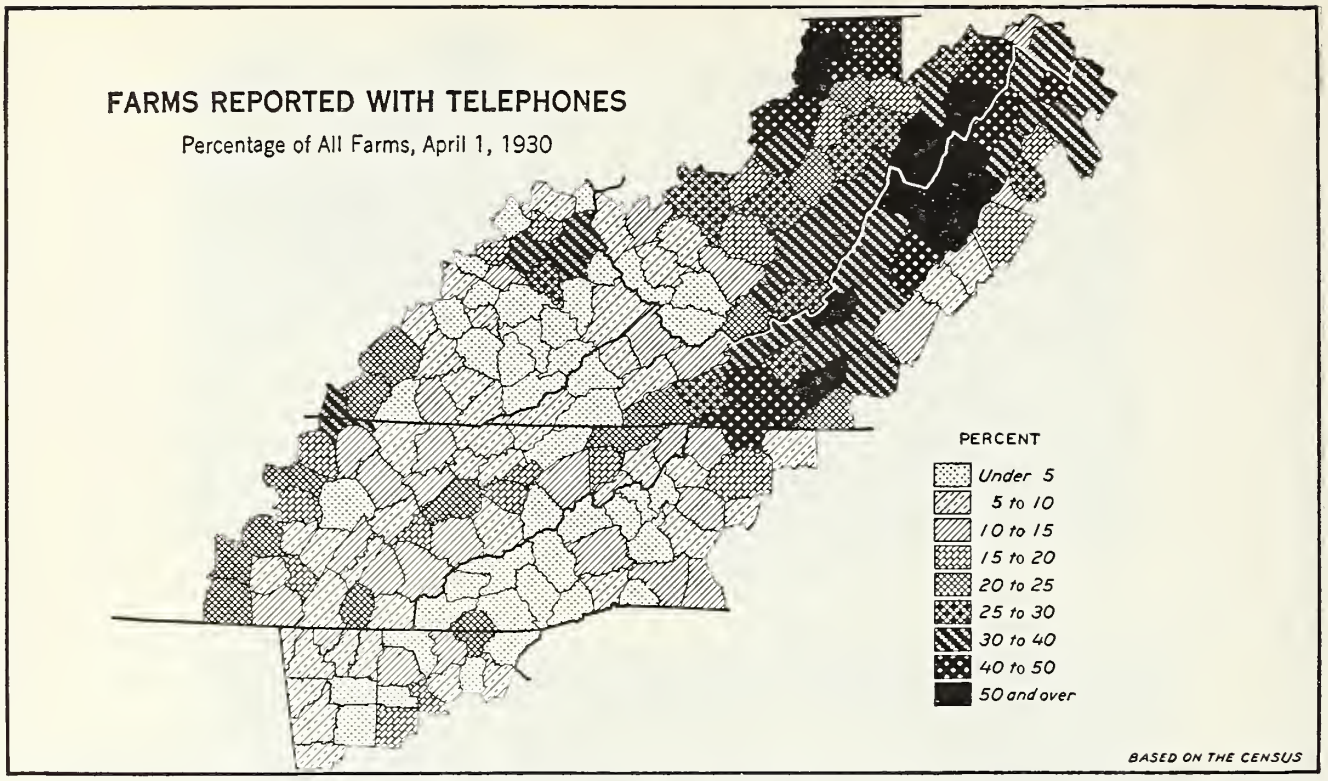

FIGURE 174.—Only 17 percent of the farms in the Southern Appalachians had telephones in 1930 compared with 22 percent in 1920. This decline was widespread, as 161 of the 205 counties reported a decrease in the number of farm telephones. The proportion of farms with telephones in 1930 ranged from one county without a single farm telephone to another county with telephones on 71 percent of the farms. Ninety counties had telephones on 15 percent or more of the farms; these counties were located mainly in Virginia and in West Virginia outside the Northeastern Cumberland Plateau.

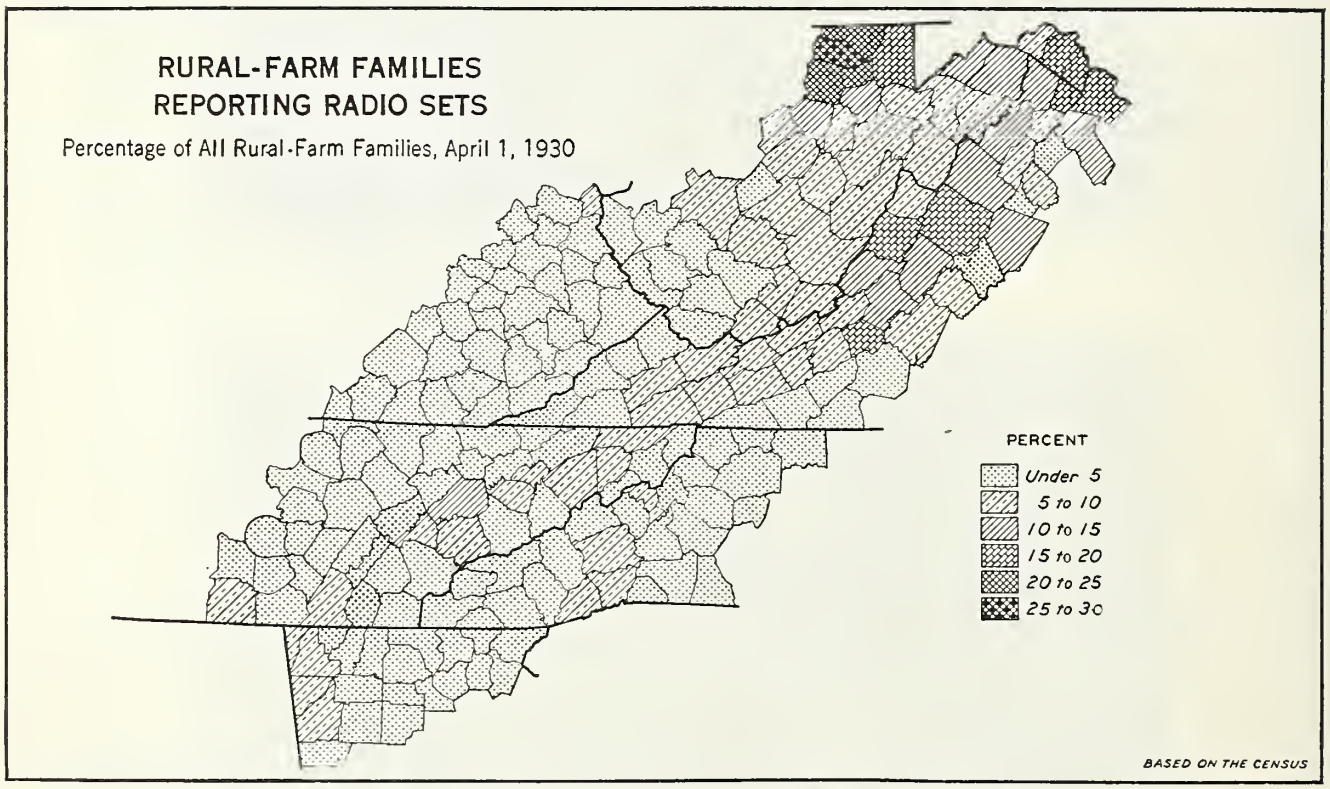

FIGURE 175.—Only 5 percent of the rural-farm families in the region had a radio set in 1930. The highest proportion reported in any one county was 25 percent. There were 12 counties with sets in 15 percent or more of the rural-farm families; these counties all lie in Virginia and West Virginia. To reach the rural families with programs for adult education, the University of Kentucky in 1933 began to establish numerous radio-listening centers in eastern Kentucky.

VALUE OF PRODUCTS FURNISHED BY THE FARM

In a region where the money income of farm families is very small, the products raised by each family for its own use are of supreme importance for its well-being. The value of the home-produced food, firewood, etc. used by the operator's family in 1929, as estimated for census enumerators, averaged $286 for the Southern Appalachians—14 percent higher than the average for all farms in the United States. It is impossible to say how accurately the estimates made for census enumerators represent the actual money value of the products furnished farm operators by their farms, since no data are available comparing the census estimates with systematically kept records from all farms in a given area. Even allowing for a wide margin of error in individual estimates, and assuming that a fairly high value was placed on products from the farm other than food the average value is high enough to suggest the inference that, on the average, farm families in the region are supplying for themselves a very large proportion of their food supply. This inference is borne out by figures on food furnished by the farm from studies of specified counties. Nevertheless, the section on the food supply of families living in the Southern Appalachians (pp. 153) shows that many of the families for which food consumption data are available have not had satisfactory diets and that they need to supplement their present food supply with other foods which might well be produced on their own farms.

Variations in the estimated money value of food, firewood, etc., furnished the operator by his farm are shown in figure 176. Since census figures on the quantities of goods furnished by the farm are not available, it is impossible to determine how far the variations in estimated money values reflect differences in the quantities of home-produced goods, and how far they reflect higher prices for farm produce in some districts than in others. In general, the estimates were higher in the northeastern and north-central sections of the region than in the sections to the south and west. They were also high, as a rule, in civil divisions near summer resorts, and near coal-mining villages where a nonfarm population increased the local demand for food in 1929.

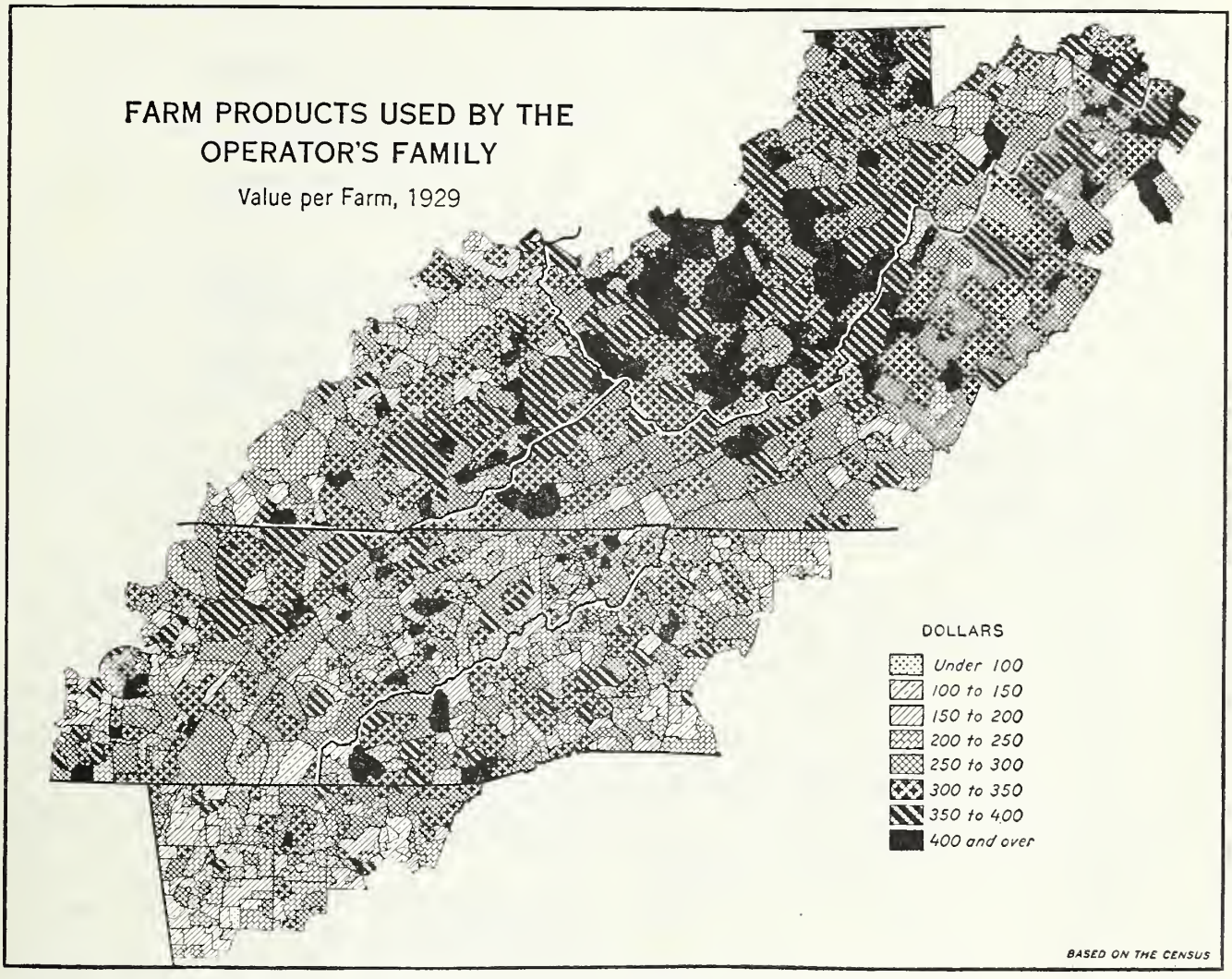

FIGURE 176.—The value of the products furnished the operator's family by his farm is a figure difficult to estimate because most farm families keep no record of the quantity and value of the farm products used in the home. The estimates given to census enumerators by farm families in the Southern Appalachians showed an average of $286 worth of farm products used in the home in the year 1929. The estimates for West Virginia averaged $347; for Virginia, $304; for Kentucky, $291; for Tennessee, $273; for North Carolina, $254; and for Georgia, $218. Less than 0.5 percent of the 1,660 minor civil divisions reported an average value of products furnished by the farm under $100; 4 percent, $100 to $150; 11 percent, $150 to $200; 21 percent, $200 to $250; 25 percent, $250 to $300; 20 percent, $300 to $350; 11 percent, $350 to $400; and about 8 percent, $400 and over. The average value of products furnished by the farm varied from $31 in a civil division in Georgia to $602 in a civil division in Tennessee.

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The relatively high prices received by farmers who sold their produce in isolated mining villages may have enhanced the money value placed upon home-produced food. In Kentucky, the estimated value of farm products furnished the operator's family was 14 percent higher per farm in the coal-producing counties than in the non-coal-producing counties; in Tennessee, 11 percent higher; and in West Virginia, 4 percent higher. In Virginia the average estimated value of food and firewood produced for home use was exactly the same for coal-producing and non-coal-producing counties.

FARM-FAMILY LIVING IN SELECTED COUNTIES

The studies of farm-family living in Laurel and Knott Counties, Ky., and in Grayson County, Va., include, in addition to data on housing and housing facilities, information on goods and services furnished by the farm and bought for family use and on some of the factors conditioning farm-family living. All three of these counties are in the mountainous parts where conditions are very different from those in the Appalachian Valleys. Laurel County is located in the Northwestern Cumberland Plateau, a subregion with ridge-top settlements. (See pocket map showing topography of Southern Appalachians.) The usual elevation is about 1,200 feet above sea level, with occasional knobs that are 300 feet or more higher. Roads are poor except for a north-and-south Federal highway and a new State highway intersecting it. Coal production amounted to 129,054 tons in 1927, but the veins are thin and production is declining. London, with a population of 1,950 in 1930, is the largest town. A railroad crosses the county, and railroad shops at Corbin, in an adjoining county, employ several hundred workers, part of whom are from Laurel County.

Knott County is situated in the Northeastern Cumberland Plateau, a subregion with creek-bottom settlements (pp. 11). The ridge tops and valley floors are narrow, the hillsides are steep. Elevations range from less than 1,000 to over 2,000 feet. Coal production amounted to 408,315 tons in 1929, and most of the coal deposits in this county have not yet been actively mined. Extensive coal-mining operations were carried on in neighboring counties in that year. Two railroads touch the county boundaries, but their usefulness is limited by the fact that there are only two gravel-surfaced roads in the county, neither very long, and that the dirt roads are not well graded. Travel is frequently by creek bed. The only town, Hindman, the county seat, had a population of 508 in 1930.

Grayson County is located on the southern border of Virginia, in the Blue Ridge Plateau. Elevations range from about 2,200 feet to the 5,719 feet of Mount Rogers, the highest mountain of the State. The topography is rough, but few of the slopes are too steep for pasturage. The county has 2 very good State highways, 1 north and south, 1 east and west. The other roads are poor. In 1930 Independence, the county seat, had a population of 250. Fries and Galax, textile towns on the eastern border of the county, numbered 2,205 and 2,544 persons, respectively.

Of the population 10 years of age and over in Laurel County in 1920, according to the census, 7 percent were illiterate; in 1930, 6 percent; in Knott County in 1920, 19 percent; in 1930, 8 percent; and in Grayson County in 1920, 9 percent; and in 1930, 8 percent.

In the 1930 census, 44 percent of the Laurel County farms were classified as self-sufficing; 22 percent as general; 16 percent as part-time; 5 percent as crop specialty; and 13 percent as other types. Of the Knott County farms, 77 percent were classified as self-sufficing; 2 percent as general; 10 percent as part-time; and 11 percent as other types. Of the Grayson County farms, 43 percent are classified as self-sufficing; 24 as general; 10 percent as part-time; 18 percent as animal-specialty; and 5 percent as other types. It is evident that the proportion of self-sufficing farms is unusually high in Knott County, although, as already indicated (p. 43), many general farms in the more mountainous counties bear a close resemblance to self-sufficing farms. Figures 52 to 64, in the section on farm organization and management, illustrate the extent to which the three counties are typical of others with respect to types of farms, and table 11 shows the number of farms in the entire region of the types dominant in these counties.

The money value of goods and services purchased and furnished by the farm for family use affords one of the best measures of the level of farm-family living (figs. 177 and 178). Family expenditures averaged $324 in 1927–28 for the families studied in Laurel County, $450 in 1929–30 for those studied in Knott County, and $399 in 1930–31 for those studied in Grayson County. Money value of all goods and services furnished by the farm averaged $365 for Laurel County, $517 for Knott County, and $376 for Grayson County. The value of food furnished by the farm averaged $308 for Laurel County, $422 for Knott County, and $241 for Grayson County.

The figures from the three groups are not exactly comparable because of price declines in 1930–31. There are no indexes measuring price changes in the Southern Appalachians. An indication of the purchasing power in 1927–28 of the money spent by the Knott and Grayson County families in 1929–30 and 1930–31 can be obtained by applying to their expenditures the indexes of the Bureau of Agricultural Economics for prices of goods purchased for family maintenance by farmers in the entire United States. Average expenditures of the Knott County and Grayson County families, thus raised to the 1927–28 price level, become $456 and $437, respectively.

If money value of food furnished by the farm is adjusted to the 1927–28 price level by means of an index based on average farm prices in Virginia and Kentucky and weighted according to quantities of food produced for family use in Grayson County, the average becomes $427 for Knott County and $282 for Grayson County. Although the adjusted values do not represent what money expenditures and value of farm-furnished food actually were in Knott and Grayson Counties in 1927–28, they do give some indication of the part price changes play in the differences between the figures for these three groups.

Farm incomes in Grayson County in 1930–31 were smaller than in the years just previous because of the decline in prices of cattle and other farm products and because of the drought of 1930. The drought was not so severe in this county as in many parts of the Appalachians, but it did affect both crops and gardens. Figures collected in 1930–31 in Leslie County, Ky. (*61*), where farming conditions are very similar to those in Knott County, show the combined effect of meager resources to begin with, the drought, the

PERCENTAGE OF FAMILIES IN DIFFERENT ANNUAL VALUE-OF-FAMILY-LIVING GROUPS

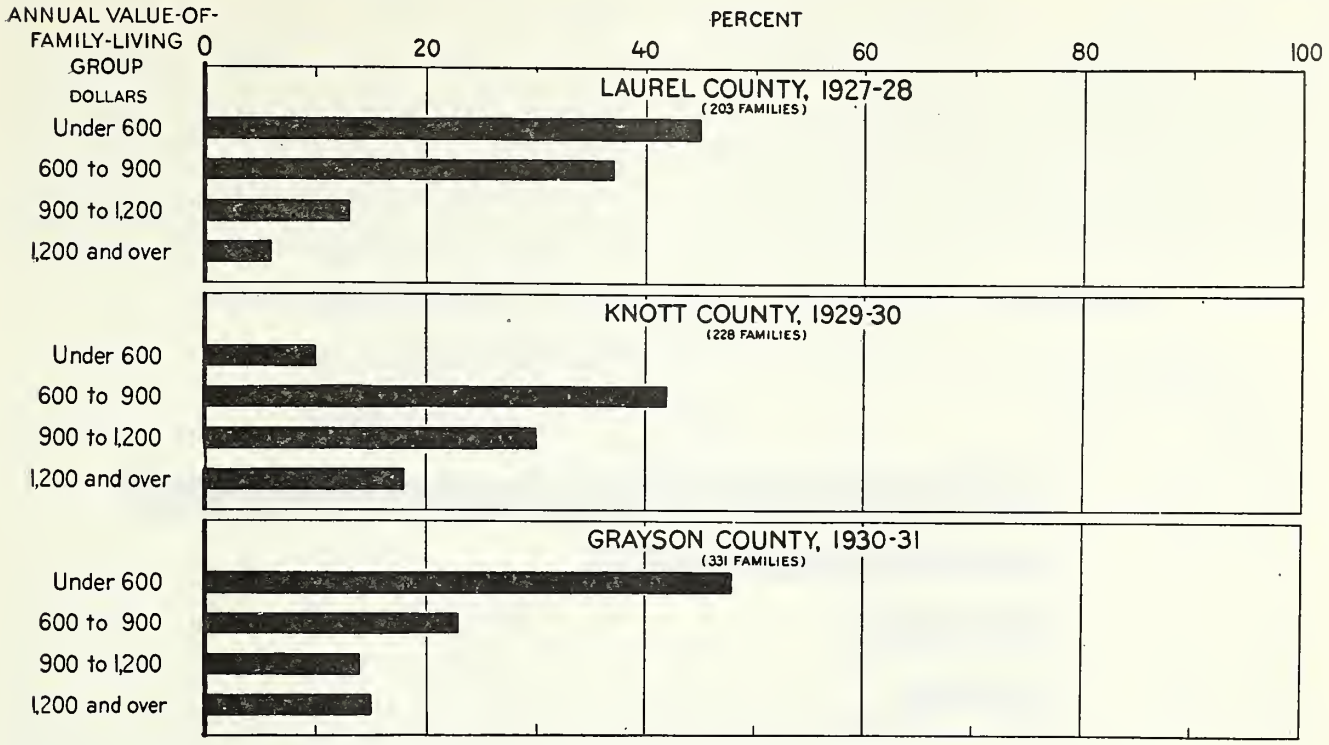

FIGURE 177.—In three groups of families studied in the Southern Appalachians, annual money value of family living was computed by adding money expenditures for goods and services for family use, money value of goods furnished by the farm, and estimated rental value of the family dwelling. A much greater proportion of the families in Knott County, Ky., in 1929–30, were in the higher value-of-living groups than in the other two counties. Between 45 and 50 percent of the families in Laurel County, Ky., in 1927–28, and in Grayson County, Va., in 1930–31, had a value of living under $600 a year.

VALUE OF LIVING PER CAPITA BY ANNUAL VALUE-OF-FAMILY-LIVING GROUPS

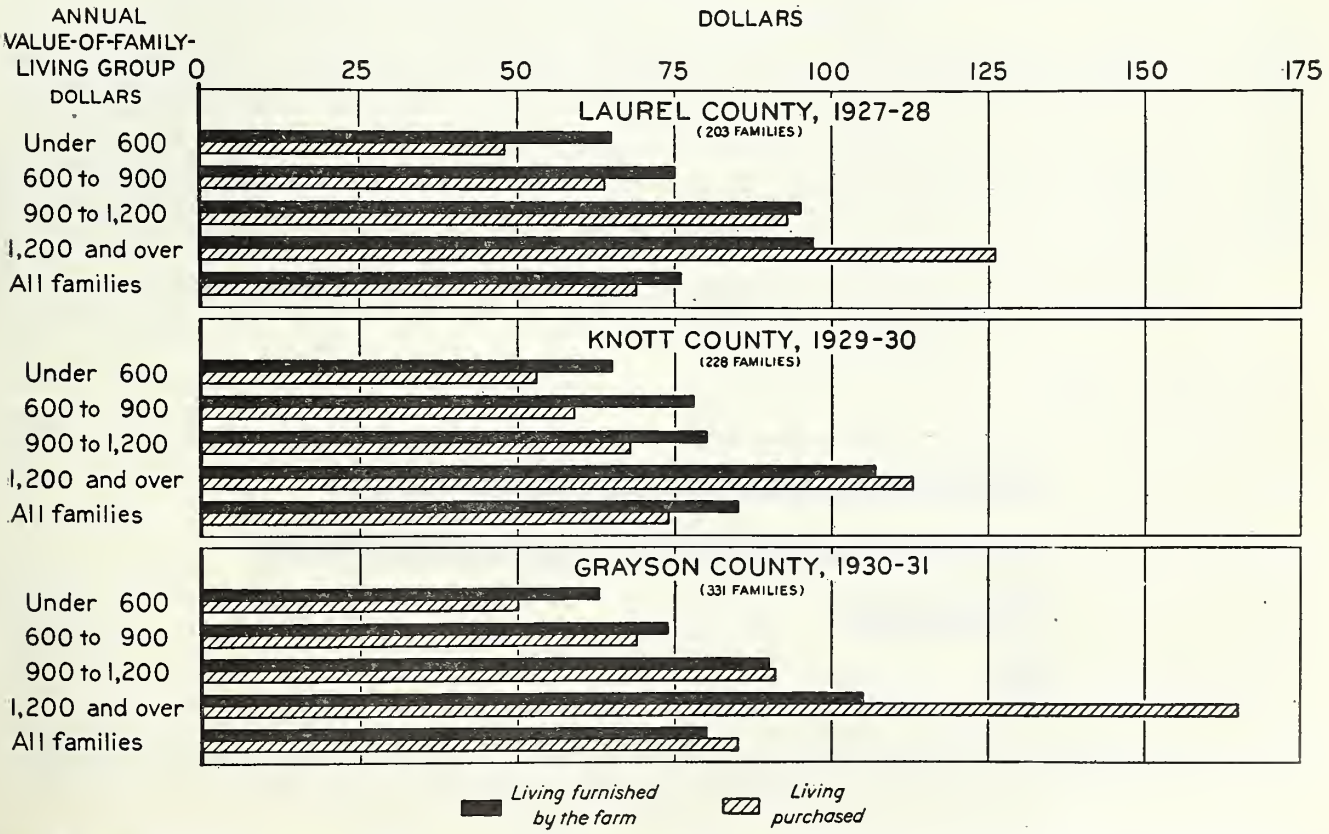

FIGURE 178.—Money value of living per capita averaged $145 in Laurel County, Ky., in 1927–28; $159 in Knott County, Ky., in 1929–30; and $165 in Grayson County, Va., in 1930–31. In the lowest value-of-living groups, the money value of farm-furnished products exceeds that of items purchased, but in the highest groups value of purchased items is greater. Nevertheless, even in Grayson County, in the highest value group the average per capita value of items purchased was only $165, and that of all items of living $270.

decline in farm prices, and the decline in opportunities for earnings in industry by which farm incomes had been supplemented in more prosperous years. The Leslie County figures are computed on a somewhat different basis from that used in computing the figures obtained in Laurel, Knott, and Grayson Counties, but, in general, the Leslie County figures on income may be regarded as comparable with those on value of family living from the other three groups. Figures 179 and 180 show the very large proportion of families in the low-income groups in Leslie County in 1930–31, and give some indication of the probable distribution by income groups of families in Knott County and other Appalachian counties in a similar geographic location in that year.

The data of figure 181 indicate the importance of income from industries other than agriculture in determining the level of living of the farm families studied in Knott County in 1929–30, and in Grayson County 1930–31. Receipts of 203 Laurel County families in 1927–28 from the earnings of the farm operator and other members of the family off the farm and from pensions, gifts, interest, dividends, and other nonfarm sources averaged $289 (*30, p. 230*). Work in railroad shops, carpentry and painting, and mining coal, brought in the greatest amounts of money. This Laurel County average includes the relatively small receipts from work on other farms excluded from the figures for Knott and Grayson Counties.

The percentage distribution of the money value of living is also a useful measure of the level of living (fig. 182). The distribution for the two lower value-of-living groups in both Laurel and Knott Counties is very similar to the distribution of family expenditures by Belgian workingmen's families in 1853 analyzed by Engel (*12*). In these Belgian families 67 percent of the total expenditures was represented by expenditures for foods. In Knott and Laurel Counties from 62 to 68 percent of the money value of living of the families in the lower value-of-living groups was represented by food (including both food furnished by the farm and food purchased). The percentage represented by housing and by clothing was slightly higher and the percentage represented by miscellaneous items was slightly lower for the Belgian families than for the families in Laurel and Knott Counties

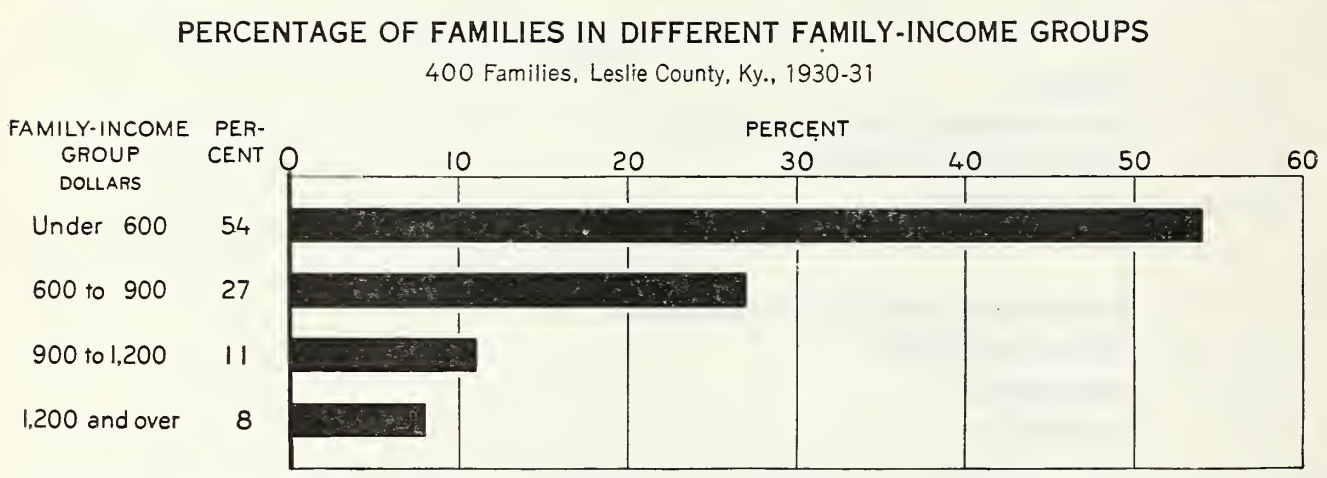

FIGURE 179.—The family income of 400 families in Leslie County, Ky., in 1930–31 was computed by adding wages received by all members of the family (exclusive of money earned and spent when living away from home); value of crops, cattle and poultry, and animal products both sold and consumed (excepting animals sold and replaced); value of wood, coal, and handicraft products sold; and money received from investments, pensions, and relief funds. (Based on data from Income and Health in Remote Rural Areas, by M. B. Willeford, (*61.*)

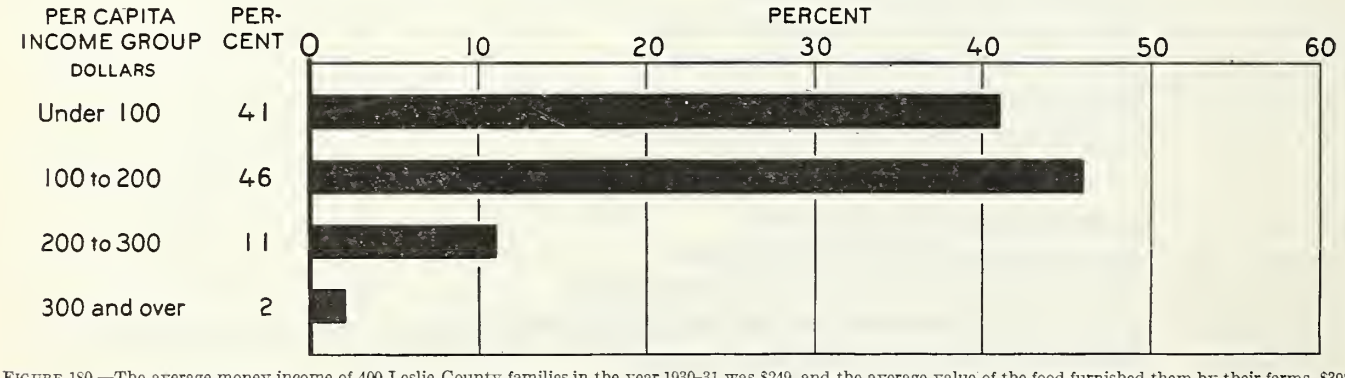

FIGURE 180.—The average money income of 400 Leslie County families in the year 1930–31 was $249, and the average value of the food furnished them by their farms, $392. Money income per capita averaged $50, and value of food furnished by the farm per capita $78. Neither value of fuel furnished by the farm nor the rental value of house occupied was included in this computation of income. (Based on data from Income and Health in Remote Rural Areas by M. B. Willeford, (*61*).)

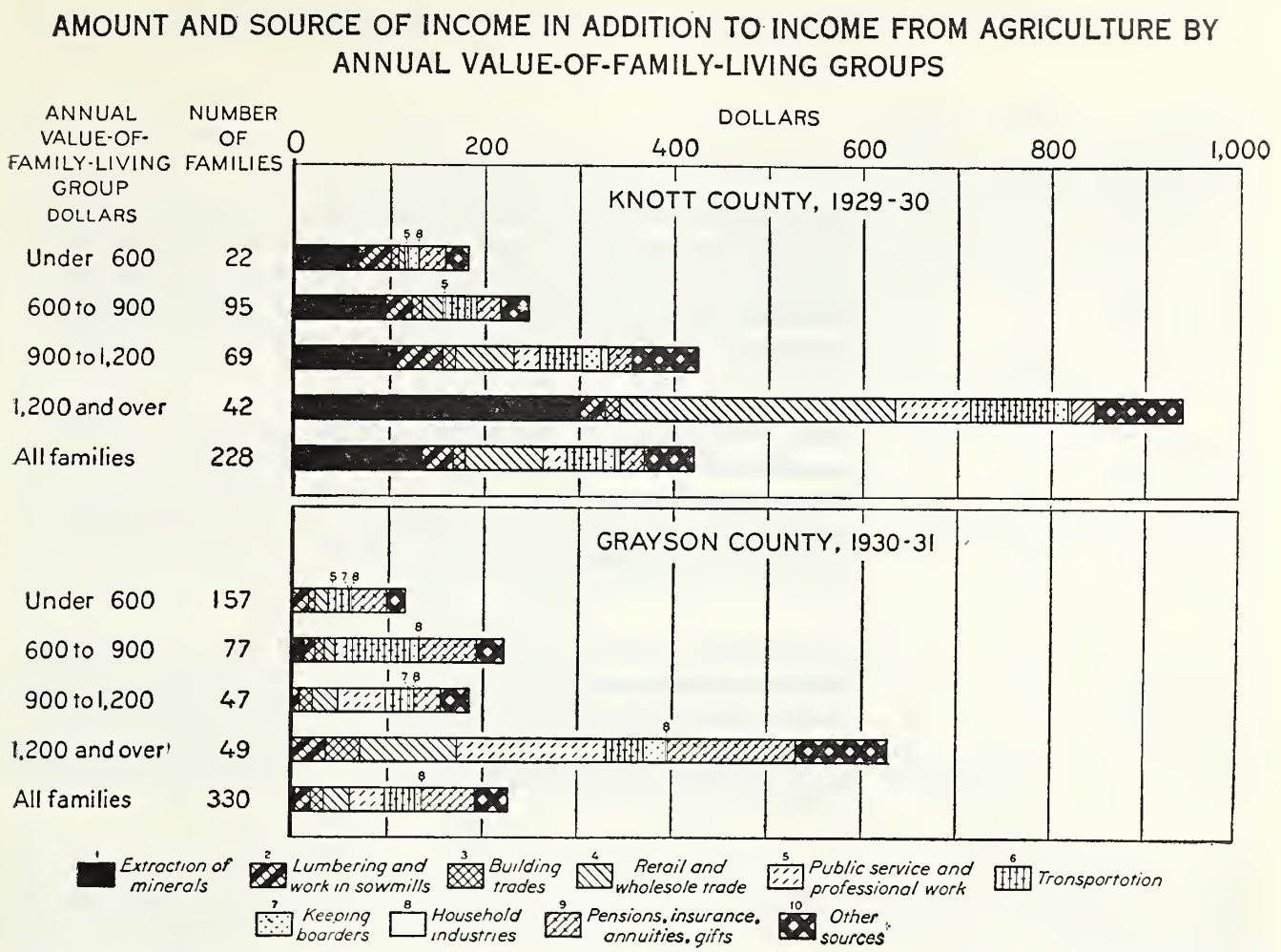

FIGURE 181.—In 1929–30, the income of 228 families in Knott County, Ky., from industries other than agriculture averaged $424, almost enough to meet average money expenditures for family use. Income from the extraction of minerals (wages earned working in coal mines and on pipe lines, rentals from gas and oil leases, and coal royalties) furnished about one-third of this nonfarm income. In Grayson County, Va., in 1930–31, the nonfarm income of the 330 families for which this information was obtained averaged $227, sufficient to meet over one-half of the average money expenditures for family living.

Table 25 shows that the distribution of value of living by the three groups of Appalachian families differs in important respects from that of a group of representative Wisconsin farm families (*25*). Among the Appalachian families the relative value of items furnished by the farm is greater than among those in Wisconsin, owing to the high percentage for furnished food in the Appalachian groups.

TABLE 25.—*Percentage distribution of annual value of family living*

Item	203 families Laurel County, Ky., 1927–28	228 families Knott County, Ky., 1929–30	331 families Grayson County, Va., 1930–31	900 families 7 counties in Wisconsin 1929–30
Items purchased:	*Percent*	*Percent*	*Percent*	*Percent*
Food	17	17	10	20
Clothing	13	17	16	14
Operation goods	5	2	3	13
Other items	12	10	23	18
Total purchased	47	46	52	65
Items farm furnished:				
Food	45	44	31	16
Housing	6	4	12	16
Other items	2	6	5	3
Total furnished	53	54	48	35
Money value of current living	100	100	100	100

The annual value of housing furnished by the farm is materially higher among the Wisconsin families. Annual housing values were computed by taking 10 percent of the current value of houses occupied, as estimated by field workers. These estimates averaged $440 for Laurel County, $340 for Knott County, and $930 for Grayson County. Census figures on the value of farmers' dwellings for these three counties average $402, $307, and $804 respectively.

In evaluating the probable adequacy of the houses represented by these figures, the fact that winter weather is severe in the Appalachians must be taken into account. At a station of the Weather Bureau near Laurel County the average daily minimum temperature for February (the coldest month there) is 24°F.; at a station near Knott County the average daily minimum for January is 23°; and at a station near Grayson County the average daily minimum for January is 22°. Housing in Grayson County, in general, is distinctly better than in either Laurel or Knott County, but a large proportion of the farm families in Grayson County live in inadequate houses (fig. 183). Data on the type of housing in these three counties have already been presented in connection with housing statistics from other studies (p. 137).

Money value of miscellaneous items in the family living, including furnishings and equipment, trans-

PERCENTAGE OF ANNUAL VALUE-OF-FAMILY-LIVING REPRESENTED BY ITEMS AND SERVICES OF SPECIFIED TYPES

ANNUAL VALUE-OF-FAMILY-LIVING GROUP DOLLARS	NUMBER OF FAMILIES	SIZE OF FAMILY PERSONS
LAUREL COUNTY, 1927-28		
Under 600	91	4.0
600 to 900	74	5.3
900 to 1,200	26	5.5
1,200 and over	12	6.5
All families	203	4.8
KNOTT COUNTY, 1929-30		
Under 600	22	4.4
600 to 900	95	5.6
900 to 1,200	69	6.9
1,200 and over	42	7.1
All families	228	6.1
GRAYSON COUNTY, 1930-31		
Under 600	157	3.9
600 to 900	77	5.1
900 to 1,200	47	5.7
1,200 and over	50	6.1
All families	331	4.7

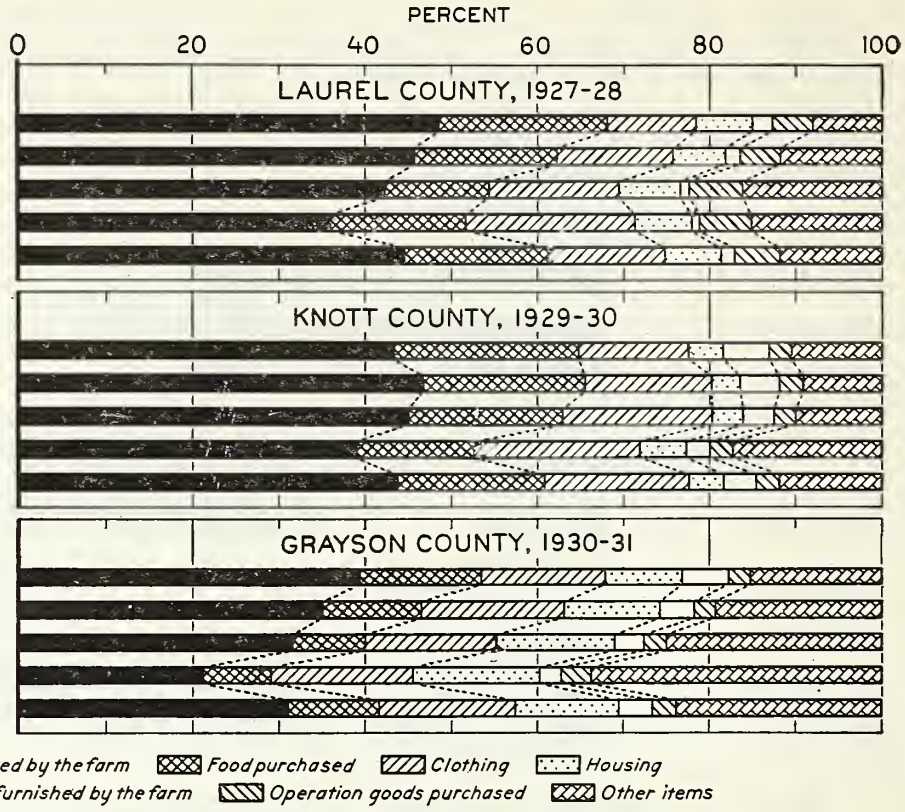

FIGURE 182.—Sixty percent of the average money value of the items included in family living by the families in Laurel and Knott Counties, Ky., is represented by the money value of food, an unusually high percentage compared with similar figures for farm families in other sections of the country. The percentage representing money value of food in the lowest value-of-living group among the Grayson County, Va., families is also unusually high. The percentages for housing in Laurel County and Knott County are unusually low.

AVERAGE NUMBER OF PERSONS PER ROOM BY ANNUAL VALUE-OF-FAMILY-LIVING GROUPS

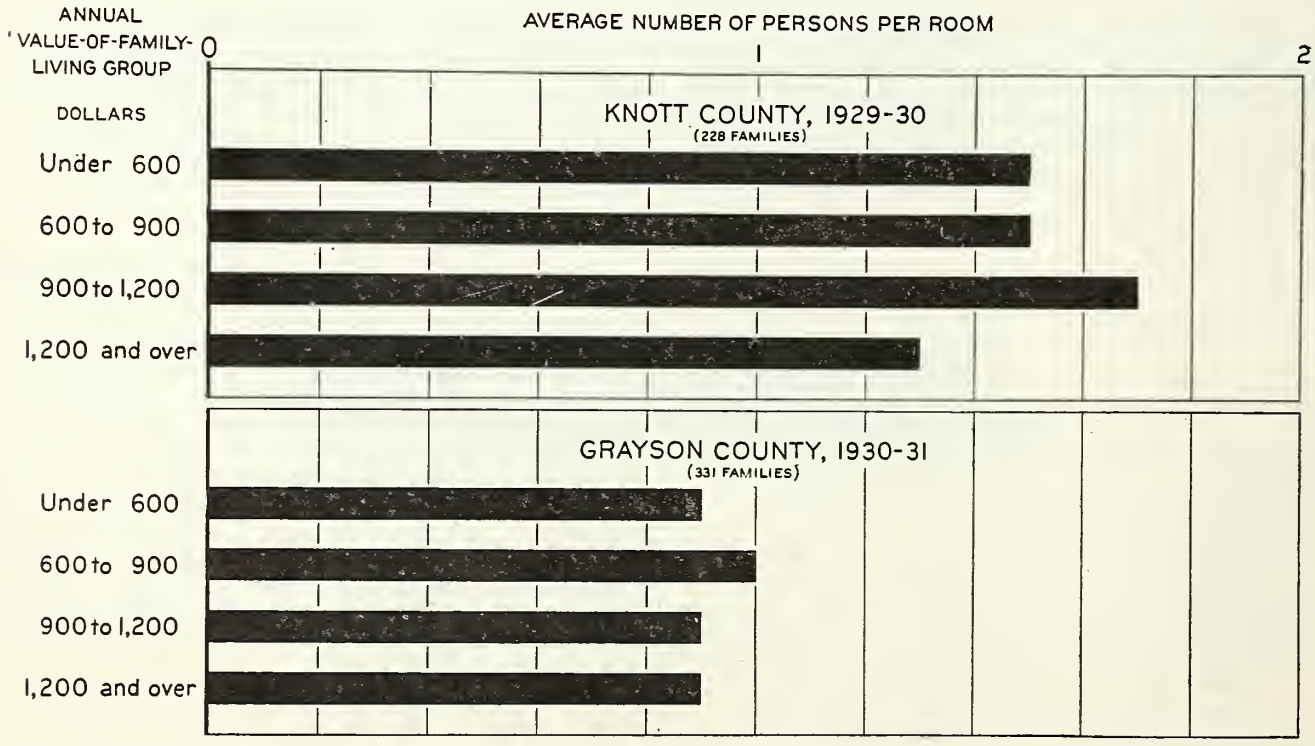

FIGURE 183.—The average size of the houses in Knott County, Ky., is smaller and the average size of households larger than in Grayson County, Va.; hence living quarters in Knott County are much more crowded than in Grayson County. The average size of the houses studied in Knott County was 4 rooms, and in Grayson County over 5 rooms. Even in the highest value-of-living group in Knott County, the average number of persons per room did not meet the generally accepted standard of one person per room.

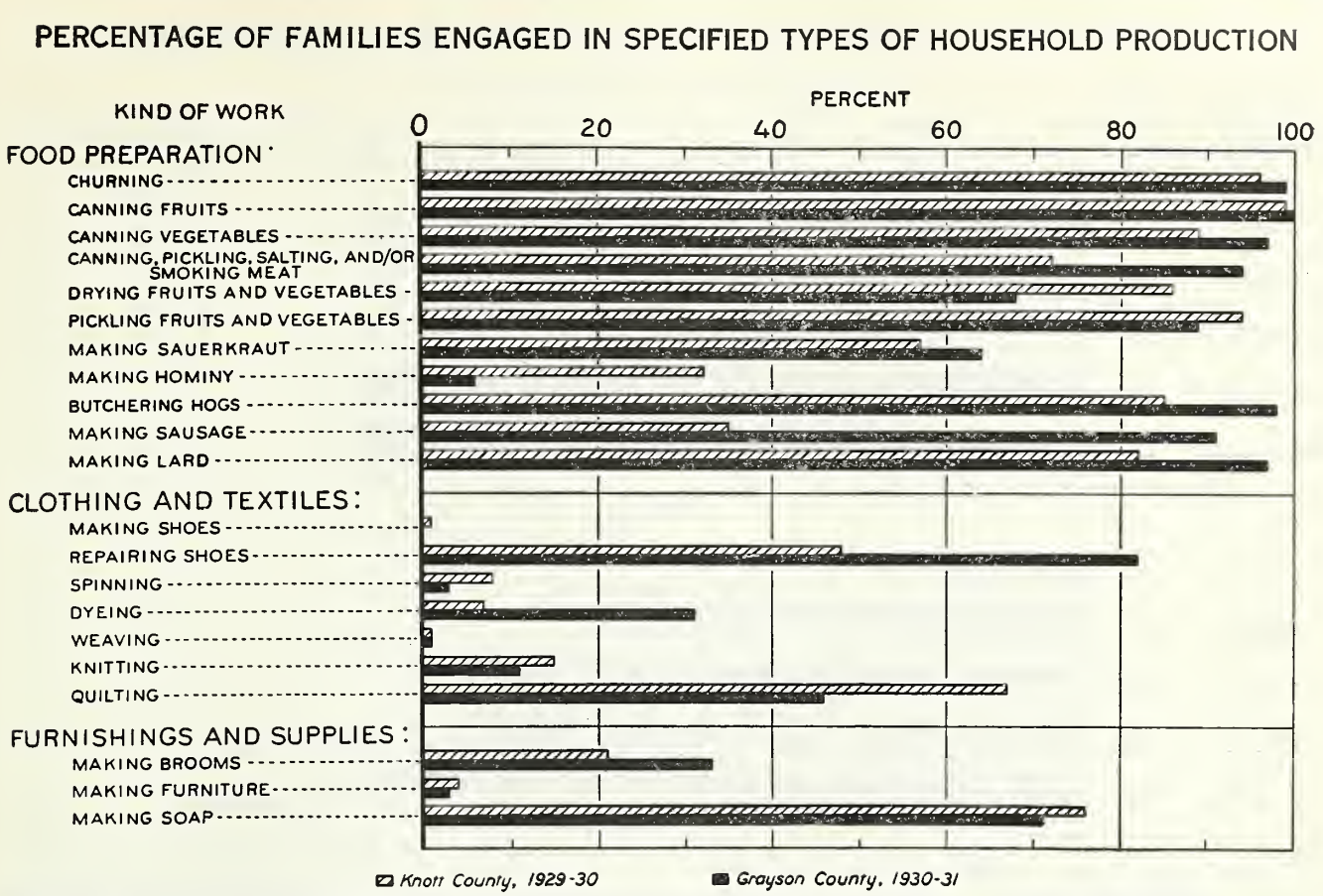

FIGURE 184.—Numerous household tasks that had been abandoned in many, if not in most, farm homes before the present depression were still carried on by the mountain families studied in Kentucky in 1929–30 and in Virginia in 1930–31. In the Kentucky group the percentage of families preserving meat, butchering hogs, making sausage and lard, repairing shoes, dyeing cloth, and making brooms was considerably lower than in the Virginia group a year later, but the percentage drying fruits and vegetables, making hominy, and making quilts was considerably higher.

portation, personal care, medical care, recreation, education, and community welfare, averaged $82 for the Laurel County families, $115 for the Knott County families, and $184 for the Grayson County families. The adequacy of these sums may be judged by the fact that the amounts recommended in 1929 for such expenditures in a budget prepared by the Chicago Council of Social Agencies for an economically independent family of five total $390 (*29*). The comparison is relevant since the cost of the items included in this group varies much less from city to country than the cost of food and of housing. The cost of adequate medical care alone is very great where most families are far removed from doctors and hospitals. The experience of the Frontier Nursing Service in Leslie County, Ky. (*61, pp. 72–73*) indicates that the annual cost of adequate medical care can be reduced to $11 per person served, or approximately $5 per person in the population served, when graduate public-health nurses trained as midwives work with doctors, but that the Leslie County population cannot support the service without subsidy.

The unpaid labor contributed by the members of the family to the household has not been included in computing money value of family living because of the difficulties of estimating its money value. It is obvious, however, that the amount and the quality of the household production is of great importance in determining level of family living. Most of the tasks listed in figure 184 are carried on by women and girls (butchering, shoe making and repairing, and furniture making being the conspicuous exceptions). Their number and variety are the more remarkable because in most of these families women and girls also work outdoors. In 79 percent of the Knott County families the homemaker was entirely responsible for the care of the poultry; in 37 percent for the fruit and vegetable garden; in 33 percent she did part of the field work of the farm, and in 16 percent helped to take care of the livestock.

The wide range in the size of farm families in the Southern Appalachians makes it advisable to continue the analysis on the basis of figures presenting money value of living per capita rather than per family. When the data on value of living for Knott and Grayson Counties are grouped by the number of persons in the economic family, it appears that in Knott County the average value of living declined from $335 per capita in the 9 families of 2 persons to $121 in the 67 families of more than 7 persons, and that in Grayson County the average value of living declined from $245 per capita in the 52 families of 2 persons to $122 in the 41 families of more than 7 persons.

Fertility of the soil in the region varies greatly from the top of knobs and ridges to the bottom land beside the creeks but there are no statistical measures of the relative suitability for agricultural purposes of the individual farms studied. It has been impossible, therefore, to prepare any statistical comparison of the soil and slope of the land farmed and money value of family living. But it is possible to measure relationship between number of acres operated and money value of

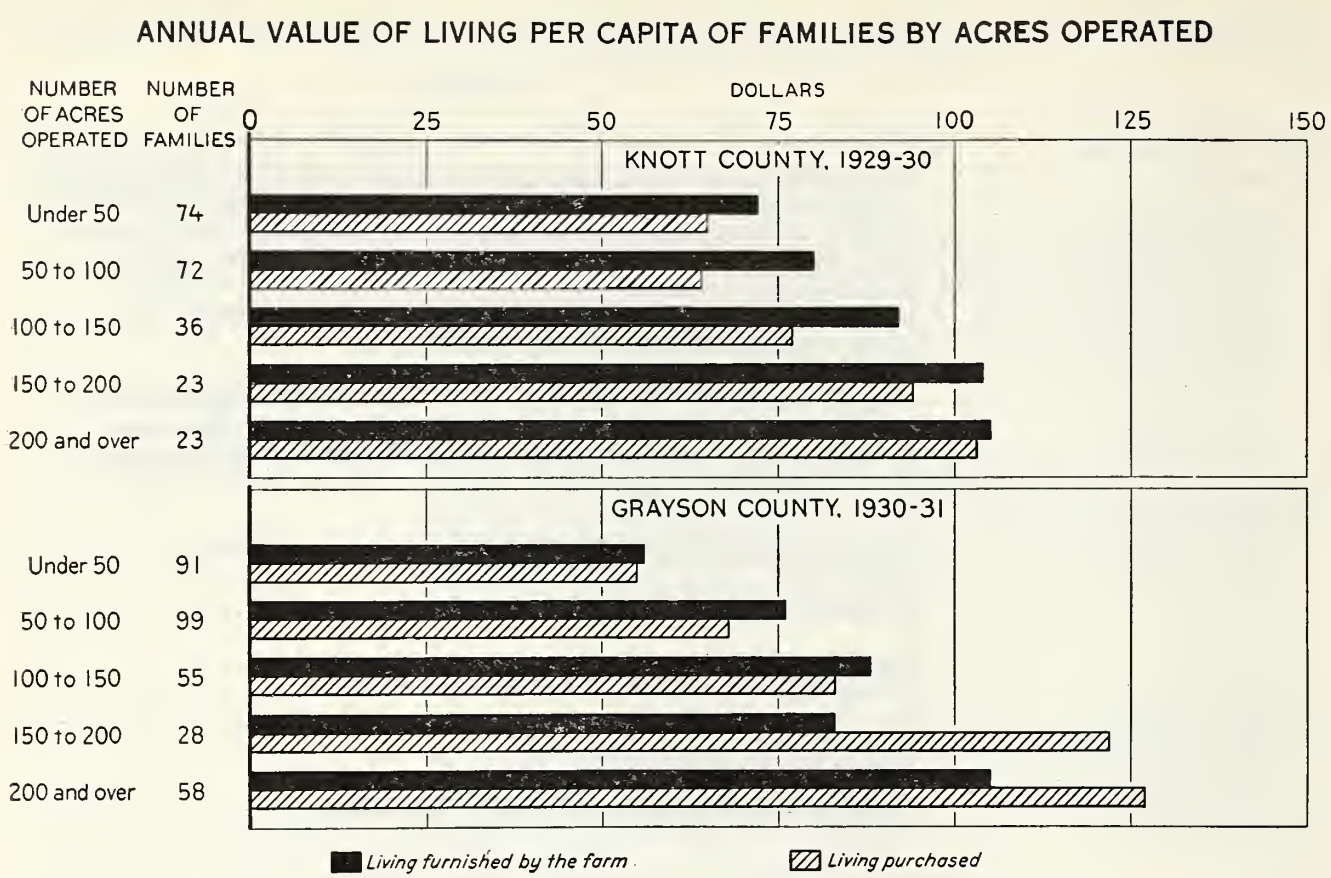

FIGURE 185.—Figures on money value of living per capita in Knott County, Ky., and in Grayson County, Va., were obtained by dividing money value of family living in each acreage group by the number of persons dependent on that living. In both counties there is a positive relationship between the number of acres operated, the value of the living furnished by the farm, and of the living purchased. The relationship is more clearly defined in Grayson County, where income from industries other than agriculture was smaller than in Knott County.

living. Figure 185 shows the increase in value of living per capita in Knott and Grayson Counties with increases in the number of acres operated. Figures for Laurel County show that money value of family living increased somewhat irregularly from $139 per capita in families with a crop acreage of 15 acres or less to $170 per capita in families with a crop acreage of over 45 acres.

Data collected by the field workers in Knott and Grayson Counties show that the schooling obtained by the men and women who are now at the head of the 559 families surveyed in these counties varied greatly, not only in the length of time school was attended, but also in the quality of the instruction given. From the material given in figures 186 and 187, it is obvious that, in the case of the majority, the period of their school attendance was very brief indeed. Since the period of schooling of the group as a whole was so short, it was to be expected that, in general, the relationships between the period of schooling of the farm operator and the homemaker and the money value of their family living would not be very clear. But in both Knott and Grayson Counties in those families in which the farm operator went to school 7 school years (of 8 months each) or more, there was a somewhat higher value of living per capita (including both purchased and furnished goods) than in those families in which the farm operator had a shorter period of schooling.

Figures 186–188 bring out the fact that the Grayson County families had a longer period of schooling than the Knott County families and that the period of schooling of the younger generation has been longer than that of the older one. Of the group studied in Knott County, in the case of 144 families in which there were children 16 years of age and over, the length of school attendance was known for the farm operator, the homemaker, and the children. In the Grayson County group there were 237 such families. When the months of school attendance of the child 16 years old or over in each family who had had the most schooling were averaged, it was found that in Knott County the children had had, on the average, 72 months of schooling as compared with 27 months for the farm operators and 22 months for the farm homemakers; in Grayson County the children had had, on the average, 65 months of schooling as compared with 36 months for the farm operators and 38 months for the farm homemakers.

The relationship between the period of school attendance of the child 16 years old or over with the longest school attendance and money value of living per capita shown in figure 188 implies not only that families with larger economic resources have been keeping their children in school longer than families whose economic resources are less, but, in the opinion of the persons who were in close touch with the Knott County and Grayson County surveys, it also implies in many instances contributions to the family from children whose education has been more adequate than their parents—contributions in the technic of farming and of homemaking and in some cases contributions of money.

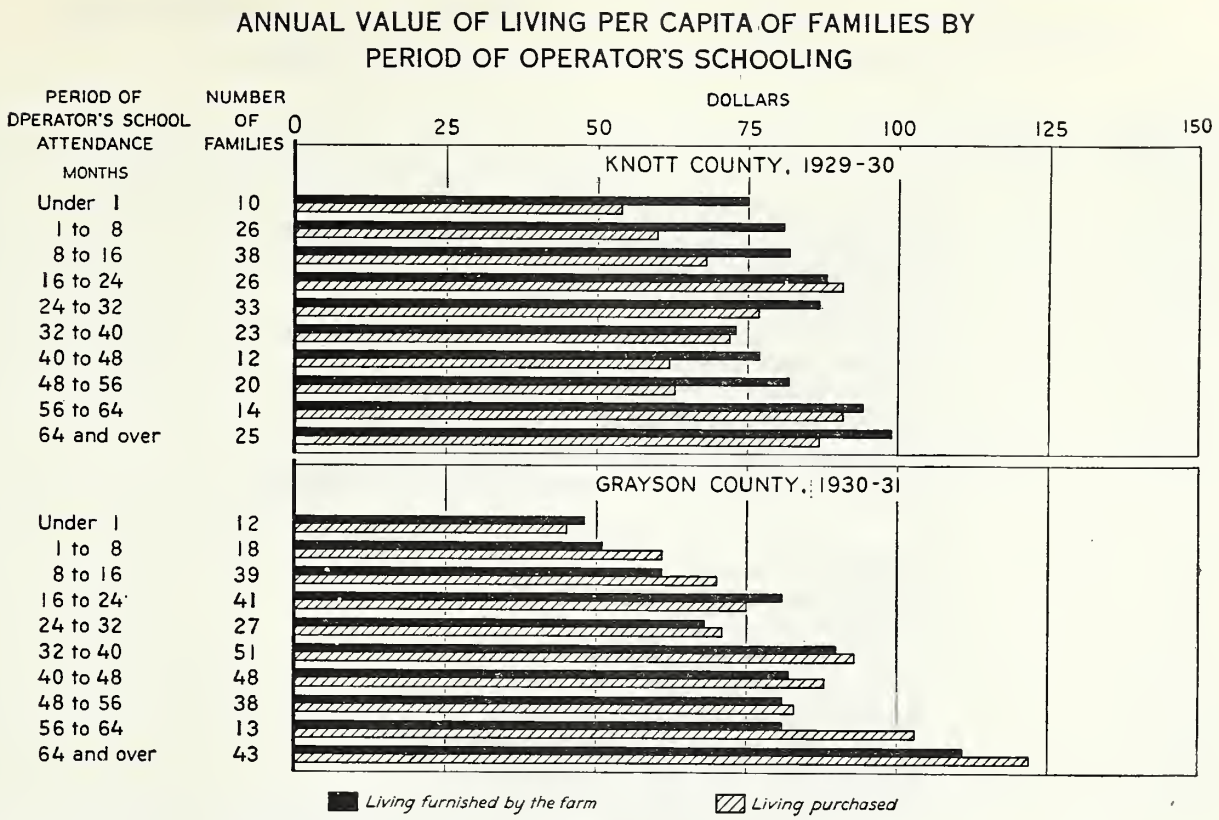

FIGURE 186.—The educational opportunities of the farm operators in both Knott County, Ky., and Grayson County, Va., have been limited by the inadequacy of the school facilities in the mountains for the past generation. Among the 330 families in Grayson County in 1930–31 for which the data were available, there was a positive, if irregular, relationship between the period of the operator's school attendance and the money value of living per capita for the individuals making up his family. Among the 227 families in Knott County in 1929–30 for which the data were available, the relationship between these two items is difficult to trace.

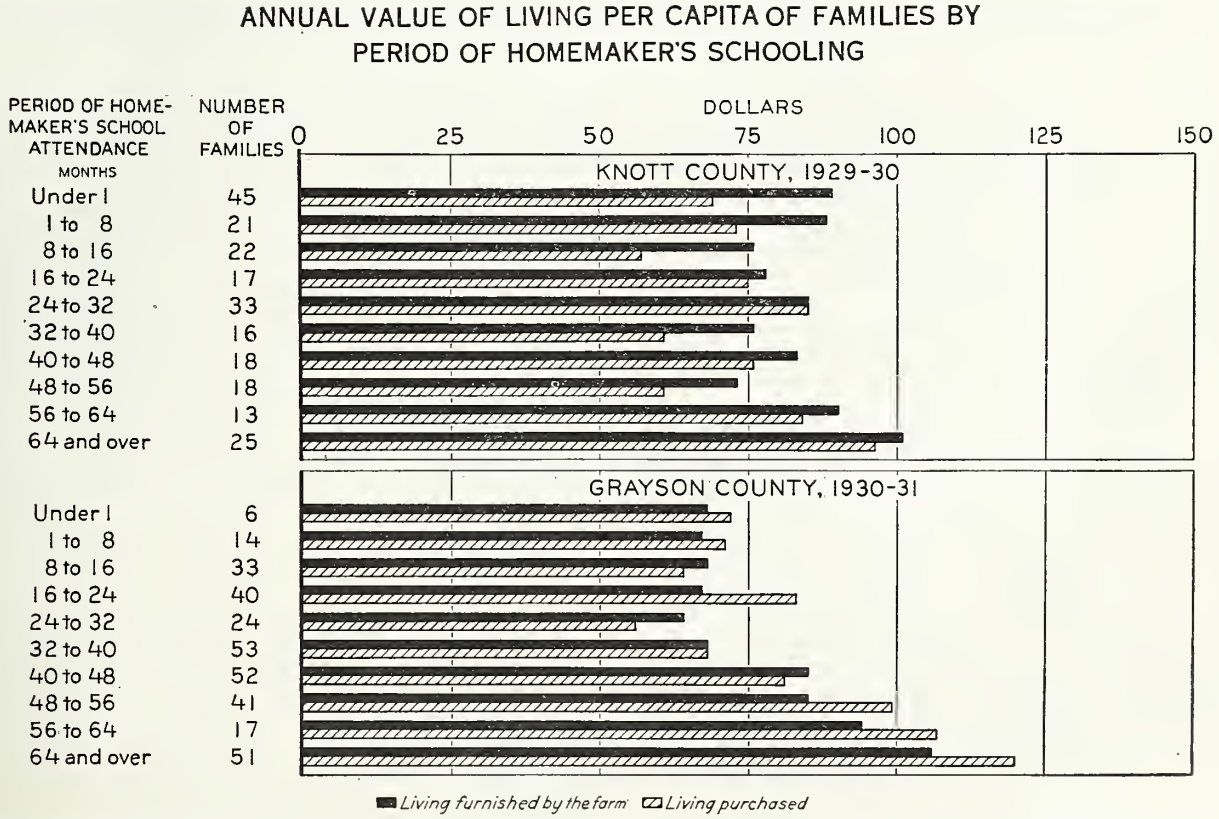

FIGURE 187.—The relationship between money value of living per capita in families in Grayson County, Va., in 1930–31 and the period of the homemaker's school attendance is not so clearly defined as the relationship with the period of the operator's school attendance shown in figure 186. But there is a positive relationship. The figures for the families in Knott County, Ky., for 1929–30 are again very irregular. The number of Knott County homemakers who had less than 1 month's schooling is particularly striking.

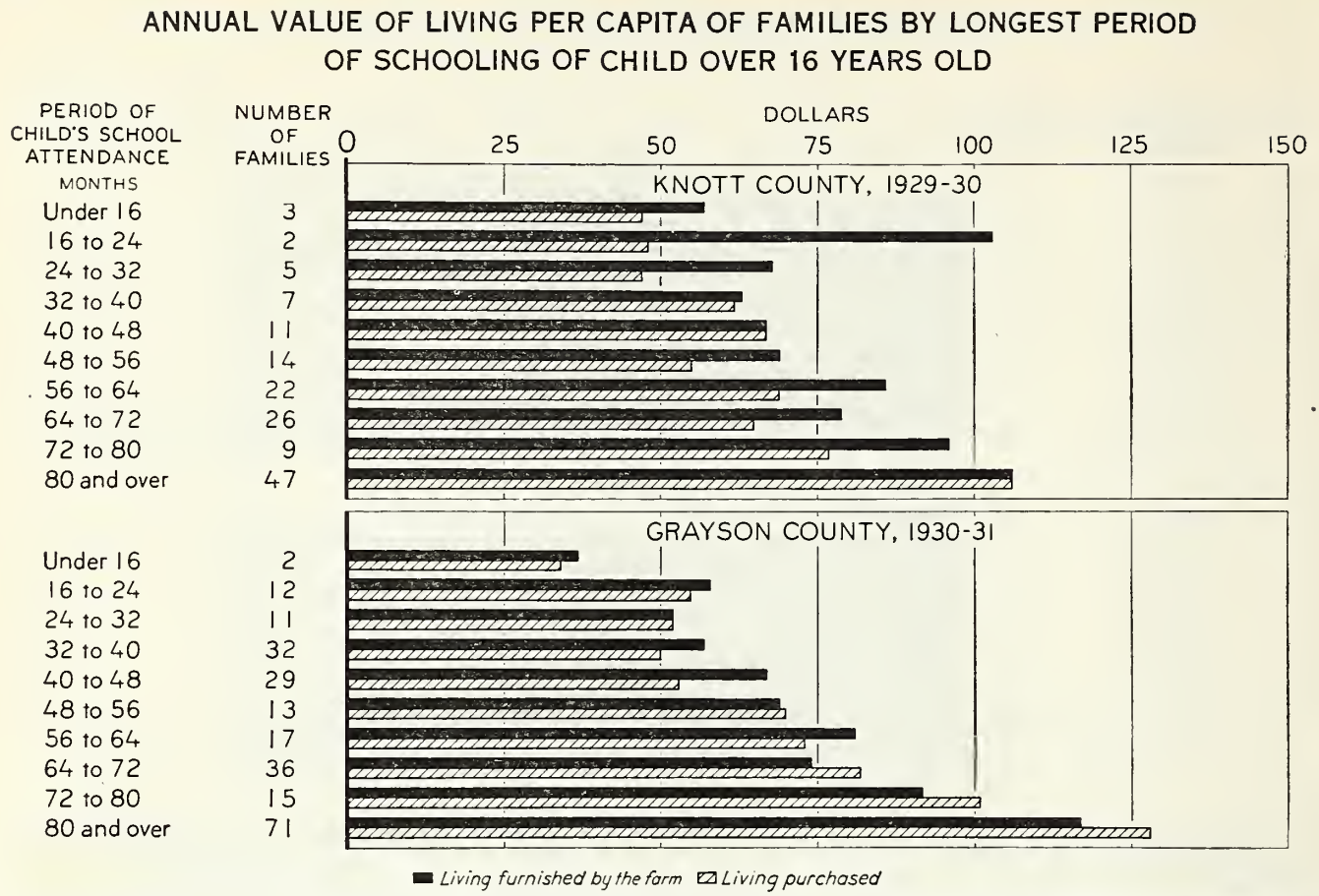

FIGURE 188.—In comparing money value of living per capita with the period of school attendance of the child in the family with the most schooling, only those families were included in which there were children at least 16 years old. If there were children living away from home, their schooling was taken into account in the comparison. Children in both counties have attended school longer than their parents. Longer periods in school for children are associated with higher per capita value of living.

CONCLUSIONS REGARDING FARM-FAMILY LIVING

There are wide variations in farm-family living in the Southern Appalachians, but the average level of living is low compared with that of white farm families in most other regions of the United States. It is impossible to isolate the complex elements which condition differences among families and among communities and to say which element had the most influence, but the data reviewed clearly reveal the influence of several major factors on family living in the region.

The census data on values of farm dwellings and household facilities, which furnish the best available indexes for measuring variations in family living in the region as a whole, show that the level of living is generally higher in the valleys in the northeast and north-central sections than in the less fertile sections to the south and west, indicating that differences in soil and slope (pp. 137–138) are the most fundamental of the factors conditioning variations in farm-family living. In the more fertile areas, prosperous communities have grown up, with good roads, good schools, and good health services, where well-endowed people can develop satisfactory family living. In areas of less favorable geographic conditions where crops are more difficult to grow and market, the capital goods needed for satisfactory individual and community development have not been accumulated.

Studies of specified counties indicate that the large families of the region have tended to lower the level of living; that per-capita value of living is lower in the larger families; and that it is lower on the smaller farms. Many small farms represent patrimonies divided among the large families of the last generation.

These studies emphasize the importance of outside earnings to supplement farm income in certain sections. Among the farm families studied in Knott County, Ky., in a relatively prosperous year, and in Grayson County, Va., in a year of drought and economic depression, those with the highest level of living had the largest incomes from nonagricultural sources. The lumber and the bituminous-coal industries have furnished part-time employment to many farm operators in the region, but have not been a satisfactory source of supplementary income because of the yearly variations in employment.

Differences in the knowledge of nutrition, sanitation, and child-care, and the effect of overcrowding are reflected in statistics from the county studies (figs. 179–188). Farm families in many sections are handicapped by the inadequacy of the formal education of the farmer and homemaker, and by their isolation from outside contacts. Poor roads have been a factor in keeping them unaware of developments in the technic of homemaking, in medical care, and in educational facilities. Many who have observed the people, the homes, and the schools in the various sections of the Southern Appalachians believe that differences in education and in isolation are the most fundamental factors conditioning variations in farm-family living in the mountainous parts. It is certain that at present it is impossible to separate the economic from the cultural factors affecting the living of families in this region.

FOOD SUPPLY OF FAMILIES LIVING IN THE SOUTHERN APPALACHIANS

By HAZEL K. STIEBELING, *senior food economist, Division of Economics, Bureau of Home Economics*

The character of the food supply is not infrequently the crucial factor in determining the quality of family living. Upon the nutritional adequacy of the diet depends the health and working efficiency of the individual, and upon the abundance and variety of food depends the success of social functions centering around the family table.

As cited in a previous section, the data of the census of 1930 indicate that farm families in the Southern Appalachians raise a large share of their food. There are wide variations, however, from one family to another in the variety, abundance, and nutritional adequacy of the diet. Some families have more fertile land than others; some are more enterprising in planning and in carrying through the production and conservation of a satisfactory year-round food supply. Still others are able to purchase considerable food to supplement their home-grown supply, thanks to the cash income from the farm or from mining, lumbering, or other industries.

The first dietary studies made in the region were conducted by the Office of Experiment Stations in eastern Tennessee (*59, pp. 21–116*) and in northeastern Georgia (*60, pp. 117–136*) between 1901 and 1904. The foundation of the fall and winter diets at that time consisted of about a pound of flour and meal per person per day together with 3 to 4 ounces of fat. The fat included some butter, but consisted mainly of lard and salt pork. Lean meats, fish, and eggs were eaten very sparingly; the average consumption by the 64 Tennessee families was 0.55 pound per person per week, and by the 11 Georgia families, 0.04 pound. Milk was also used very sparingly, the average quantity used by the Tennessee families being 1.45 quarts per person per week, and by the Georgia families 0.19 quart per person per week. On the average, the weekly food supply of each person in the Tennessee group studied also included 0.34 pound of sugar, 0.27 pound of molasses, 1.74 pounds of potatoes, 0.22 pound dried beans, and 1.29 pounds of other vegetables and fruit. In Georgia the average weekly supply of vegetables was more generous. It included, on the average, 7.32 pounds of potatoes and sweetpotatoes, 0.36 pound of dried peas and beans and 3.63 pounds of other vegetables and fruits. Of sugar, the average consumption per week was 0.28 pound and of molasses 0.70 pound.

Such diets are much below optimal in proteins of high quality, in calcium, in iron, and in vitamins A, C, and G. The use of whole grain rather than highly refined products enhanced the vitamin B value of the diets. The families whose food supply was more abundant than average ate more potatoes, milk, and green or leafy vegetables. But none of the diets can be considered fully adequate when judged by present-day standards of nutrition.

Much the same kind of diet was found to prevail in eastern Kentucky in the winter of 1919–20 by Roberts (*38*) in her evaluation of the diet and nutrition of the mountain children. Where the very limited and monotonous diets were most satisfactory from the nutritional standpoint, milk was apparently the saving factor.

From estimates of their yearly food supply it would appear that the diets of farm families in Madison County, N.C., in 1922 (*44*), were much more abundant. They reported, for example, the use of more than a quart of milk per person per day, about one-half pound of butter per person per week, and between 1 and 2 pounds of pork, exclusive of other lean meats.

Table 26 presents a summary of recent studies of the estimated or recorded consumption of important foods or groups of foods by families living in selected areas of Kentucky [28] and Virginia.[29] For purposes of comparison the table also presents the quantities of different foods or groups of food which the Bureau of Home Economics (*43*) suggests as a basis for diets at four levels of nutritive content and cost.

Insofar as the data of table 26 can be accepted as representative, it would appear that families in this region eat a very high cereal diet in the summer, as well as in the winter. The quantity of milk they use is extremely variable; some families have a generous supply and others have too little for dietary adequacy. They consume a fair variety and quantity of vegetables and fruits in summer, but they can relatively little, so that potatoes, dried legumes, and dried fruit are the foods chiefly available in winter.

Even in summer, when gardens and pastures are at their best, not all families enjoy nutritionally adequate diets. For example, only 3 of the 41 Kentucky families, and 7 of the 15 Virginia families, from whom records were obtained, had food that supplied fully enough protein, calcium, phosphorus, and iron as judged by generally accepted nutritional standards. And even in these diets, "adequate" quantities were available only because the total quantity of food consumed was very large. Had only enough been eaten to furnish 3,000 calories per man per day, less than standard allowances of protein and minerals would have been provided. Most of the summer diets of the Kentucky families were somewhat low in iron, even though green vegetables were eaten fairly liberally. More eggs, lean meat, and whole-grain products (and correspondingly less of the highly refined cereal products) would have improved the diets in this respect. About one-fourth of the family diets were too low in calcium. More milk and cheese would have safeguarded families against this deficiency and would have enhanced the diet in vitamins A and G and in protein quality as well. The summer diets of the Virginia families were higher in iron than those of the Kentucky families, probably because wild greens (foods very rich in iron) formed a large share of the vegetable supply, whereas green snap beans, a less rich source of iron, was the chief green-colored vegetable during the period of the dietary study in Kentucky. Almost half of the summer diets of Virginia families were deficient in calcium, some to a very serious extent, and about a fourth were very low in protein. They were richer in vitamin A on the average but poorer in vitamin C than the diets of the Kentucky families.

Few systematic studies of the relation of food and health have been made in this region. Many observers have been impressed by the premature appearance of old age among the people of the mountains, by the poor condition of their teeth, and by their lack of energy and initiative.

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[28] UNITED STATES DEPARTMENT OF AGRICULTURE, BUREAU OF HOME ECONOMICS. Unpublished data.

[29] Obtained under the direction of Helen Nebeker Hann in connection with a sociological study made by Mandel Sherman and others under grants from the American Home Economics Association and the Payne Fund of New York.

TABLE 26.—*Food supply of families in the Southern Appalachians, compared with diets at four levels of nutritive content and cost*

ESTIMATES OF FOOD SUPPLY OF KNOTT COUNTY, KY., FAMILIES DURING 1929-30

Classification	Families included	Quantities per capita per week of— Flour cereals	Whole, skim, and buttermilk	Potatoes, sweet potatoes	Dried beans, peas	Tomatoes, citrus fruit	Green, yellow, leafy vegetables	Dried fruit	Other vegetables and fruit	Sugar	Sirup, jelly, honey	Butter	Other fats	Lean meats, fish	Eggs
Year-round food supply with money value per person per year of—	*Number*	*Pound*	*Quart*	*Pound*	*Pound*	*Pound*	*Pound*	*Pound*	*Pound*	*Pound*	*Pound*	*Pound*	*Pound*	*Pound*	*Dozen*
Less than $75	[1] 12	5.71	2.55	5.63	0.20	0.53	1.38	[2]	3.33	0.61	0.07	0.34	0.74	0.75	0.20
$75 to $99	[3] 9	4.74	4.88	6.88	.17	1.48	2.10	[2]	7.14	.59	.22	.51	.43	2.08	.24
$100 to $124	[4] 9	6.35	5.44	9.19	.11	.92	1.49	[2]	9.08	.51	.04	.74	.34	2.49	.24
$125 and over	[5] 11	9.17	6.70	6.53	.17	1.19	3.01	[2]	7.83	.95	.23	.73	.65	2.96	.50
Total or average	[6] 41	6.28	4.53	6.87	.17	.97	1.89	[2]	6.35	.65	.13	.54	.56	1.87	.28
RECORDS OF FOOD CONSUMPTION OF KNOTT COUNTY, KY., FAMILIES KEPT FOR 1 WEEK, 1931															
July or August food supply with money value per person per day of—															
8 to 16.9 cents	14	4.56	4.00	1.65	0.10	0.45	2.48	0.00	2.24	0.52	0.11	0.43	.68	0.32	0.22
17 to 25.9 cents	19	4.78	5.43	1.43	.02	.48	3.22	.00	3.20	.68	.32	.65	1.08	.27	.18
26 to 34.9 cents	7	5.39	6.30	2.12	.00	.61	4.31	.00	4.39	.82	.27	1.39	1.55	.37	.17
35 cents and over	1	4.85	10.00	.62	.00	.71	2.04	.09	5.29	1.55	.30	.58	.94	2.66	.47
Total or average	41	4.78	5.08	1.60	.05	.49	3.06	[7]	3.03	.65	.23	.67	.99	.34	.20
RECORDS OF FOOD CONSUMPTION OF MADISON COUNTY, VA., FAMILIES KEPT FOR 5 DAYS, 1930															
May or June food supply of families living in—															
Corhin Hollow	5	7.36	2.48	1.44	0.62	0.00	0.98	0.00	0.15	0.44	0.36	0.00	0.43	0.24	0.10
Richards Hollow	5	7.23	3.70	2.50	.52	.52	.85	.07	1.97	1.05	[7]	.12	1.59	.32	.51
Nicholson Hollow	5	6.44	12.63	1.75	.04	.37	1.38	.08	2.40	1.14	.38	.87	1.18	.37	.37
Total or average	15	7.03	6.17	1.85	.41	.27	1.07	.05	1.42	.85	.26	.32	.98	.31	.30
DIETS AT FOUR LEVELS OF NUTRITIVE CONTENT AND COST, SUGGESTED BY BUREAU OF HOME ECONOMICS (*44*)															
Restricted diet, emergency	------	4.62	2.98	3.17	0.58	0.96	0.77	0.19	0.77	0.96		0.87	0.58	0.15	
Adequate diet, minimum cost	------	4.31	5.00	3.17	.58	.96	1.54	.38	1.63	.67		.94	1.15	.29	
Adequate diet, moderate cost	------	3.08	5.87	3.17	.38	1.73	1.92	.48	4.04	1.15		1.00	1.92	.29	
Liberal diet	------	1.92	5.87	2.98	.13	2.12	2.60	.38	6.25	1.15		1.00	3.17	.58	

[1] Average value of family living, $856 during 1929–30.
[2] Included in other fruit.
[3] Average value of family living, $1,119 during 1929–30.
[4] Average value of family living, $1,433 during 1929–30.
[5] Average value of family living (9 families), $1,192 during 1929–30.
[6] Average value of family living (39 families), $1,119 during 1929–30.
[7] Negligible quantities.

When diets are made up, as are most of those shown in table 26, of very large proportions of refined grain products, fats, and sugars and small proportions of milk, eggs, and vegetables, there is generally a shortage of calcium, iron, and vitamins A, B, C, and G. These factors play an important role in bone and tooth structure, in the maintenance of healthy tissue, and in the preservation of the vitality of youth. Foods furnishing these factors to the diet are sometimes called "protective foods." Milk and the green leafy vegetables are chief among them.

Table 27 indicates a relationship between a generous milk supply, which means a liberal calcium intake, and growth in height among school children in Knott County, Ky., and in isolated districts in the Blue Ridge in Virginia, localities where the population is probably more homogeneous than in most sections of the country. Insofar as can be judged from the available data, the proportion of children who are "tall" for their age is decidedly greater where milk consumption is generous than where the milk intake is low.

Throughout the Southern Appalachians educational programs are needed to spread a knowledge of food values and nutritional needs. Home food-production practices that would develop food resources to best advantage should be encouraged. Gardens, cows, poultry, and pigs are necessary to furnish the vegetables, milk, eggs, and lean meat essential to the diets of individual families. Nutritionally adequate diets would materially raise the level of living in this region, and would make "possible for a much larger proportion of all people that full measure of health, happiness, and efficiency which only the most fortunate now enjoy" *(40, p. 535)*.

TABLE 27.—*Distribution of school children by stature*

MADISON COUNTY, VA.[1]

Classification	Families represented	Weekly per capita milk supply	Children measured	Children of— Tall stature [2]		Medium stature [2]		Short stature [2]	
	Number	*Quarts*	*Number*	*Number*	*Percent*	*Number*	*Percent*	*Number*	*Percent*
Corhin Hollow	------	------	17	1	6	4	24	12	70
Richards Hollow	------	------	24	7	29	8	33	9	38
Nicholson Hollow	------	------	24	11	45	7	30	6	25
Total or average	------	------	65	19	29	19	29	27	42
KNOTT COUNTY, KY.									
Diets[3] that furnish per calcium-unit[4] per day—									
Less than 0.68 g Ca	10	2.94	27	4	15	12	44	11	41
0.68 to 0.99 g Ca	18	5.04	48	17	35	22	46	9	19
1.00 g and over Ca	13	7.49	27	12	44	12	45	3	11
Total or average	41	5.08	102	33	32	46	45	23	23

[1] Dietary records were not obtained from all families whose children were measured, and height records could not be obtained from all children in families from whom dietary records were obtained. The average per capita milk supply of 5 unselected families in Corhin Hollow was 2.48 quarts per week, of 5 families in Richards Hollow 3.7 quarts, and of 5 families in Nicholson Hollow 12.63 quarts.
[2] As judged by Baldwin-Wood standards, given in the weight-height-age table for boys and girls of school age, published by the periodical, Mother and Child and furnished separately by the American Child Health Association.
[3] Based on records obtained in July and August 1931.
[4] An adult was considered equivalent to 1 calcium unit: children under 14 years, 1.5 units; children 14 years and over, 1.3 units.

SOCIAL CONDITIONS AND SOCIAL ORGANIZATIONS

By W. E. Garnett, *rural sociologist, Virginia Agricultural Experiment Station*

This section will be confined to a general description of health conditions and agencies, marriage and divorce, and a brief discussion of crime, certain types of social organizations, libraries, and the circulation of certain magazines. Even if complete statistical data were available for these items, it is recognized that they would portray inadequately general social conditions and that they would provide only rough indices of social progress and of the adequacy of social organizations. As a matter of fact, the statistical information for most of these items is exceedingly limited. Furthermore, such information as is available is frequently not comparable for the several States embraced by the study.

HEALTH CONDITIONS AND FACILITIES

If the health of any group of people is to be properly cared for, readily available medical, dental, nursing, and hospital care at reasonable cost are essential. Well-organized, adequately supported, public health work to carry on a continuous program of disease prevention is also needed.

The unsanitary, unhygenic living conditions and the inadequate, poorly balanced diet common to many families in the more mountainous parts (p. 153) tend to produce much ill health. This fact is substantiated not only by the opinion of many physicians, welfare workers, nurses, and health officers but also by statistics of the prevalence of diseases [30] and of the causes of death.[31] As a measure of health conditions

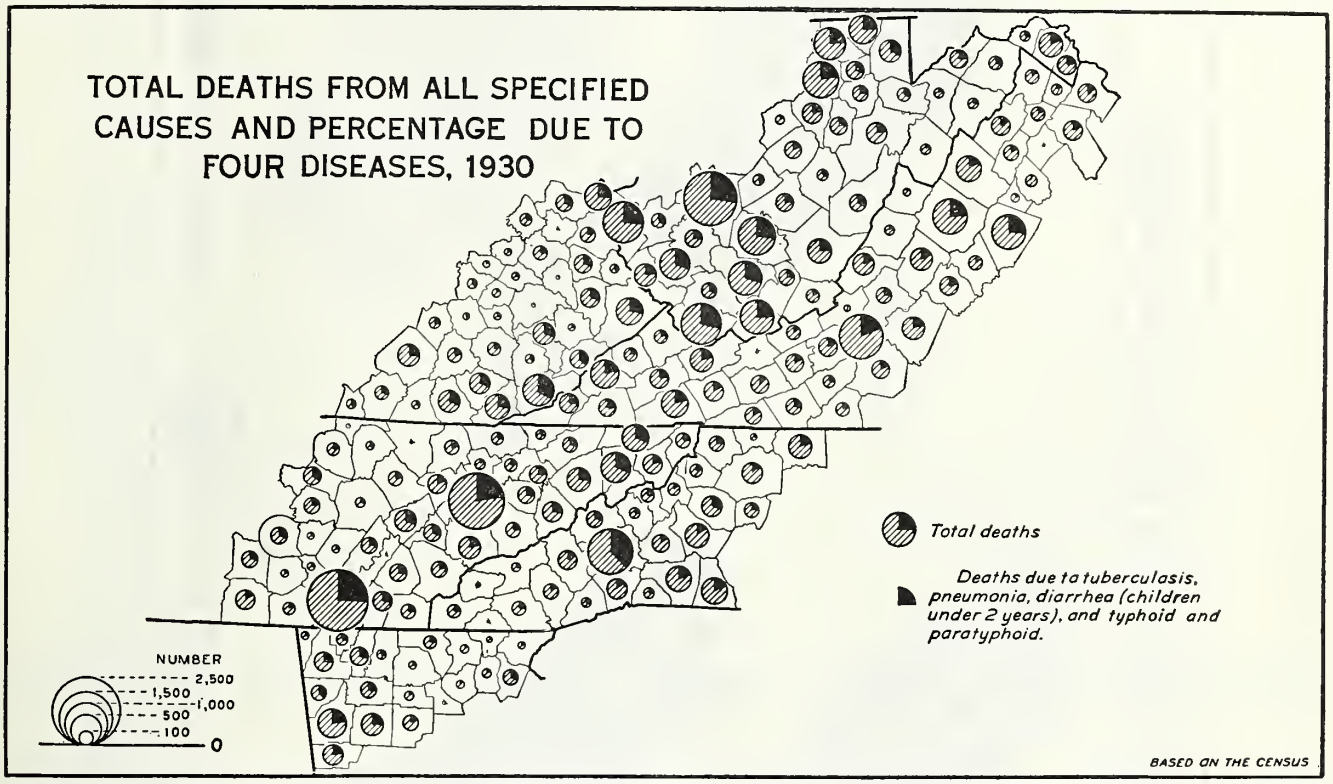

FIGURE 189.—To a considerable extent, the deaths from tuberculosis, diarrhea among infants, pneumonia, and typhoid and paratyphoid indicate the prevalence of diseases which are largely preventable. The percentage of deaths for which cause was specified for these four causes combined in 1929 was about one-fourth greater in the region than in the United States. In the Central Appalachian Valleys and Ridges, where living conditions are better than in the Northeastern Cumberland Plateau (figs. 177–180), the percentage of deaths from these four causes in the former was only two-thirds that in the latter. (Preliminary data from the Division of Vital Statistics, Bureau of the Census.)

The data of this section, as well as that of the sections dealing with schools and churches, indicate that general social conditions prevailing in the fertile and economically well-developed valleys of the region compare favorably with those prevailing in other rural portions of the United States. In the more rugged and isolated areas, however, the social conditions are frequently below standards prevailing elsewhere, and still reflect the results of long years of isolation and of poorly developed social institutions.

With the development of economic resources and the breaking down of those barriers causing isolation, new and changed social organizations and institutions are needed. Not only is it imperative for people in isolated areas to alter and develop social organizations in order that they may adjust themselves to a rapidly developing economic organization, but in view of the movement of population out of areas which were formerly isolated, it is also of concern to the members society that the emigrants from such areas be fitted for the complex economic and social organization of modern society, otherwise conflicts with the codes and laws of society may result.

[30] Because of the isolation of portions of the region and other factors, the available statistics are not sufficiently complete, comprehensive, or accurate to provide a definite measure of the amount of sickness. In fact, even if such data were available, there would be no norm with which to compare them. The frequency of certain notifiable diseases in the States of which the region is a part, as shown in the reports of the Public Health Service (*57*) and supplements to these reports, indicates unfavorable conditions for health, particularly in view of the probable incompleteness of the data. The frequent mention of the States of the region in the annual reports of the Surgeon General of the United States (*56*) in connection with the prevalence of trachoma and pellagra—diseases almost unknown in those parts of the country where precautions are taken against spreading of disease and where diets are adequate—may be taken as supporting evidence of the prevalence of health conditions inimical to the public welfare.

[31] Although a high death rate in the region as a whole might be expected, according to preliminary data of the census, there were only 8.8 deaths per 1,000 population in 1929 compared with 11.9 deaths per 1,000 population in the registration area of the United States. (*53*) The unusually low death rate in the Southern Appalachians may be explained partially by the large proportion of young and middle-aged people, but probably a large part of the difference arises from incompleteness in the reports to the census. For instance, in the Central Appalachian Valleys and the Central and Northern Piedmont Plateau, where conditions would seem favorable for a

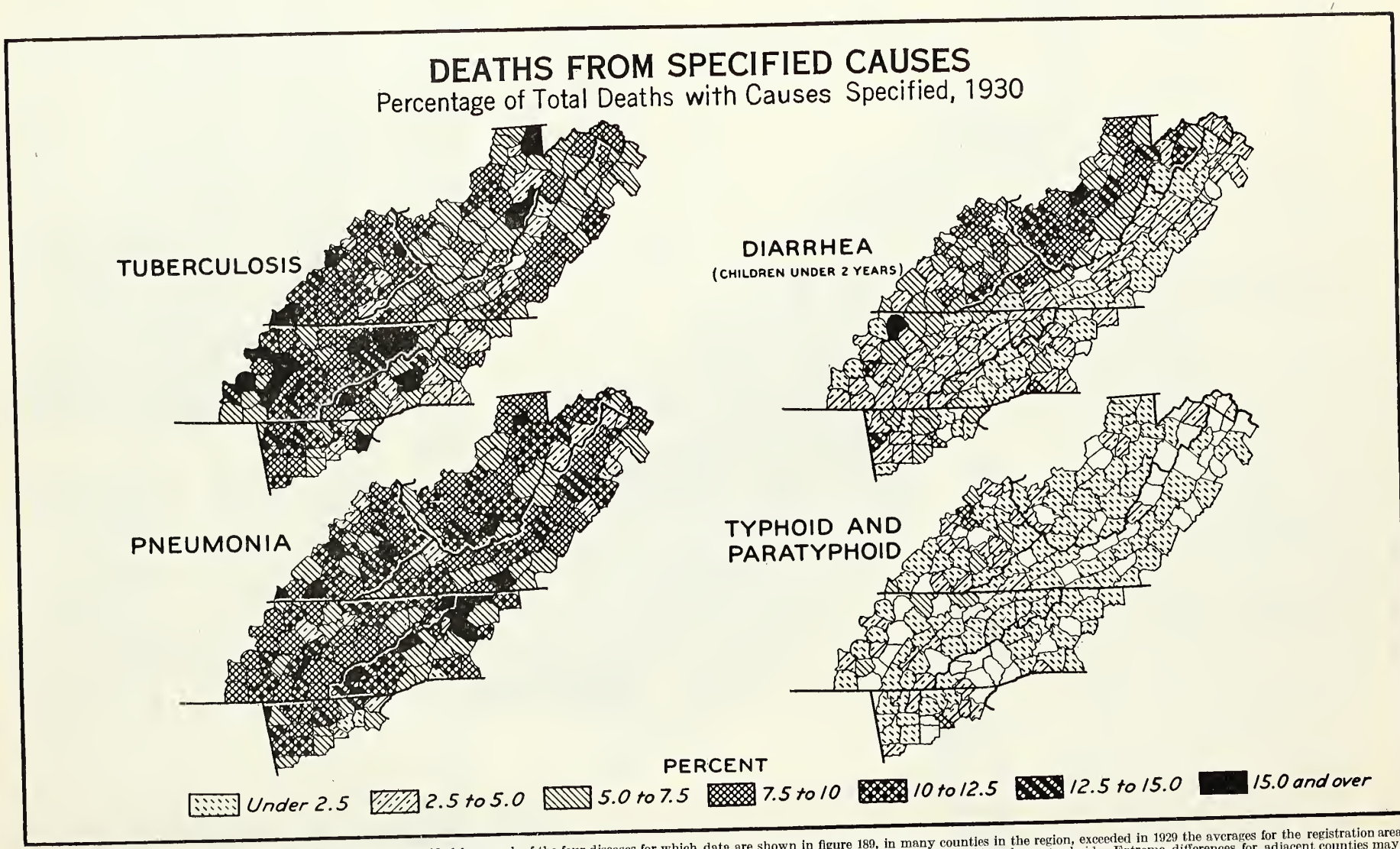

FIGURE 190.—The percentage of all deaths for which cause was specified from each of the four diseases for which data are shown in figure 189, in many counties in the region, exceeded in 1929 the averages for the registration area of the United States of 7.3 percent from tuberculosis, 8.5 percent from pneumonia, 2 percent from diarrhea among infants, and 0.5 percent from typhoid and paratyphoid. Extreme differences for adjacent counties may be attributed largely to the fact that statistics for a single year do not provide a valid basis of comparison between counties. For this reason, importance should be attached largely to the data for groups of counties. (Preliminary data from Division of Vital Statistics, Bureau of the Census.)

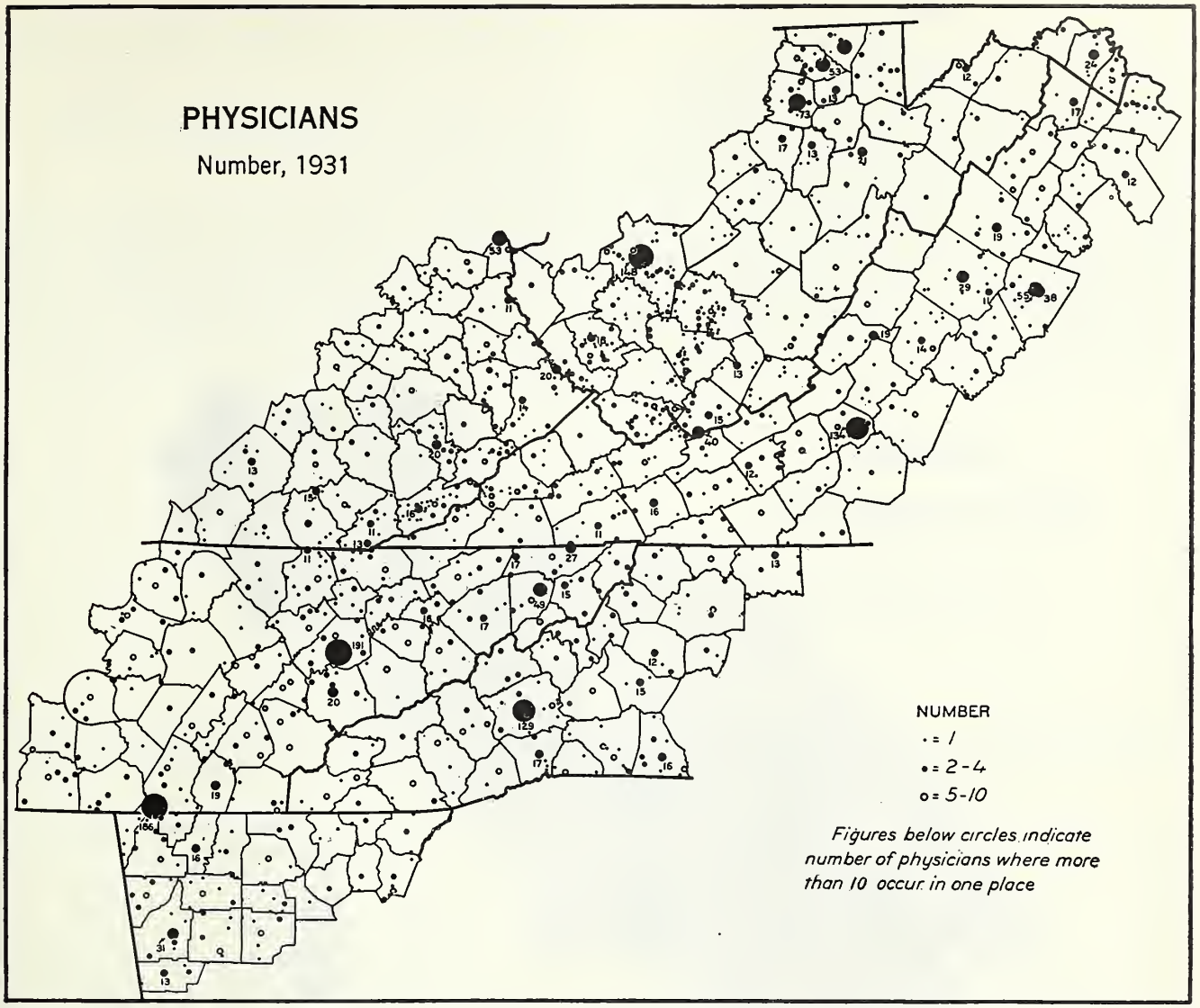

FIGURE 191.—The general tendency for physicians to locate in cities and other centers of population has left many rural areas, especially in the more mountainous counties, with no readily accessible physician. Some localities are 15 or more miles by air line from a physician and perhaps twice that far over roads which, except under favorable conditions, cannot be traveled by automobile. On the other hand, urban centers and areas where there is coal mining have a large number of physicians. (Based on data in the American Medical Directory for 1931 (*2*).)

in different parts of the region, the proportion of all deaths for which cause was reported from four largely preventable diseases combined (tuberculosis, diarrhea among infants, pneumonia, and typhoid and paratyphoid) is shown in figure 189. In figure 190 the percentage of all deaths for which cause was reported is shown for each of the four diseases separately. Since in a given year the number of deaths from a particular cause may be abnormally large in proportion to all deaths, importance should be attached largely to the situation in a group of counties rather than that in an individual one.

In general, the proportion of deaths from tuberculosis is higher than the average for the registration area of the United States in the Cumberland Plateau and the Appalachian Valleys in Tennessee and Georgia. The proportion of deaths from pneumonia was relatively high throughout the region. The deaths of infants from diarrhea was also relatively high throughout most of the region and especially high in the Cumberland and Allegheny Plateaus. The deaths from typhoid and paratyphoid, although greatly above the average for the Nation, is not a cause of a large number of deaths in most counties.

Although the proportion of all deaths from the causes specified in figures 189 and 190 vary greatly from county to county, largely because the data are for only 1 year and relate to a relatively small group, two conclusions at least seem justified. (1) The importance as causes of death of such diseases as tuberculosis, diarrhea among infants, pneumonia, typhoid and paratyphoid are higher in the region than in the United States. (2) In parts of the region, such as the Central Appalachian Valleys, where the standard of living is relatively high and incomes are large, the proportion of deaths from the four specified causes is much smaller than in other parts, such as the Northeastern Cumberland Plateau, where the standard of living is relatively low and incomes are small.

low death rate and a high degree of reliability in the mortality statistics, there were 12 or more deaths per 1,000 population in 1929 compared with only 8 deaths per 1,000 population in the Northeastern Cumberland Plateau, where conditions would seem much less favorable for a low death rate and a high degree of reliability in the mortality statistics. The incompleteness of reports, however, probably does not greatly invalidate an analysis of the proportion of deaths reported which were caused by diseases reflecting health conditions.

PHYSICIANS

The need for medical services indicated by the number of deaths from tuberculosis, diarrhea among infants, pneumonia, and typhoid and paratyphoid, is further reflected in the distribution of physicians (fig. 191). The distribution is such that large segments of the population (fig. 147) cannot obtain adequate medical care. The nearest physician is frequently several miles away. Telephones are often few in number in rural areas (fig. 174) and so located that communication with a physician is impossible other than by traveling part or all of the distance to a physician's home. In many localities the roads are poor and several hours may be required to travel the distance on mule- or horse-back. This condition is frequently further aggravated by the inability of patients in isolated areas to pay for medical services and by the possibility that physicians who live in isolated areas may not be equipped to give a high quality of professional service, even though the patient has the ability to pay.

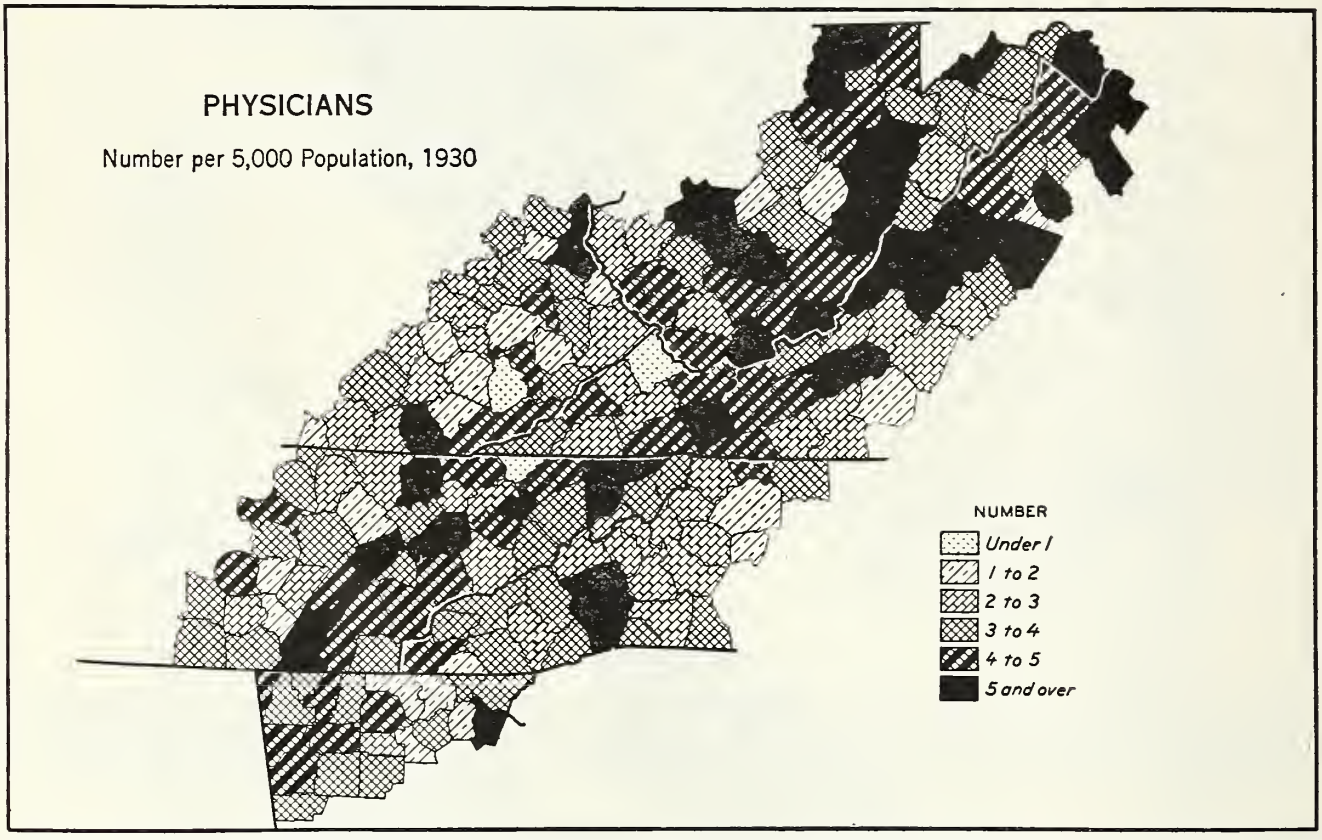

FIGURE 192.—In general, counties with urban centers or a very concentrated rural population have the greatest number of physicians per 5,000 population. Cities of over 10,000 population in the region in 1930 had 9.8 physicians per 5,000 inhabitants compared with 3 physicians for the same number of people in the Northwestern Cumberland Plateau (fig. 4) where population is scattered and there are no large cities. Only 12 of the 205 counties had more than 6.4 physicians per 5,000 population, the average for the Nation. (Based on data in the American Medical Directory, 1931, and the census for 1930. (*50*))

The number of physicians per unit of population is about two-thirds that in the United States as a whole. Only a few of the 205 counties (fig. 192) have as many as 6.7 physicians per 5,000 population, the estimated number "necessary to meet the present need in the United States for individual preventable services, the puerperal state, and the diagnosis and treatment of diseases and defects." (*9, p. 116.*) In general, counties with urban centers, a dense rural population, and a large per capita wealth come most closely to meeting this standard whereas counties thinly populated and with a low per capita wealth fall far below the standard. Moreover, it is counties in the latter group which need the greatest amount of medical services. Under conditions that require physicians to depend for their living upon the number of their patients and the money obtained per patient, the present tendency for the number of physicians to be excessive in some areas and deficient in others may be expected to continue.

The relatively large number of physicians in some of the rural counties with coal mining has resulted mainly from the practice of large companies of employing physicians to provide, for a small fee, medical care for the employees of the company. Development of medical services on a communal basis under public auspices might well be considered in many parts of the region.[32]

Employment of physicians under public auspices appears most urgent in the Blue Ridge, the Allegheny, and the Northeastern and Northwestern Cumberland Plateaus. Aside from the relatively high death rate from preventable diseases in these subregions and the occurrence of trachoma and similar diseases more frequently than in most other parts of the United States, the need for additional physicians is increased by the very high birthrate (p. 5). The limited resources in many parts of these subregions combined with the high birthrate, will undoubtedly make for a continued, and possibly more rapid, emigration in the future. The desirability of having the immigration to other regions comprised of healthy persons as well as the general social desirability of having a region

[32] Employment of physicians on a community basis has been favorably reported in Saskatchewan (*9, p. 90*).

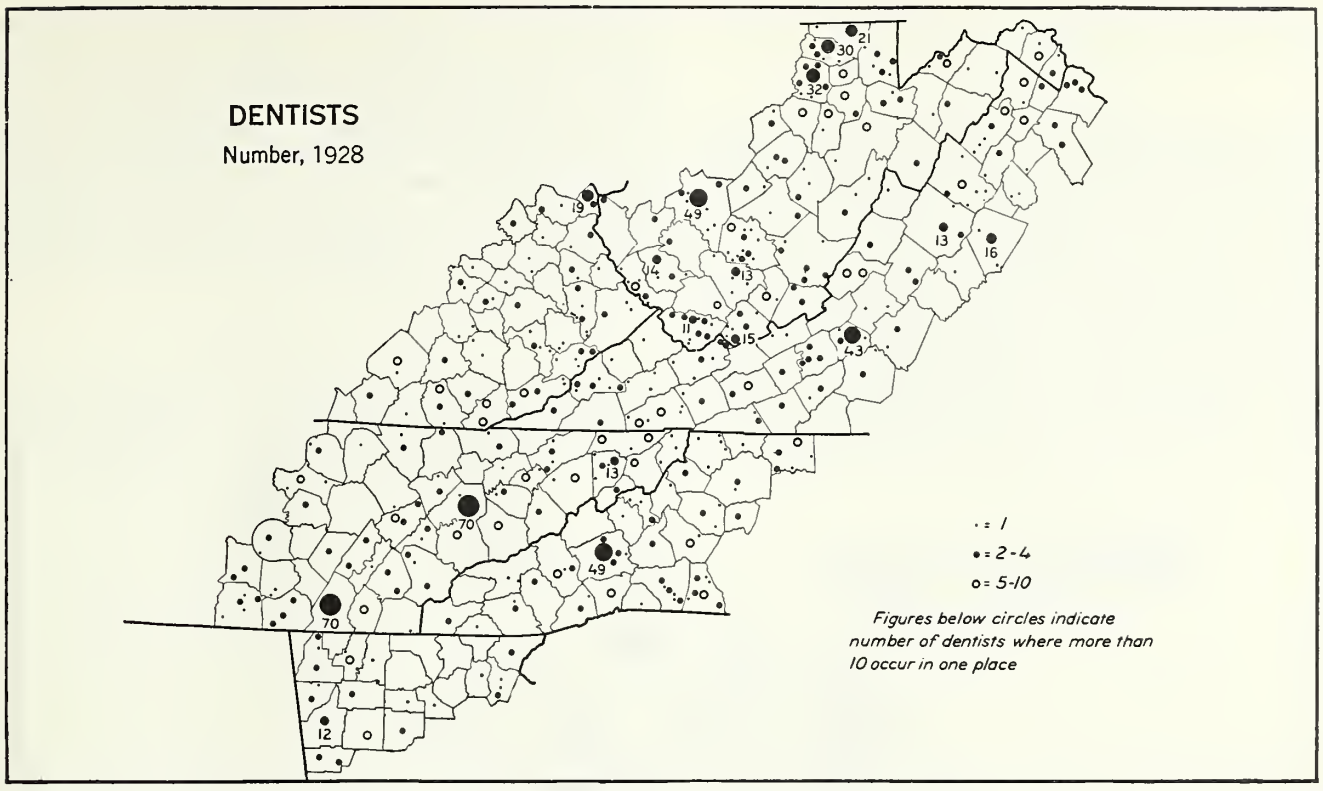

FIGURE 193.—The distribution of dentists in the region is similar to the distribution of physicians (fig. 191), but physicians outnumber dentists 3 to 1. Although many isolated communities are as far, if not farther, from a dentist than from a physician, this can hardly be said to work as much hardship as inaccessibility to medical services because of the frequently greater need for haste in obtaining a physician. (Based on data in Polk's Dental Directory, 1928 (*34*).)

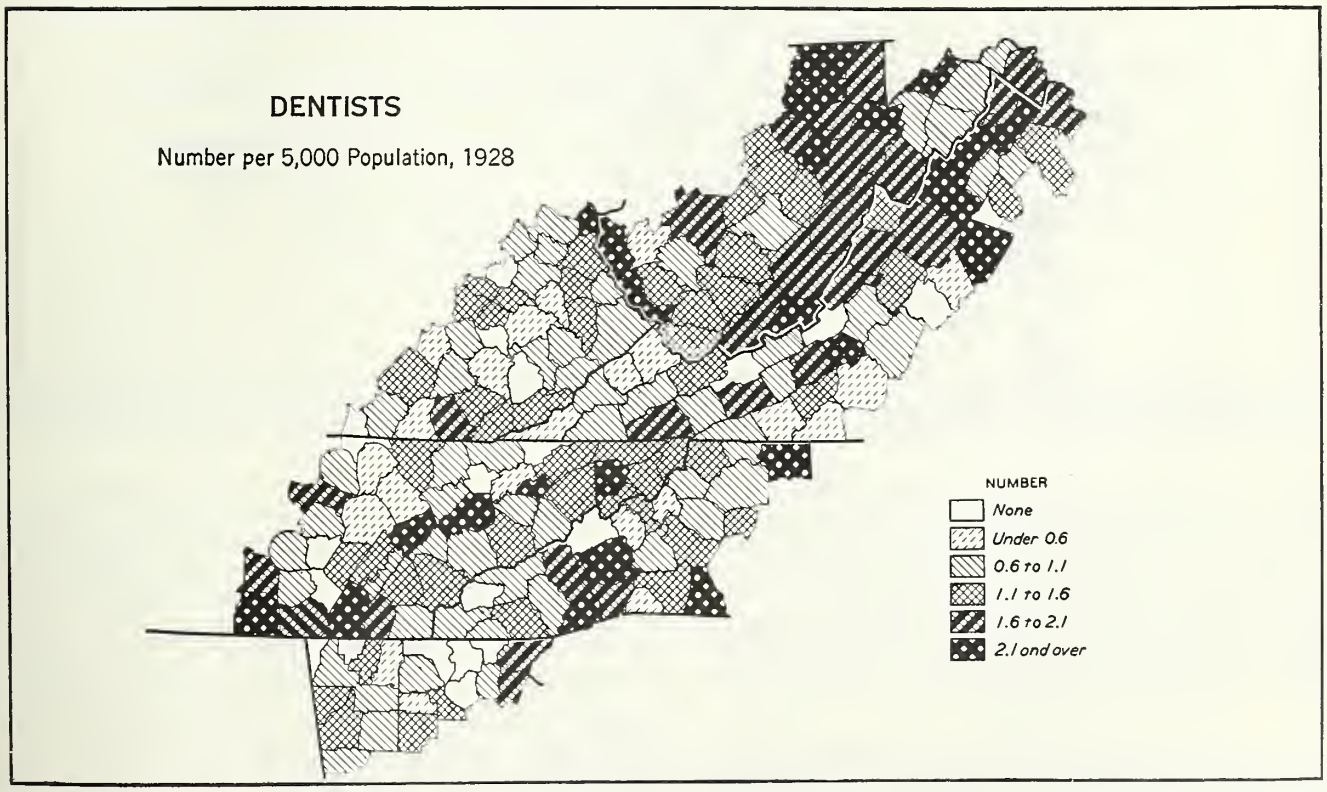

FIGURE 194.—The number of dentists per 5,000 population is relatively large in most counties with urban centers, dense rural population, and in a large group of counties in the northern part of Virginia and West Virginia in which incomes are relatively high. In nearly one-third of the counties in 1928, however, there was less than 1 dentist per 5,000 population compared with 2.8 dentists for the same number of people in the United States. In the counties of Kentucky there was 0.9 dentists per 5,000 population. (Based on data in Polk's Dental Directory, 1928 (*34*), and the census for 1930 (*50*).)

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composed of healthy individuals, makes the question of employment of physicians under public auspices of more than local concern.

DENTISTS

The importance to health of proper care of the teeth is becoming generally recognized. As shown in figure 193, many localities in the Southern Appalachians are a long distance from the nearest dentist. Not all of these localities are thinly populated (fig. 147). The dentists, like physicians, tend to be grouped in the centers of population because of the possibilities for greater income than in the more sparsely settled areas. In the region as a whole, there were about 1.5 dentists per 5,000 population in 1928 (fig. 194) compared with 2.8 dentists per 5,000 population in the United States. These figures may be compared with an estimated number required to care adequately for the teeth of all people, assuming the dentists do nothing but chair work, of approximately 5 dentists per 5,000 population (*9, pp. 125–127*). In both the country as a whole and in the Southern Appalachians the number of physicians is much more nearly adequate than the number of dentists, largely because of the greater popular demand for medical than for dental services.

HOSPITALS

The work of physicians and, to a lesser extent, of dentists may be hampered by inadequate hospitalization. Adequate hospitalization is especially important in a region in which the number of physicians is insufficient for complete care of all people. As shown in figures 195–197, the number and capacity of hospitals is inadequate. In view of the topography and the means of transportation many localities and even sections must be considered as inaccessible to a hospital equipped to provide either complete or partial medical care. In the region as a whole, there were only 8.8 beds per 5,000 persons in general hospitals in 1930 compared with an estimated requirement of 23.1 beds (*26, pp. 118–121*). In general, a similar inadequacy exists in the number of beds in hospitals giving special kinds of treatment, the possible exception being hospitals treating for tuberculosis. A well-known center for treatment of tuberculosis has been developed in Buncombe County, N.C.

OTHER HEALTH FACILITIES

Inaccessibility to a physician, a dentist, and a hospital does not mean that no attention is given to those who need medical care. Private organizations of religious, social, and philanthropic nature have been active for several decades in protecting and furthering health in remote areas.[33] Some of the organizations have mainly encouraged sanitation and healthful ways of living. Others have employed one or more nurses and have maintained an infirmary. The Frontier Nursing Service in eastern Kentucky (*35*) has devoted its energy principally to care of families, particularly mothers at childbirth, through specially trained nurses. Organizations of the character mentioned above have usually had other objectives than care of health and the number of such organizations has been too small to serve more than a small percentage of the total population.

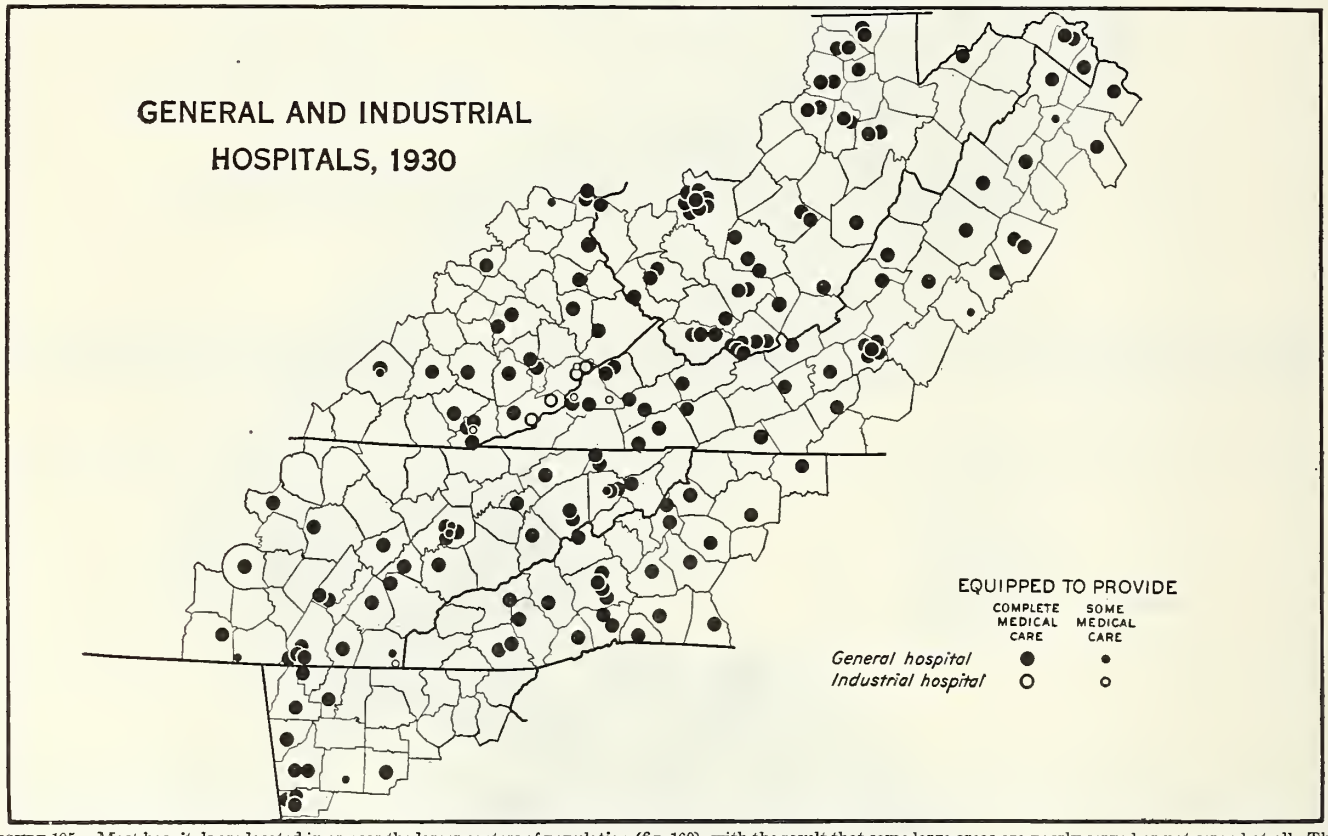

FIGURE 195.—Most hospitals are located in or near the larger centers of population (fig. 160), with the result that some large areas are poorly served or not served at all. This is especially true for the southern tip of the Blue Ridge and much of the Northwestern Cumberland Plateau. Some localities are as much as 50 miles from a general hospital and much farther if the ordinary routes of travel are followed. Several of the general and industrial hospitals do not provide complete medical care. (Based on data in the American Medical Directory for 1931 (*2*).)

[33] A brief history of the development of missionary and philanthropic schools is contained in Miss Hooker's book, Religion in the Highlands (*21, pp. 195–214*). Of the 162 welfare agencies other than schools and home-mission churches mentioned by Miss Hooker, at least 47 carried on health work at the time of the study in 1931.

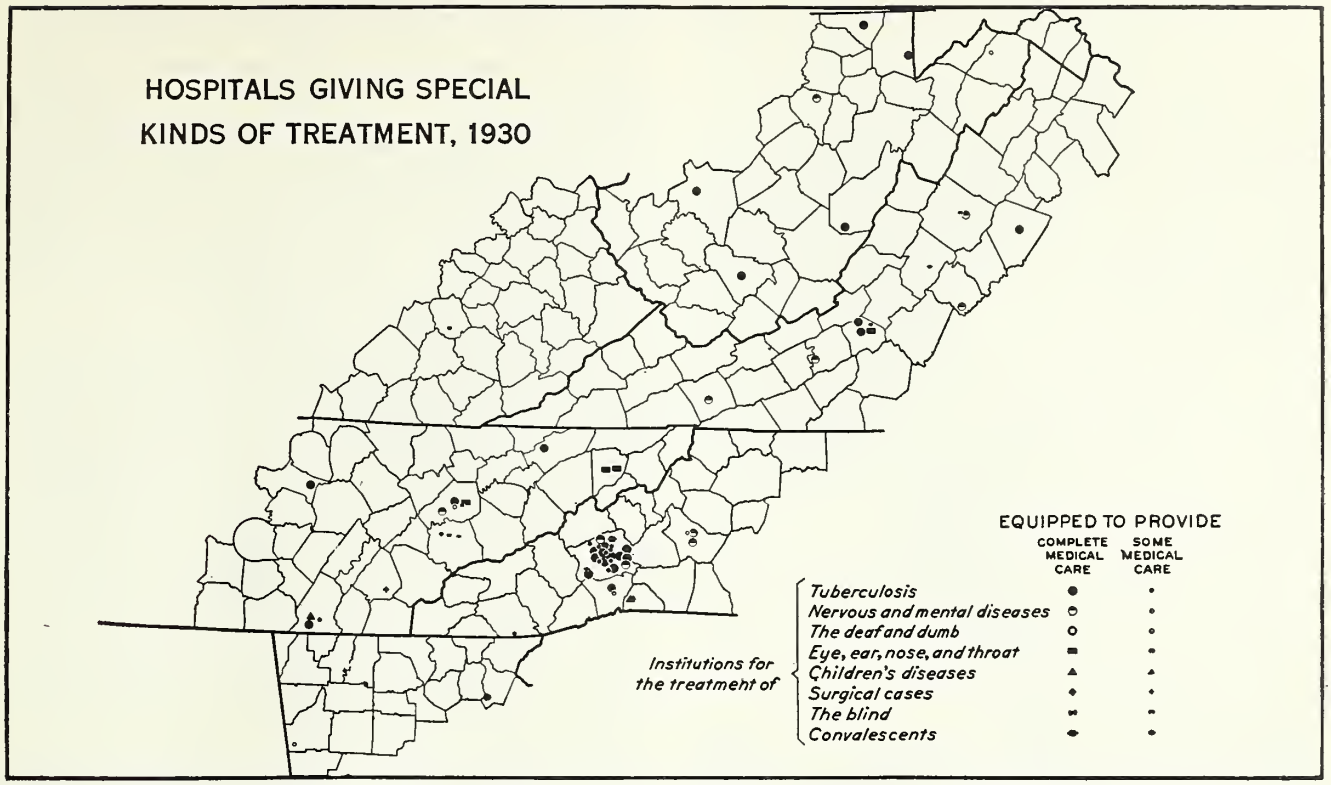

FIGURE 196.—Hospitals providing special kinds of treatment are even more concentrated in the larger population centers than are the general and industrial hospitals. Hospitals specializing in the treatment of tuberculosis constitute a large part of the total number of specialized institutions. Asheville, N.C., has become a center of hospitals for the treatment of tuberculosis among people drawn from within and from without the region. (Based on data in the American Medical Directory for 1931 (*2*)).

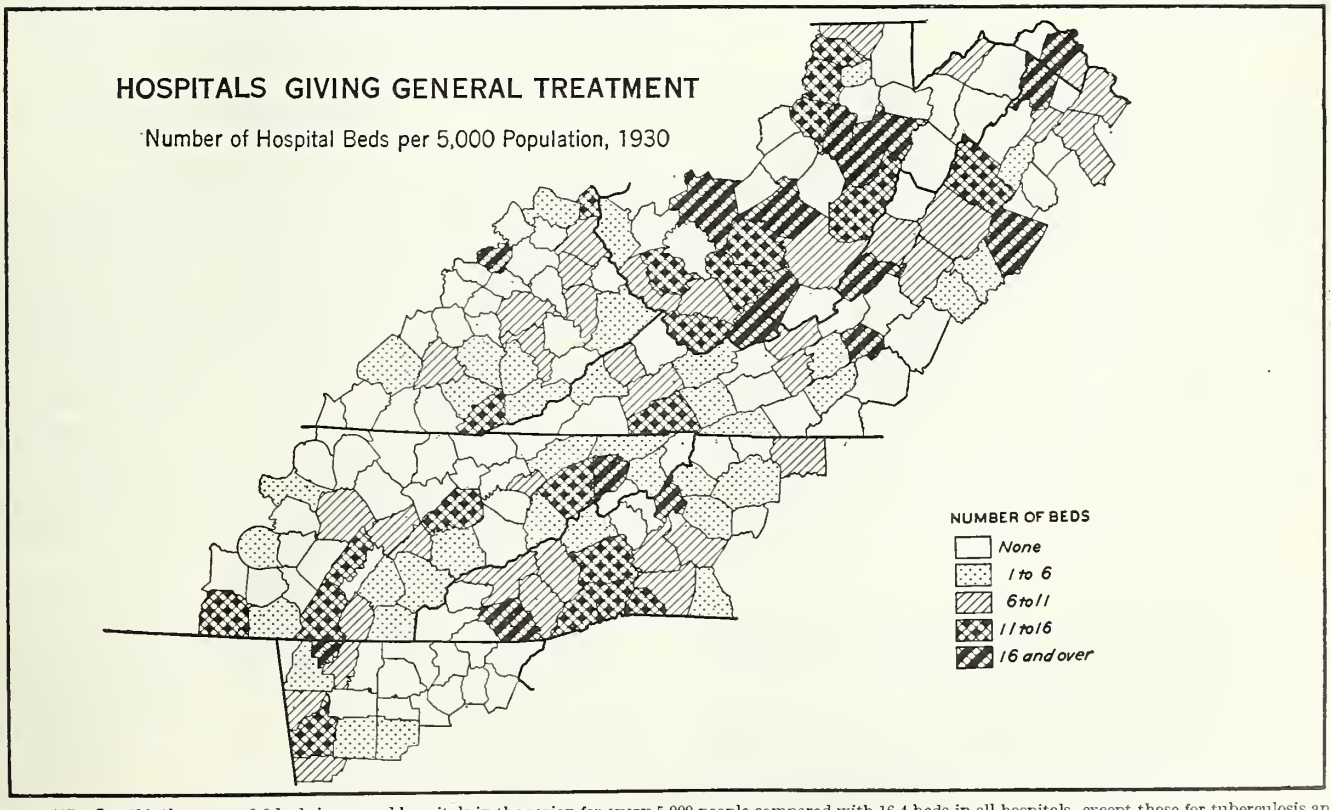

FIGURE 197.—In 1930, there were 8.8 beds in general hospitals in the region for every 5,000 people compared with 16.4 beds in all hospitals, except those for tuberculosis and mental diseases, in the United States. Only a few counties, mostly with or near large centers of population, have as many as 16 beds per 5,000 people in general and other hospitals (excluding those for tuberculosis and mental diseases). (Based on data in the American Medical Directory, 1931, (*2*) and the census for 1930 (*50*).)

Public health work in the region, particularly during the last 20 years, has grown rapidly as a result of both State and Federal interest. The several State boards of health gather statistics on births and deaths, exercise precautions for prevention and control of disease, engage in programs of sanitation, give medical examinations to school children, and engage in other activities designed to protect and promote the health of the people.[34] To this end, through the cooperation of State and county authorities, and, in some instances with the encouragement and aid of the United States Public Health Service, county-health units have been established. In 1933, 72 of the 205 counties had whole-time county health officers *(57, v. 48, pp. 818-826)*. Many other counties had a sanitary officer or one or more county nurses. The United States Public Health Service has cooperated directly with the State and county boards of health, particularly in the prevention and control of pellagra, trachoma, and venereal and similar diseases that particularly affect the public health.

In parts of the region where physicians are unavailable and the services of a trained nurse cannot be obtained, the assistance of untrained workers must be relied upon. This frequently happens in cases of childbirth and to some extent, under other circumstances.[35] In many instances needed medical attention is undoubtedly never requested.

Although limited medical attention may be available to those not accessible to a physician, a dentist, and a hospital, such attention is not adequate and, in all probability, granting that the number and location of physicians, dentists, and hospitals are adequate, there would still be a need for a greater number of publicly employed nurses and more extensive public health work.

FAMILY LIFE, MARRIAGE, AND DIVORCE

In homes of fairly high living standards, especially in the larger valleys, the family life is much the same as in any nonmountainous area. Among the poorer families, especially in the more inaccessible areas, the patriarchial type of family government is still rather prevalent. In such homes the father tends to exercise autocratic authority over other members of the family in all matters.[36] As the young people bring in new points of view through outside employment, and as the schools improve, the old customs are gradually breaking down. Under such influences the young people are becoming more impatient at restraints, and they increasingly rebel against autocratic parental control.

The odium formerly attached to spinsterhood still persists in parts of the Southern Appalachians. It may help to explain the large number of marriages per 1,000 population in 1930 in parts of the region (fig. 198). Moreover, because of incompleteness of reports, the true marriage rates are probably much higher in many counties than those shown by the data.

Girls from the poorer families still tend to marry young. Excessive childbearing and hard work usually make the mothers look broken and old by the time they reach middle age. In the Northeastern and Northwestern Cumberland Plateau, for instance, there were, in 1930, 676 children under 5 years old to every 1,000 women of child-bearing age (15–44 years) compared with 391 children per 1,000 women in the same age group in the United States; and the women in the region, in addition to household duties, were doing much work ordinarily done by men.[37]

Despite the hardships of family life, the tendency to break up the family through divorce is somewhat less in the region than in the United States (fig. 199). Available evidence obtained from the family records of many mission-school pupils *(19, p. 23)*, personal interviews, and special studies of social conditions,[38] indicate that even though divorce is not so common, desertions are.

Consequently, in the more mountainous counties an excessively large percentage of the poorer women have to carry alone the burden of supporting large families of small children. In fact, among the shiftless and irresponsible group of men, those who do not desert place on the wife and children practically the entire burden of providing for the family. Under such environmental conditions the children are greatly handicapped in their start in life.

The low educational level of the parents in the poorer families, limited contacts and limited reading, scarcity of recreational outlets, together with unattractive physical surroundings—except for the mountain scenery—make for an uninspiring home atmosphere, lack of initiative, and narrowness of outlook. Thus there is an unfriendly soil for the teachings of those who might be a possible source of aid, such as county and home demonstration agents, and public-health nurses. On the other hand, there is a favorable atmosphere for the development of lawlessness of various types.

The latter condition is also aggravated by the fact that in some sections many of the families which would tend to set standards of law and order have moved away. As Arthur Easterbrook has pointed out (11, pp. 5–18, 35–36), this movement has possibly tended to leave behind the biologically inferior population in such sections. The frequency of intermarriage among families in these sections has probably further aggravated the situation. Although the evidence is by no means conclusive as to the extent to which selective migration has occurred in the Southern Appalachians, it is apparent that in many of the poorest mountainous sections the more energetic and aggressive families have left and no immigration has taken place. Furthermore, lawlessness is pronounced in many of these sections.

A low-grade community life tends to be associated with poor homes and vice versa.

In concluding, it should be again emphasized that a good percentage of the homes in the region compare favorably in every respect with those with a similar economic base elsewhere, and that much of the foregoing discussion applies mainly to families and communities near the margin of want.

[34] A summary of the work in the several States can be found in the annual reports of the State boards of health.

[35] Untrained midwives are employed to a very considerable extent and unregistered doctors to a lesser extent in parts of the region. As shown in a study of income and health in remote rural areas in 1931 *(61, pp. 40, 45)*, untrained midwives and unregistered doctors, however, are generally quickly supplanted by trained midwives and physicians when they become available.

[36] Among the many descriptions of family life in the Southern Appalachians one of the best is to be found in Campbell's book *(6, pp. 123–152)*. Although many changes have occurred since Campbell's book was written about 15 years ago, the conditions of family life are still much the same in many of those parts where self-sufficing farms are dominant (fig. 52). Other writers well acquainted with the parts of the region about which they have written, such as Kephart *(23)*, Raine *(36)*, Ross *(39)*, Thomas *(45)*, and Combs *(8)*, in describing life and conditions in the more isolated portions also have revealed much as to the family life. In reading these descriptions, however, the time and place to which they refer should be considered, as the descriptions are frequently of a past or rapidly passing period and of the more isolated areas. This is also true of the many stories written about the region as, for instance, Miss Furman's book entitled "Quare Women, a Story of the Kentucky Mountains" *(16)*.

[37] It has been pointed out, however, that the status of women has frequently been much misunderstood and that the tasks done by women are much the same as in pioneer communities, and that they are done for the same reason, love of the family *(58, p. 248)*.

[38] Unpublished data in the files of the Department of Rural Sociology, Virginia Agricultural and Mechanical College and Polytechnic Institute.

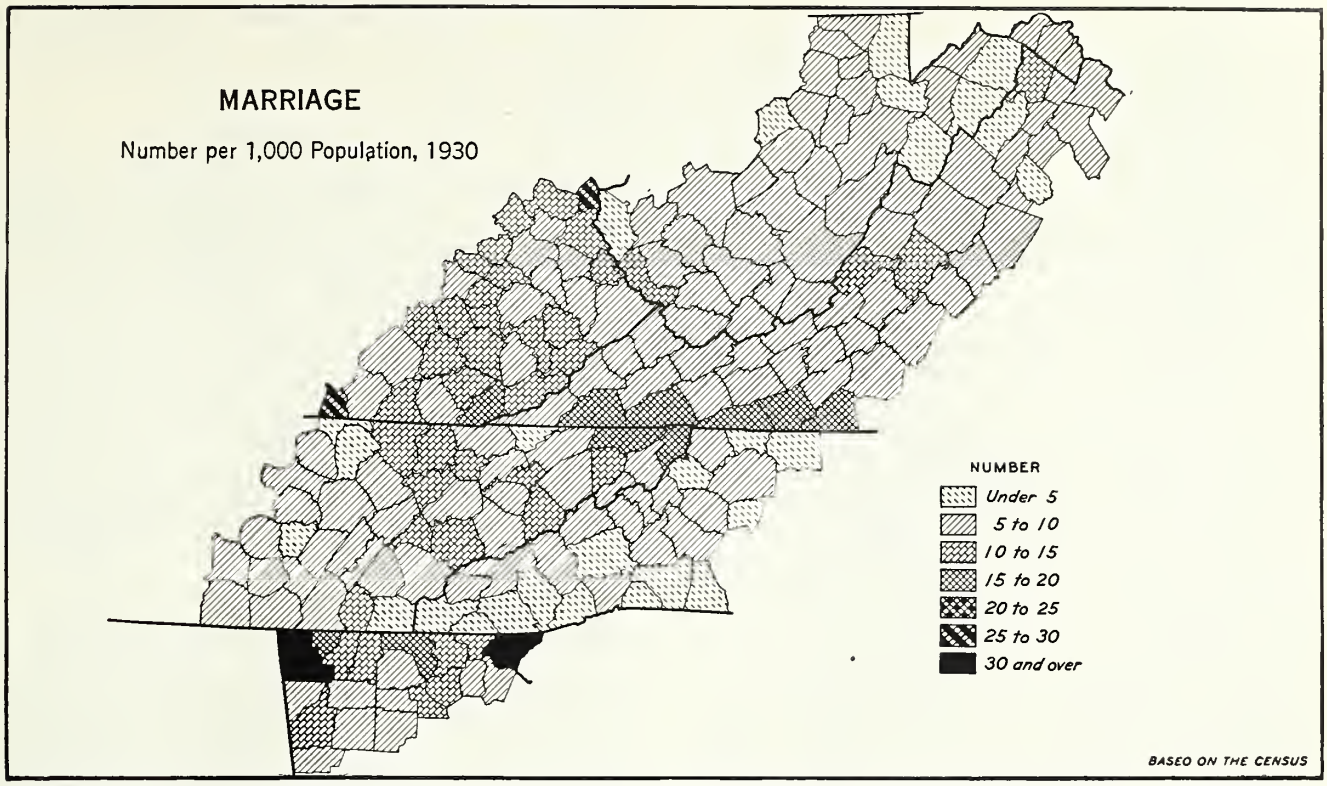

FIGURE 198.—The number of marriages in a county per 1,000 population is materially affected by the proportion of the population that is of normal marriageable age. Furthermore, in this figure the couples who marry are counted where they obtain marriage licenses and not where they live. Despite these facts, the number of marriages per 1,000 population in many groups of counties, particularly in Kentucky, was above the average of 9.2 for the United States in 1930. In some counties the number was relatively small, probably in part because of incompleteness of reports.

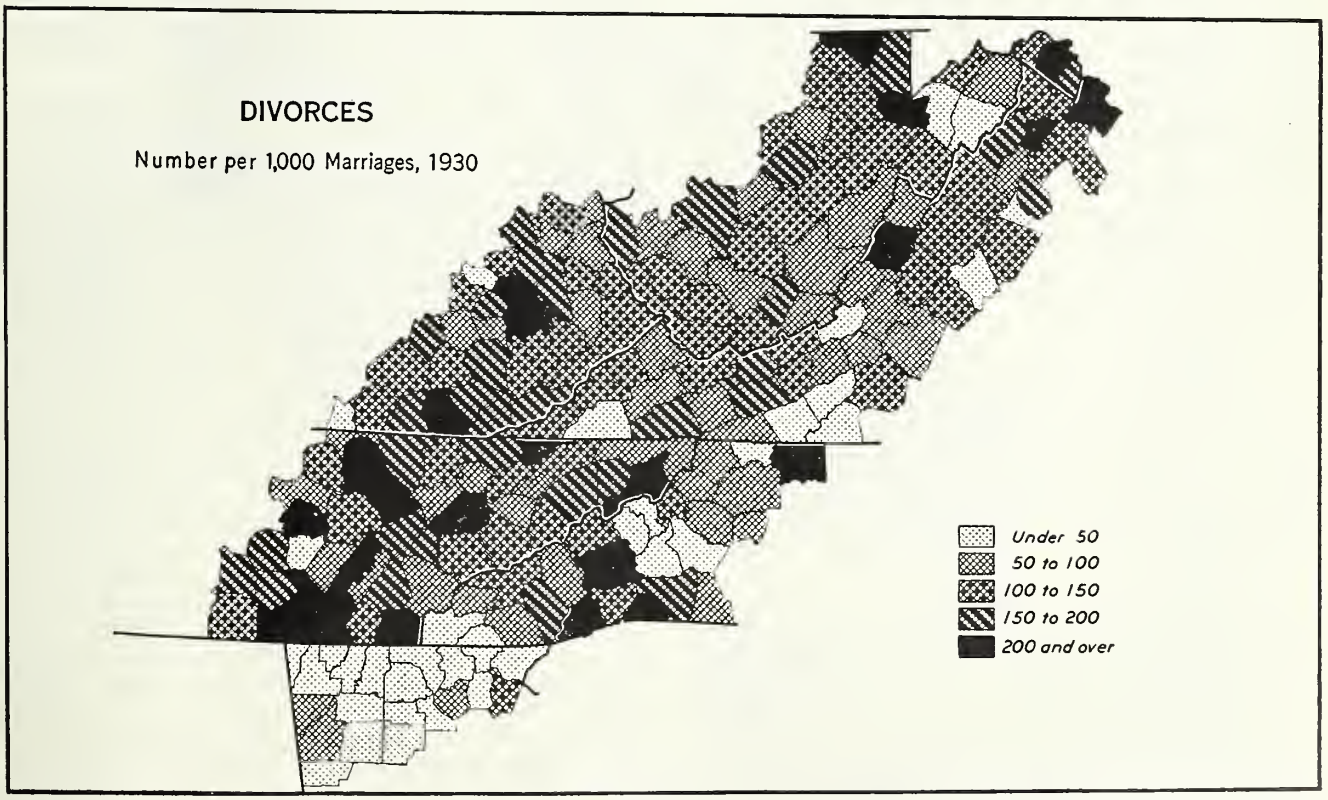

FIGURE 199.—In the region as a whole the incidence of divorce in relation to number of marriages was almost four-fifths of that in the United States in 1930. As in figure 198, the accuracy of the picture is greater when groups of counties rather than single counties are considered. Except for relatively fewer divorces in relation to number of marriages in the counties in Georgia there were no major differences in divorce rates in the region.

CRIME

Statistics on crime in the United States are very meager (*28, pp. 3–4*). Such data as are available for the Southern Appalachians are limited largely to the Federal decennial and annual censuses of prisoners in penal institutions and to the annual reports of the heads of State prisons. These data, moreover, indicate the number and kinds of crimes for which people are punished, not the number and kinds of crimes committed. For this reason, it is necessary to rely largely upon personal observation and the observations of others for most generalizations.

In much of the Appalachian Valleys and, no doubt, in other parts of the region where the economic organization is similar to that in most other parts of the United States, the number and character of the crimes are somewhat similar to those committed in other parts of the United States. In much of the Blue Ridge and the Cumberland and Allegheny Plateaus, however, the situation is sufficiently different to justify comment.

Except for the Appalachian Valleys, the people of the region were comparatively isolated until recently. Under the conditions of pioneer life in isolated communities the enforcement of justice and punishment of crime rested upon the family. From this there evolved the feud spirit. Although the hereditary feud is largely a thing of the past, personal enmity and resentment at fancied personal slights or affronts frequently lead to quarrels and disputes which prevent economic cooperation and social organization. Certain groups in parts of the region continue to carry firearms and shooting frays are common.

The frequent occurrence of such types of lawlessness as moonshining, shooting frays, and homicides has been described by such writers as Kephart (*23*), Thomas (*45*), and many others. The decennial census of prisoners committed to all penal institutions between January 1 and June 30, 1923 (*51*) shows that in the six States of which the region is a part the number of white persons sent to penal institutions for homicide was roughly 30 to 250 percent greater per 100,000 population in each State than in the United States. Besides, the commitments for homicide were a relatively large proportion of all commitments to penal institutions in the six States. These observations refer to the past but they apply in some degree to the present (*21, p. 60*).

This apparent lack of civic morality and the persistent violation of certain laws in portions of the region are at least in part attributable to a pioneer ethics. Campbell (*6*), Combs (*8*), and other writers intimately acquainted with the more backward portions of the region emphasize that, in many respects, the people strictly observe certain customs and laws. For instance, robberies are very few and women are seldom molested.

It would appear, therefore, that the views held by people outside the region as to the extent and seriousness of crimes might be quite different from those held by many people in the region. The excessive drinking, the shooting frays resulting in several "killings" each year, the personal enmities, and the reported corruption in politics, however, certainly cannot be considered as desirable. The significance of these crimes rests largely in the spirit which condones such crimes, or at least permits them to continue, and the effects which such crimes have on the social organization, rather than in a numerical or quantitative comparison of crime in this region and in other regions. An understanding of this spirit is helpful in explaining the extreme individualism and lack of social organization and is essential to those interested in improving social and economic conditions.

COMMUNITY SOCIAL ORGANIZATIONS

The extreme individualism of pioneer times and the lack of a public opinion to stop certain lawless acts are reflected in the absence of organized social activities, except for the church, in parts of the region. In a study made of community and neighborhood groupings in Knott County, Ky., in 1930 [39] practically the only social contacts found in some communities were those obtained at church gatherings and funerals and informal house-to-house visits. In one community it was reported that social gatherings of young people had been tried but found impossible because of drinking by the young men. The opportunities to participate in social activities, although frequently not so limited as in Knott County, have been few in much of the Blue Ridge and Cumberland and Allegheny Plateaus.

In contrast, a recent study in selected areas in the Appalachian Valleys in Virginia (*18*) showed a much larger variety and number of socio-civic organizations than in Knott County although less than one-half of the people participated in such organizations. Studies made in recent years in Roanoke (*42*) and Rockingham Counties (*33*), Va., in which there were urban centers, showed an even larger number and variety of social organizations. Thus there is a wide range in the opportunities presented for participation and in the participation in social organizations in different parts of the region, the opportunities and participation being slight in the relatively isolated and rural areas and much greater in urban centers and rural areas in which there has been economic development.

Figure 200 shows the number and distribution of four of the more general young people and adult community organizations. The distribution of these organizations is only loosely associated with economic and social conditions. The 4-H and home-demonstration clubs are widely scattered and show a somewhat similar distribution, no doubt because they are promoted by similar interests. As the Future Farmers of America are limited to high-school students the number of such organizations is limited. The parent-teacher associations tend to be somewhat grouped in and about centers of dense population (fig. 147).

Since other organizations displace, to some extent, the organizations mentioned above in certain counties and States, such as the Cooperative Educational Association, which in Virginia largely replaces the parent-teacher association, figure 200 gives only a generalized picture of community organizations. On the other hand, in view of the nearly 5,000,000 people in the region (fig. 147) the small number of such organizations as are shown in figure 200 would indicate that only a small proportion of the population participate in the more general community organizations. In general, the more isolated and economically retarded areas are those in which shootings and personal enmities are greatest. For these reasons, such areas have a relatively small degree of participation in present-day social organizations although, for the same reasons, such organizations are much needed.

[39] Unpublished manuscript by M. Oyler of the Kentucky Agricultural Experiment Station.

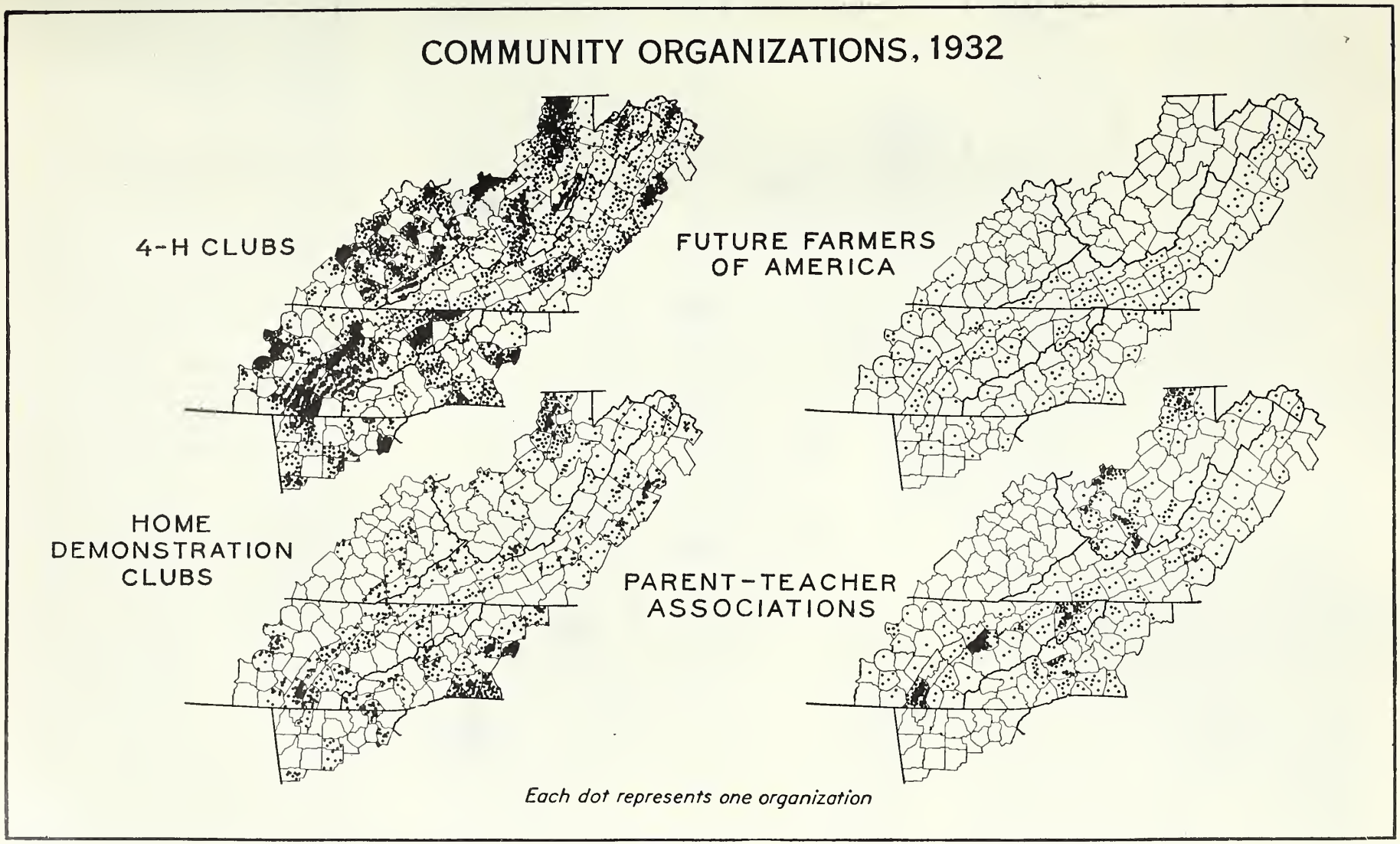

FIGURE 200.—4-H clubs and Future Farmers of America are two of the more important types of organizations for young people in the region. The 4-H clubs, sponsored by the Agricultural Extension Service vary in number largely in response to the density and social-mindedness of the population and the aggressiveness of the extension agents. Counties that have no 4-H clubs are usually without county agents. The Future Farmers of America is composed only of boys taking work in vocational agriculture in high school and, therefore, is limited to schools offering such work. In many counties, both in the mountain parts and in the valleys, only a small percentage of the young people participate in either type of organization. Since home-demonstration clubs are sponsored by agents in the employ of the Agricultural Extension Service, factors influencing the number and distribution of such clubs are similar to those for 4-H clubs. The number of parent-teacher associations is more or less affected by other organizations, as, for instance, in Virginia where the Cooperative Educational Association, a State organization with many local units and with much the same program as the parent-teacher associations, largely occupies the field. The proportion of adults who participate in the above two types of important organizations is probably even much smaller in most counties than the number of young people who participate in boys and girls clubs and the Future Farmers of America.

LIBRARY FACILITIES AND SERVICES [40]

Library service is inadequate not only in that 77 percent of the people are without access to public library service of any kind, but also in that the service available to the other 23 percent in many instances fall so far below the recognized standards of good library service that it may be said to exist in name only (fig. 201).

The available local public library resources are supplemented somewhat by the book-lending service of the extension division of the State university in each State except Kentucky, and by Berea College in that State. A similar service is also rendered by a State central library agency in each State, except West Virginia; this State has provision for such services but no funds on which to operate. In 1930–31 only 0.7 of a book to every 100 people was lent by such agencies. Most public schools also have libraries of some kind, though they are not generally made available to the public. Such libraries in North Carolina had 150 books per 100 pupils enrolled. In Virginia, 160 books per 100 pupils were reported. Similar figures were not obtained from other States.

That rural people respond to the opportunity to read when it is offered is shown from the record of books lent by the well-conducted, adequately staffed and financed, demonstration library systems put on in Knox and Hamilton Counties, Tenn., with the aid of the Rosenwald Fund. In Hamilton County there was a circulation of 9 books per capita, or 3 more than the per capita circulation in the adjacent city of Chattanooga. Only 8 counties of the 205 in the region have a similar county-wide library service.

According to the American Library Association, $1 per capita is the minimum annual appropriation on which a library can give adequate services under approved standards. In 1930 the region under study as a whole spent only 8 cents per capita on public libraries. Only 34 cents per capita was spent for that part of the population living in the service areas of the libraries shown on the map. Better library facilities are undoubtedly one of the great needs of the region.

CIRCULATION OF MAGAZINES

To a considerable extent, the circulation of magazines indicates the interest of people in the general economic and social organization of larger groups than the community and the closeness of their contacts with present-day events. As shown in figure 202, the circulation of 15 national magazines (The American Magazine, Better Homes and Gardens, Collier's, Cosmopolitan, Delineator, Good Housekeeping, Ladies' Home Journal, Liberty, Literary Digest, McCall's, National Geographic Magazine, Pictorial Review, Red Book, Saturday Evening Post, and Woman's Home Companion) per 100 population in the Southern Appalachians ranges from less than 3 in many counties in the Cumberland Plateau to 15 and more in many counties with large urban centers. No doubt low income is a factor limiting the circulation of magazines in many parts of the region.

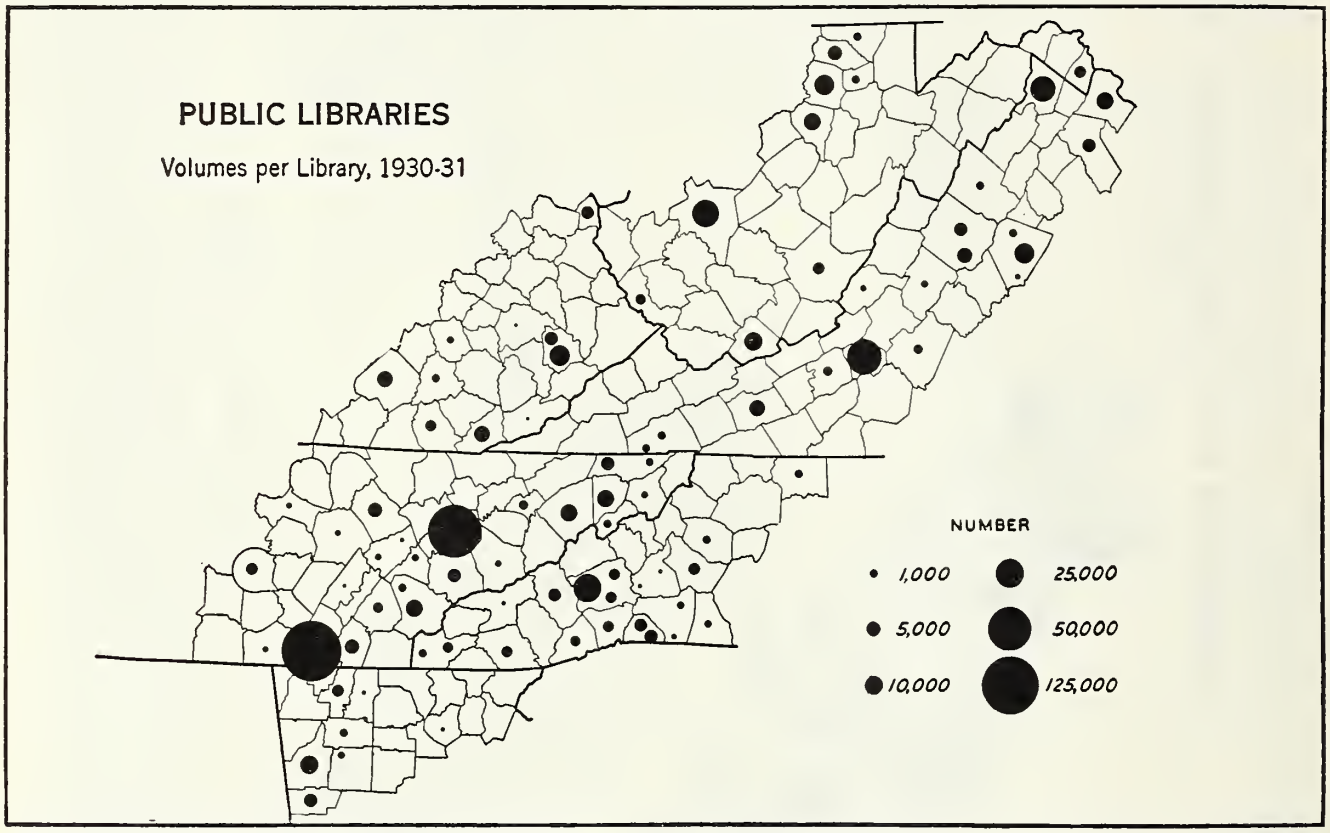

FIGURE 201.—Of the 205 counties in the region, 129 were without public libraries in 1930–31 and 136 either had no libraries or had libraries with a total of not more than a thousand volumes. The few large libraries are in the larger cities, although 20 of the 58 cities with a population of 5,000 and over are without public libraries. Only 23 percent of the population are within the service area of the public libraries. (Data furnished through the courtesy of the American Library Association.)

[40] The data on library facilities and services were furnished through the courtesy of the American Library Association by Tommie Dora Barker, regional field agent of the association in the South.

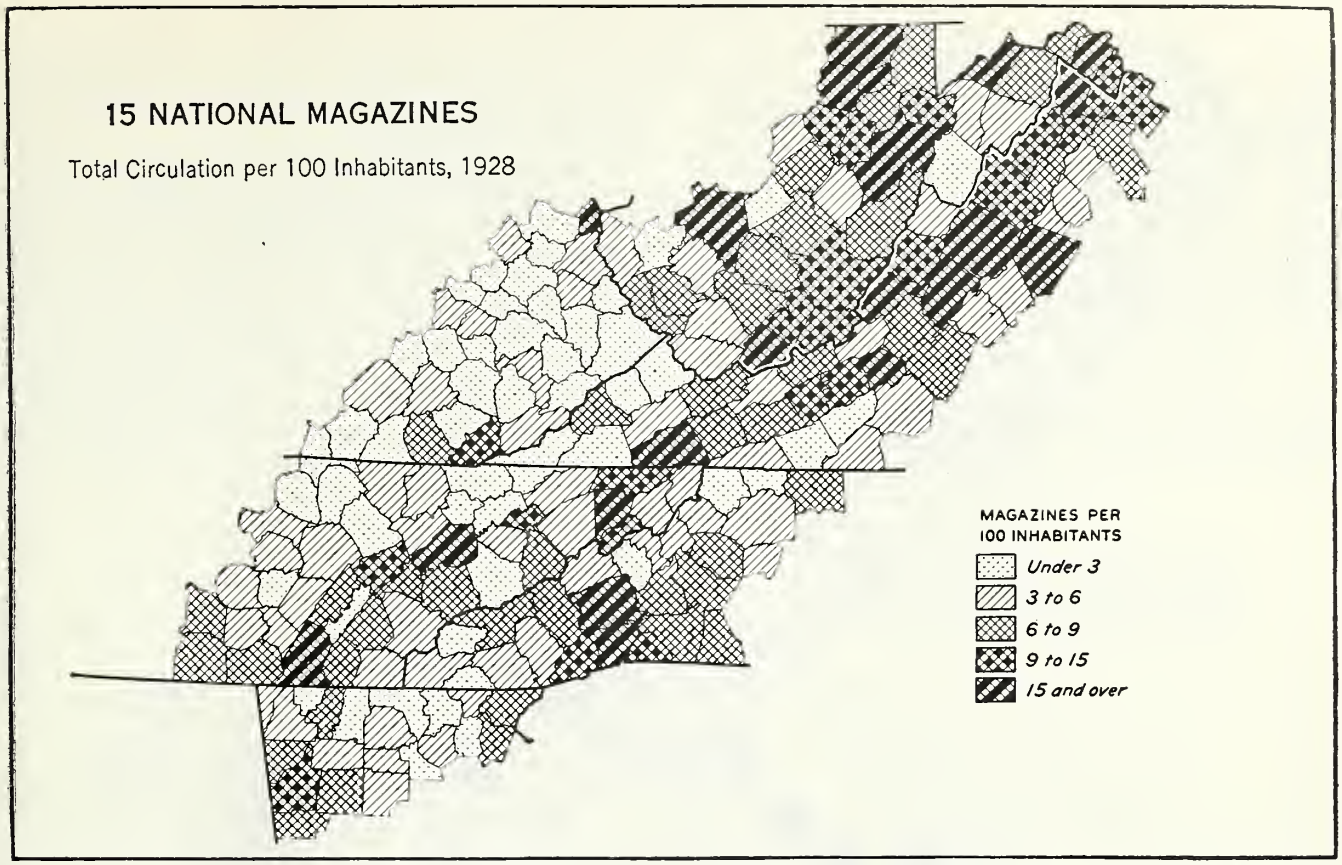

FIGURE 202.—The circulation of 15 national magazines per 100 inhabitants in 1928 was especially low in parts of the Blue Ridge and most of the Northwestern and Northeastern Cumberland Plateaus. In the latter two subregions the circulation was 6.4 magazines per 100 inhabitants as compared with 14.1 magazines per 100 inhabitants in the Central Appalachian Valleys. In the United States an average of 22.4 of the same group of magazines was circulated per 100 inhabitants. The circulation is largest in those counties with large cities and greater wealth. (Based on data from the census of 1930, (*50*) and the Market Data Handbook, United States Department of Commerce, (*54*).)

In the region as a whole an average of 10.1 of the group of 15 magazines mentioned above were circulated per 100 population in 1928. This is less than one-half the circulation of the same group of magazines in the United States. Although the circulation of weekly, semiweekly, and triweekly newspapers is usually relatively high in areas where few magazines are circulated, the absence of library facilities and services and the small circulation of the magazines mentioned above indicate the absence of a variety of reading and a probability that many people do little or no reading.

SUMMARIZING FACTS

Social conditions and social organizations in the Southern Appalachians are not on a par with those in most other parts of the United States. In the larger urban centers and in many parts of the Appalachian Valleys the situation compares favorably with that in the United States as a whole but in most other parts of the region the situation compares very unfavorably. Those parts that compare unfavorably are of particular concern because of the rapidity with which population is increasing in such areas and because of the meager economic resources—factors that have contributed to the need for extensive poor relief.

The education and mental horizon of the people in the more retarded parts, as reflected in the family life, the types of crimes, the community and social organizations, and in the number and availability of library books and magazines, reflects a situation differing greatly from that obtaining in most parts of the United States. This difference has been reduced by long-continued efforts of many mission and philanthropic schools and other agencies, but much remains to be done to provide adequate health facilities and services and a broader mental horizon leading to group action and cooperation.

THE CHURCH SITUATION

By Elizabeth R. Hooker, *director southern mountain study, Institute of Social and Religious Research*

The church situation in the different parts of the Southern Appalachians shows considerable variation. Nevertheless, the isolation and the poverty found in this region, particularly in the more mountainous districts, together with the religious history of the wider area to which the region belongs, have impressed certain common features upon religious institutions throughout the region. These common features will occupy the foreground in the brief account of the church situation that follows.[41]

NUMBER AND DISTRIBUTION OF CHURCHES

A great many churches are found in the Southern Appalachians (fig. 204). Even excluding border counties not wholly mountainous, in 1926 the remaining 171 counties had 14,423 churches, or 187 for every 1,000 square miles.[42] If evenly distributed, the churches would be only 2.3 miles apart.

In relation to population the number of churches is also comparatively high (fig. 205). In 1926 there were 3¼ churches per 1,000 inhabitants, a ratio almost the same as that for the South Atlantic and East South Central States combined, but higher than the ratios for the Northern Appalachians and for the United States as a whole, which were 2.9 churches and 2 churches, respectively.

One reason for the comparatively large number of churches lies in the presence in the region of many narrow valleys, practically all inhabited, which were isolated until recently, and many of which have not been reached by good roads even today. If the people were to attend churches it was necessary to have the churches close at home. And they greatly desired churches. In the isolated valleys of the mountains the monthly preaching service is still the principal occasion of social intercourse. Churches are spoken of with respect, even by the many who enter church houses only for revivals or funerals. The Bible is reverenced as a storehouse of proof texts adduced as authority upon theological questions, which are vital topics of discussion.

Racial differences also add to the number of churches. Where there are both white and colored inhabitants, as in the wider valleys especially in the southern part of the region, both elements naturally have their own churches.

Moreover, the people are of many denominations. In the northern portion some of the early settlers spoke English, while others spoke German; and the denominations brought with them by both racial elements are still represented today. The denominations which divided at or before the Civil War are still divided; both Methodist and Southern Methodist Churches, for

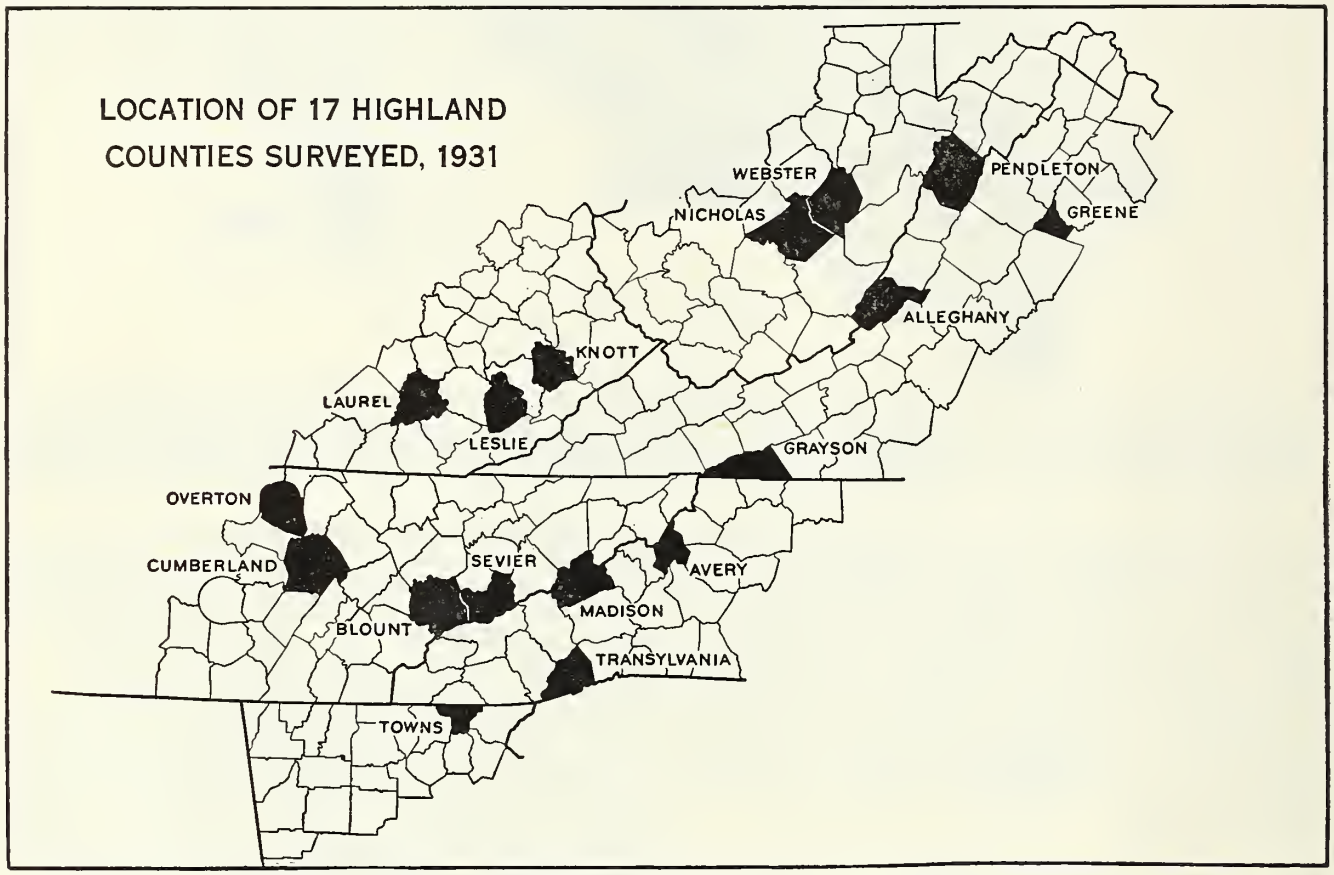

FIGURE 203.—The counties in which a religious survey was made are distributed among the three physiographic divisions of the region—the Cumberland and Allegheny Plateaus, the Blue Ridge, and the Appalachian Valleys and Ridges (fig. 4). Three are situated in each of the States of Kentucky, North Carolina, Virginia, and West Virginia. Four are in Tennessee; one is in Georgia.

[41] The statements presented in the following pages were based on data of two kinds: (1) Data from the Census of Religious Bodies: 1926 (*52*), including some unpublished data and (2) data regarding 17 counties or major portions of counties (fig. 203), which were surveyed in the field in 1931 by the Institute of Social and Religious Research. The field investigation formed part of a survey of the churches and mission schools of the Southern Appalachians (*21*). In three counties (Blount County, Tenn., Alleghany County, Va., and Nicholas County, W.Va.) centers of 5,000 or more inhabitants were studied only as they affected the rural districts; and in Sevier County, Tenn., the valley section was omitted (fig. 203).

[42] A number of counties in Alabama and Maryland are included here.

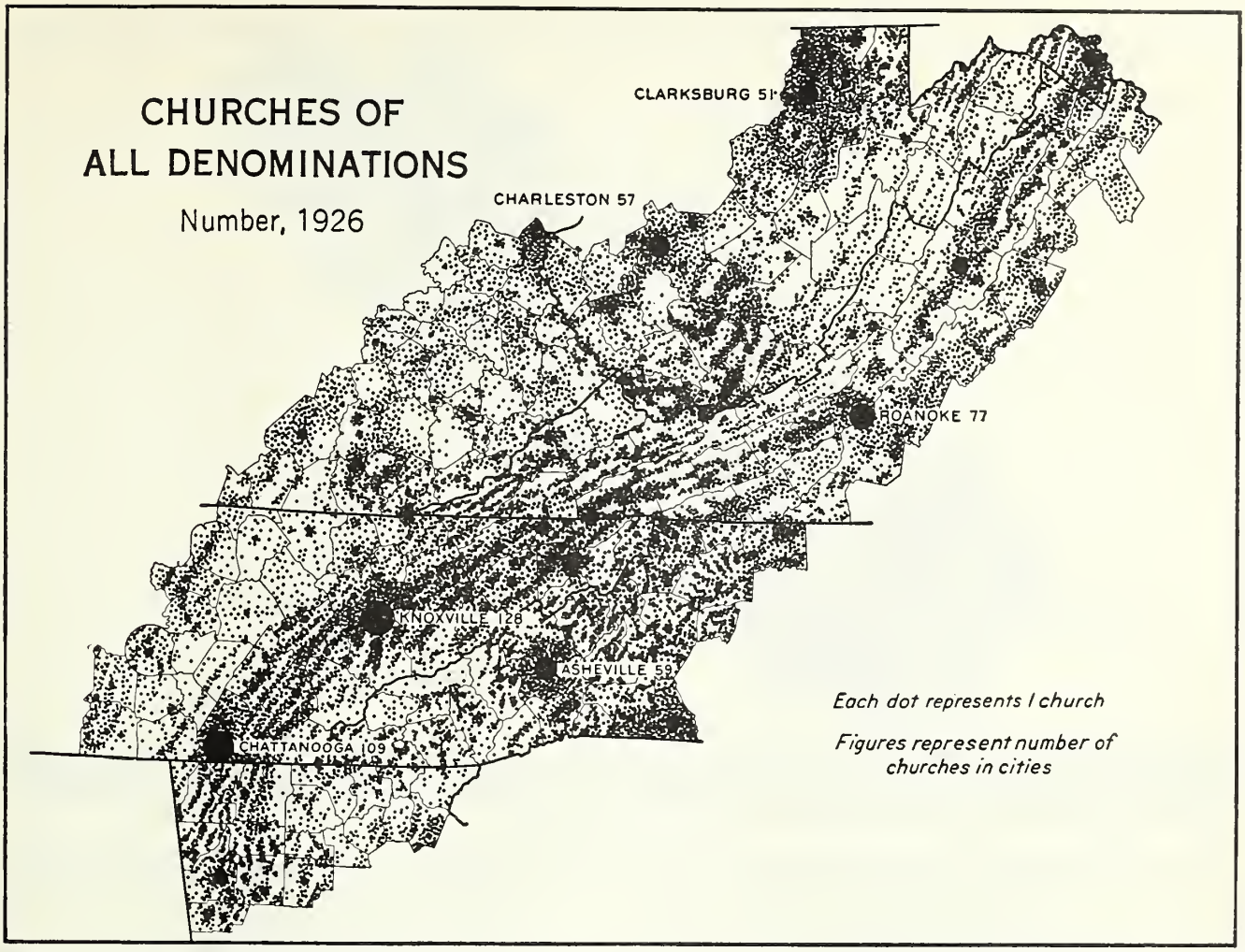

FIGURE 204.—The region has many churches, about three times as many in relation to area as has Vermont, a typical part of the Northern Appalachians. In general, churches are most numerous where the population is most dense, and are less numerous where there are fewer people. Therefore, they are especially abundant in the valleys, particularly in counties where there are large cities. But this rule has many exceptions. For example, well-populated districts in the Cumberland and Allegheny Plateaus have comparatively few churches. (Based on unpublished data from the religious census.)

example, are found in five-sixths of the counties. Some denominations arose in consequence of historical religious movements which had their origin close to these highlands. Such are the Cumberland Presbyterian Church, the three bodies of churches that claim the title "Christian," the "missionary" or Southern Baptists, and several antimissionary Baptist sects. Many churches of primitive varieties have been preserved in secluded nooks of the mountains, just as archaic forms of plant and animal life have been perpetuated in remote islands of the ocean. The distribution by counties of the churches of the Southern Baptist Convention, antimissionary Baptist Churches, and churches of Methodist Episcopal Church, South, is shown in figures 206–208. Altogether the denominations represented in the 171 counties exclusive of border counties number 98; and 23 of these denominations have more than 100 churches each.

DENOMINATIONAL DISTRIBUTION

The proportionate distribution of the churches among groups of denominations is shown in figure 209. The strongest group consists of 11 kinds of Baptists, which together account for 39.8 percent of the churches. A group of 9 Methodist denominations ranks next, enrolling 33.4 percent of the churches. Smaller proportions of churches represent 7 Presbyterian and 3 "Christian" denominations. Perfectionist bodies, the so-called "Holy Roller" sects, are 15 in number. Though they enroll only 3 percent of the organized churches reported, yet because they are widely distributed and aggressive and hold services in many localities where they have no organized church with a roll of members, they present to the older churches a distinct problem. In addition to these 5 groups, there are 45 other Protestant denominations, none very strong, but taken together enrolling 9.8 percent of the total number of churches. Finally, non-Protestant churches, most of them either Roman Catholic or Jewish, constitute 2 percent of the whole number of churches. They are found almost exclusively in counties having urban centers or mining camps, the rural mountain districts being exclusively and ardently Protestant.

Among single denominations, five lead the others in number of churches, in number of members, and in the number of counties in which they are represented. These are, in order of strength, the Southern Baptist Convention; the Methodist Episcopal Church, South; the Negro Baptists; the Methodist Episcopal Church; and the Presbyterian Church in the United States. In membership they differ widely; for every 100

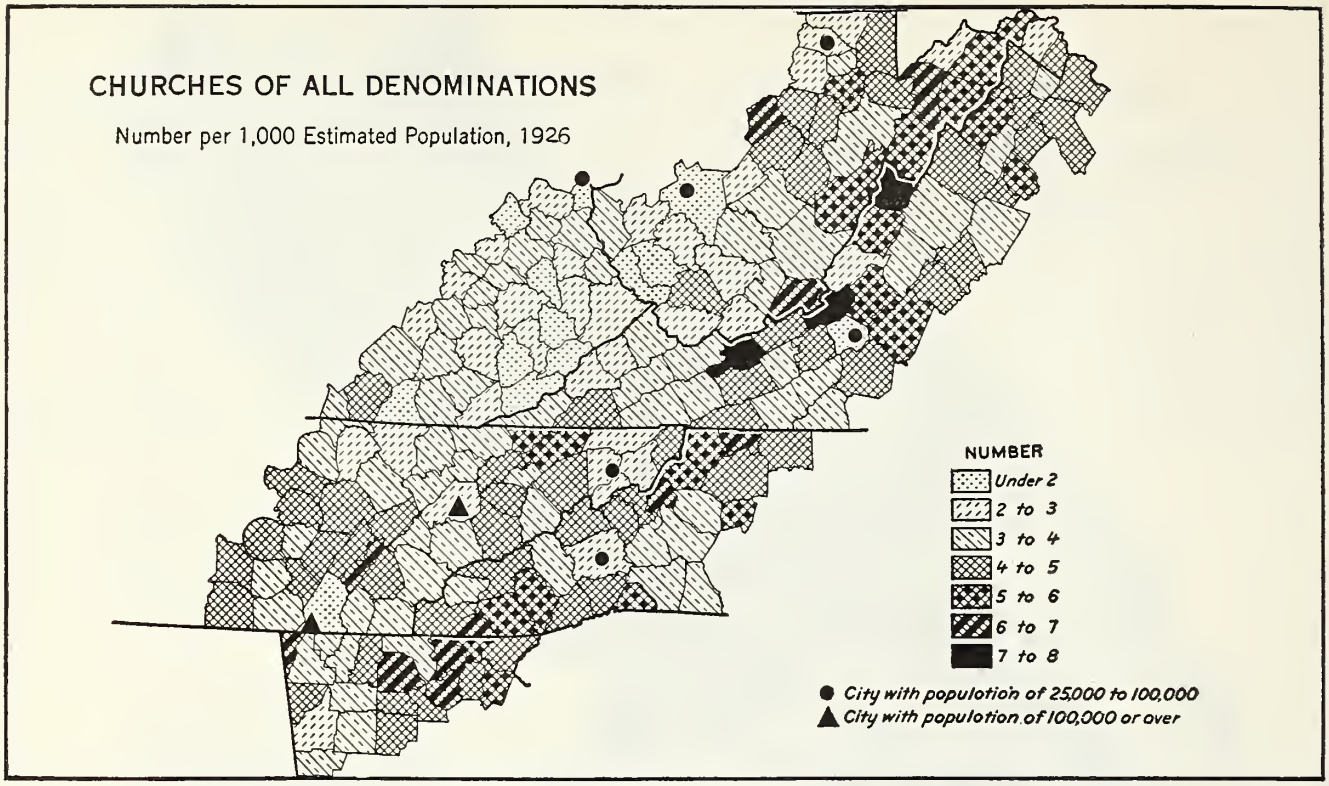

FIGURE 205.—Counties with fewer than 3 churches per 1,000 inhabitants are most prevalent in the Northeastern Cumberland Plateau. Almost all the counties with 6 or more churches per 1,000 inhabitants are found either in the Central Appalachian Ridges or in the Blue Ridge. These counties are highly subdivided by the rugged relief. In most of them the people also are much divided denominationally. (Based on unpublished data of the religious census.)

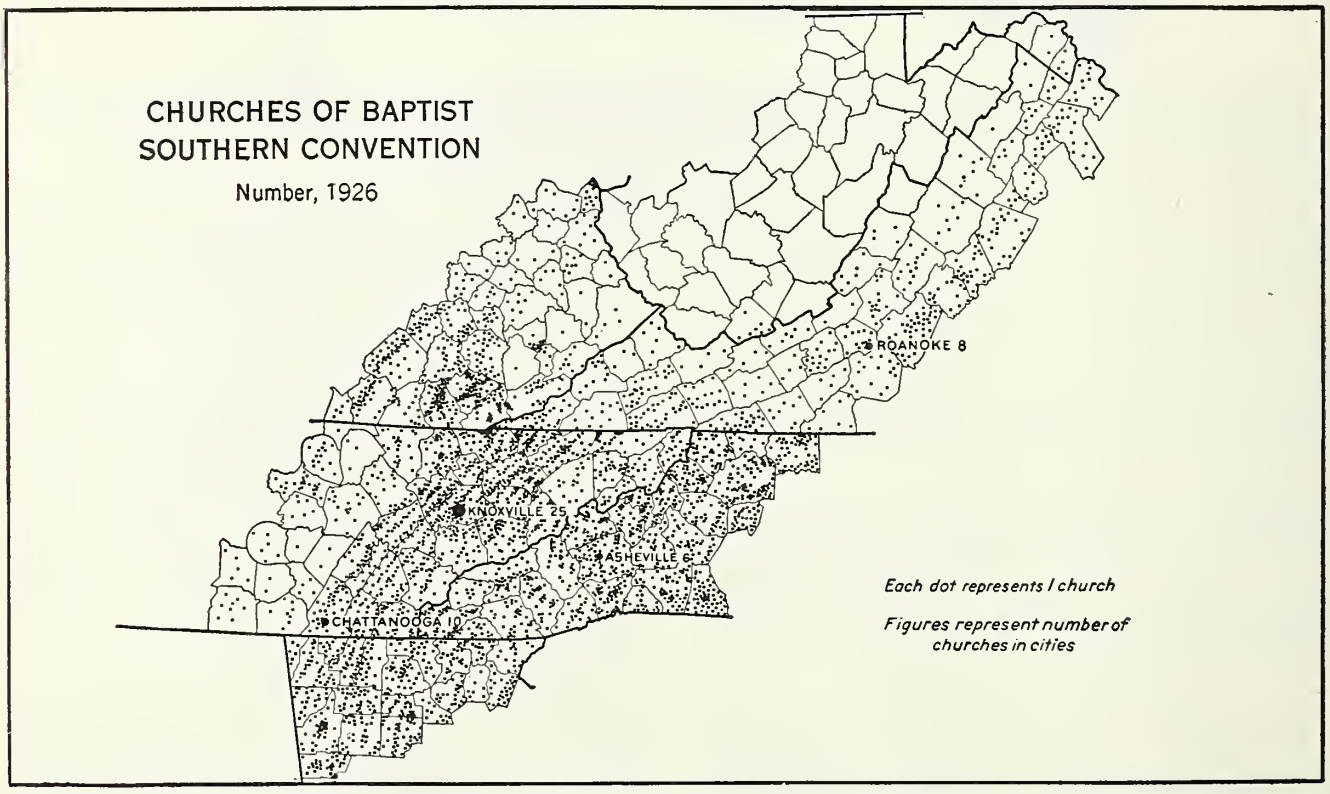

FIGURE 206.—The Southern Baptist Convention is by far the strongest single denomination in the Southern Appalachians, both in number of churches and in number of members. It is found throughout the region, except in West Virginia, where the corresponding Baptist churches are connected with the Northern Convention. (Based on unpublished data of the religious census.)

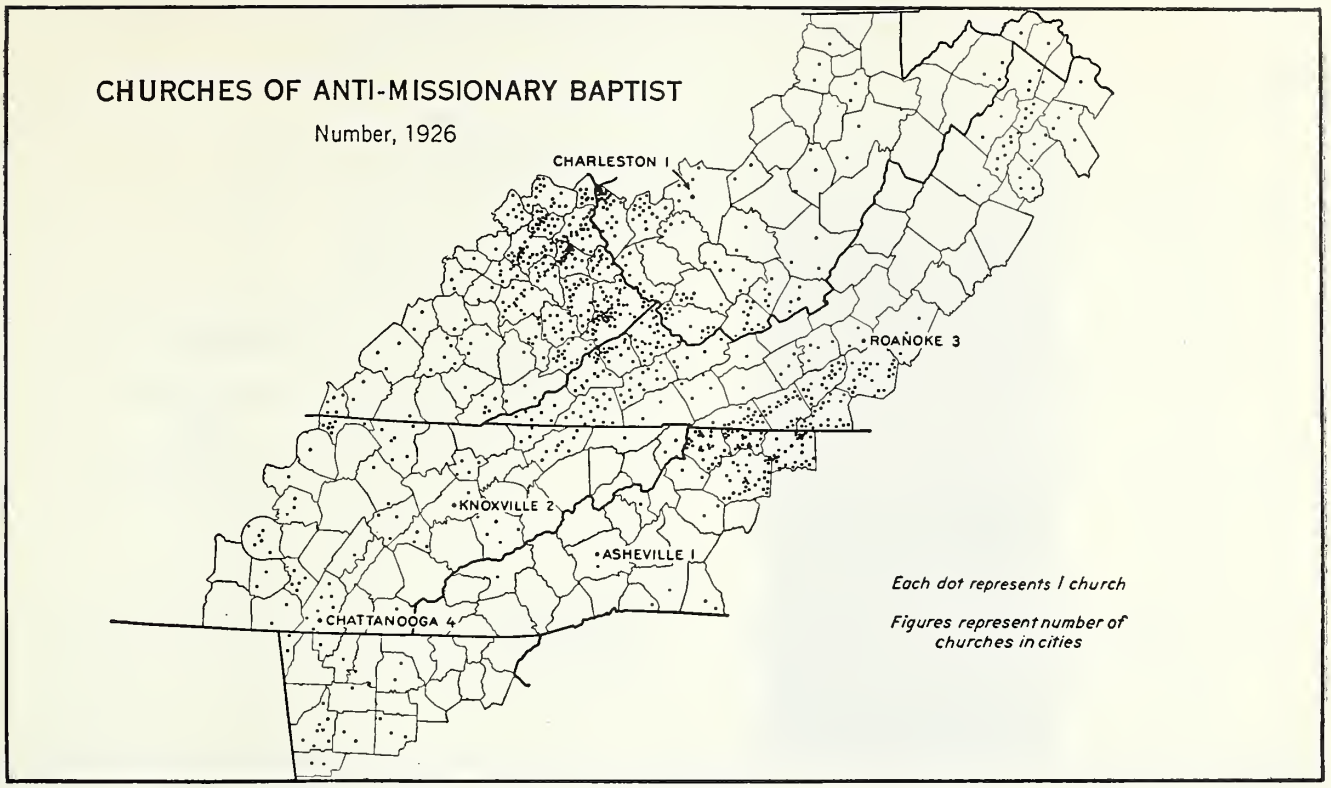

FIGURE 207.—Antimissionary churches, though found in most parts of the Southern Appalachians, are most common in two of the more isolated subregions—the Northeastern Cumberland Plateau and the Blue Ridge. Among the six kinds of antimissionary Baptists separately enumerated by the religious census, the Primitive Baptists are most numerous and most widely spread. Regular Baptists and United Baptists are also fairly numerous. (Based on unpublished data of the religious census.)

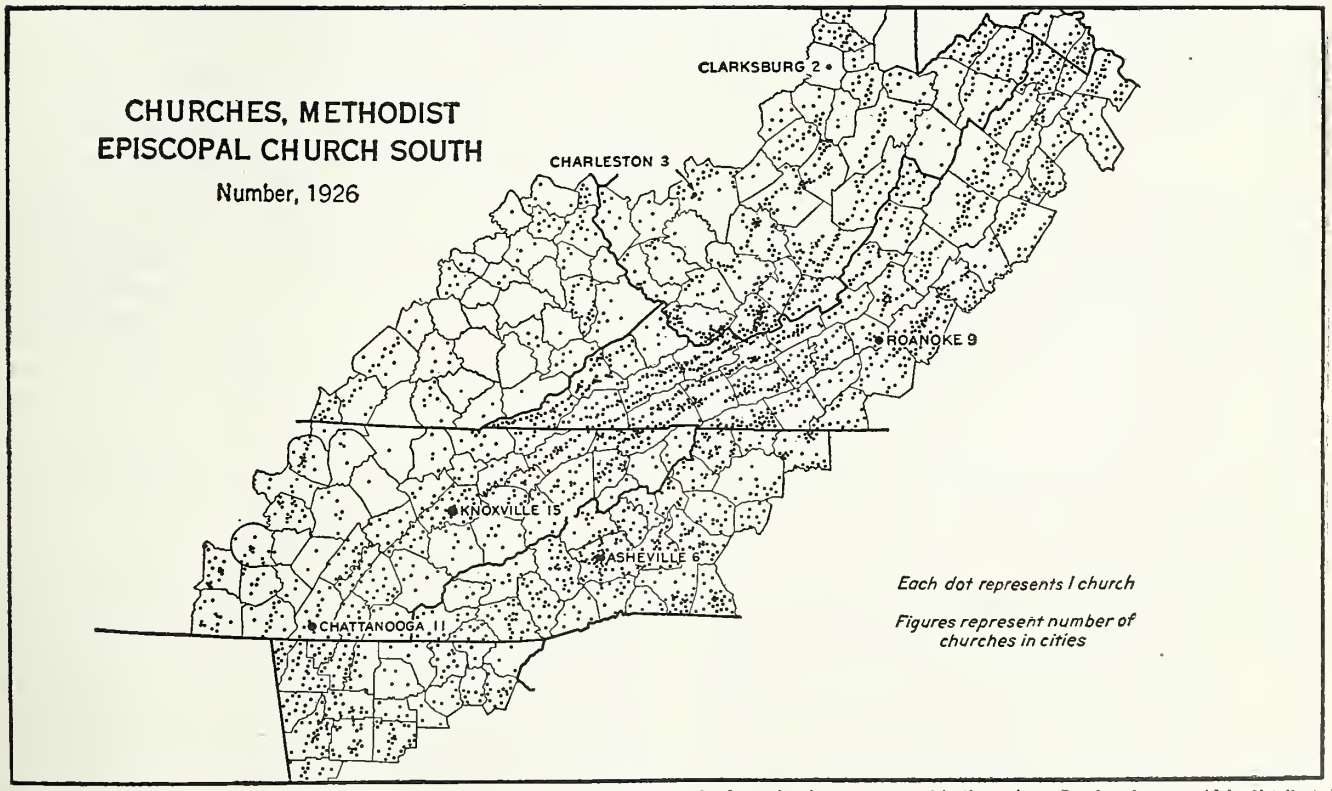

FIGURE 208.—The Methodist Episcopal Church, South, ranks second in strength among the denominations represented in the region. Its churches are widely distributed. It is least strong in the Northeastern and Northwestern Cumberland Plateaus. Because of the division in allegiance of the mountain parts during the war of 1861–65, about five-sixths of the counties having churches of the Methodist Episcopal Church, South, have also Methodist Episcopal churches. (Based on unpublished data of the religious census.)

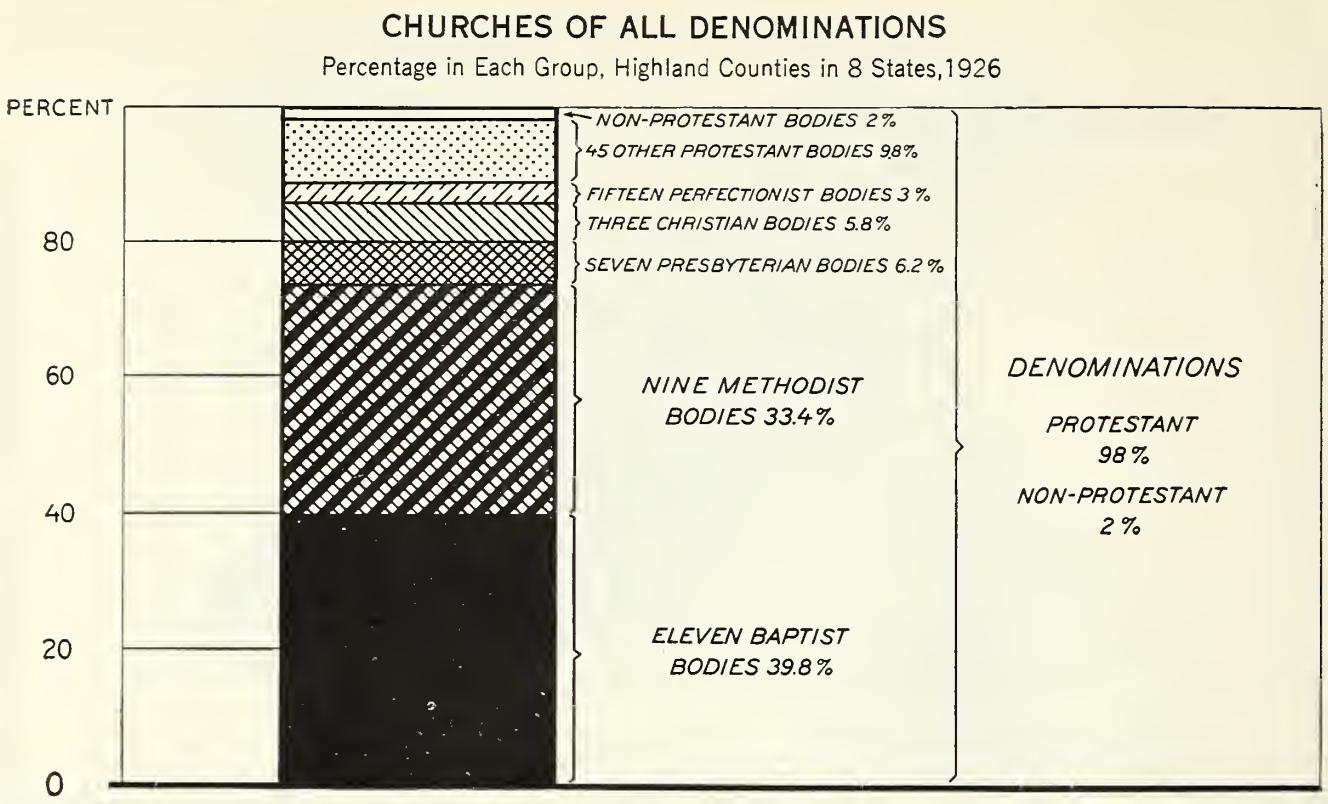

FIGURE 209.—Eleven Baptist denominations are represented by the largest proportion of churches. Nine Methodist bodies come next in relative strength. Seven Presbyterian bodies, 3 "Christian" denominations and 15 Perfectionist denominations form appreciable proportions of the whole. Churches of 45 other Protestant denominations combined form about one-tenth of the total number. Non-Protestant bodies, chiefly Roman Catholic and Jewish, are almost entirely confined to counties having urban centers or mining camps. (Based on unpublished data from the religious census.)

Southern Baptists there are 64 Southern Methodists, 35 Negro Baptists, 27 members of the Methodist Episcopal Church, and 16 Southern Presbyterians. The wide distribution in the churches of the first two of these denominations is shown in figures 206 and 208.

GEOGRAPHICAL DISTRIBUTION

The churches are distributed very unevenly, as is shown in figure 204. The variations in the spacing of the dots correspond to some extent with variations in density of population. But to this general tendency there are many exceptions. The number of churches per 1,000 inhabitants varies by counties from 1.4 to 7.6. More than half the counties represented in figure 205 have from 3 to 5 churches per 1,000 inhabitants; but 14 counties have fewer than 2 churches, and 14 counties have 6 or more churches, per 1,000 persons. Counties with very low ratios are more prevalent in the Cumberland Plateau than elsewhere, and counties with comparatively high ratios are more numerous in the Central Ridges and in the Blue Ridge Mountains.

The counties shown in figure 210 illustrate several tendencies in the distribution of the churches. Leslie County, Ky., situated in a very isolated and undeveloped district in the Northeastern Cumberland Plateau, has been deeply trenched by many crooked streams, the United States Geological Survey map showing 339 named watercourses, or 9 for each 10 square miles. Along the valleys, close to the streams, are the homes of most of the people. The small county seat is the only village. The roads are rough tracks beside or often in the larger streams. The only graveled highway, which now connects the county seat with the outer world, was not completed till August 1931. The churches are comparatively few, only 28, corresponding to 72.4 per 1,000 square miles and 2.5 per 1,000 inhabitants. These churches are all beside the streams and are usually near the junction of two streams. The early churches of the district were Churches of Christ and antimissionary Baptist Churches. A considerable number of so-called "Christian" churches, now enrolled in the minutes of the Disciples of Christ but markedly conservative in their practices, are scattered through the eastern part of the county. The north-central and northwestern portions formerly had a number of antimissionary Baptist churches, but most of these have been closed. In these portions Presbyterian churches have been introduced by missionary enterprise; and in the southern part of the county, where churches are few, although people are not lacking, 3 Evangelical churches have been planted in a similar way.

To this situation Avery County, N.C., presents a marked contrast. It is in the high mountains and has much bolder contours and simpler and somewhat wider valleys. In these valleys are situated 11 small centers with 2 to 4 churches each, and many other churches are scattered through the outlying districts. Hard-surfaced roads have been built through the principal valleys, so that a large part of the inhabited area is now within a few miles of a good road. Considerable progress has been made in the consolidation of schools, but only one experiment has been made in the consolida-

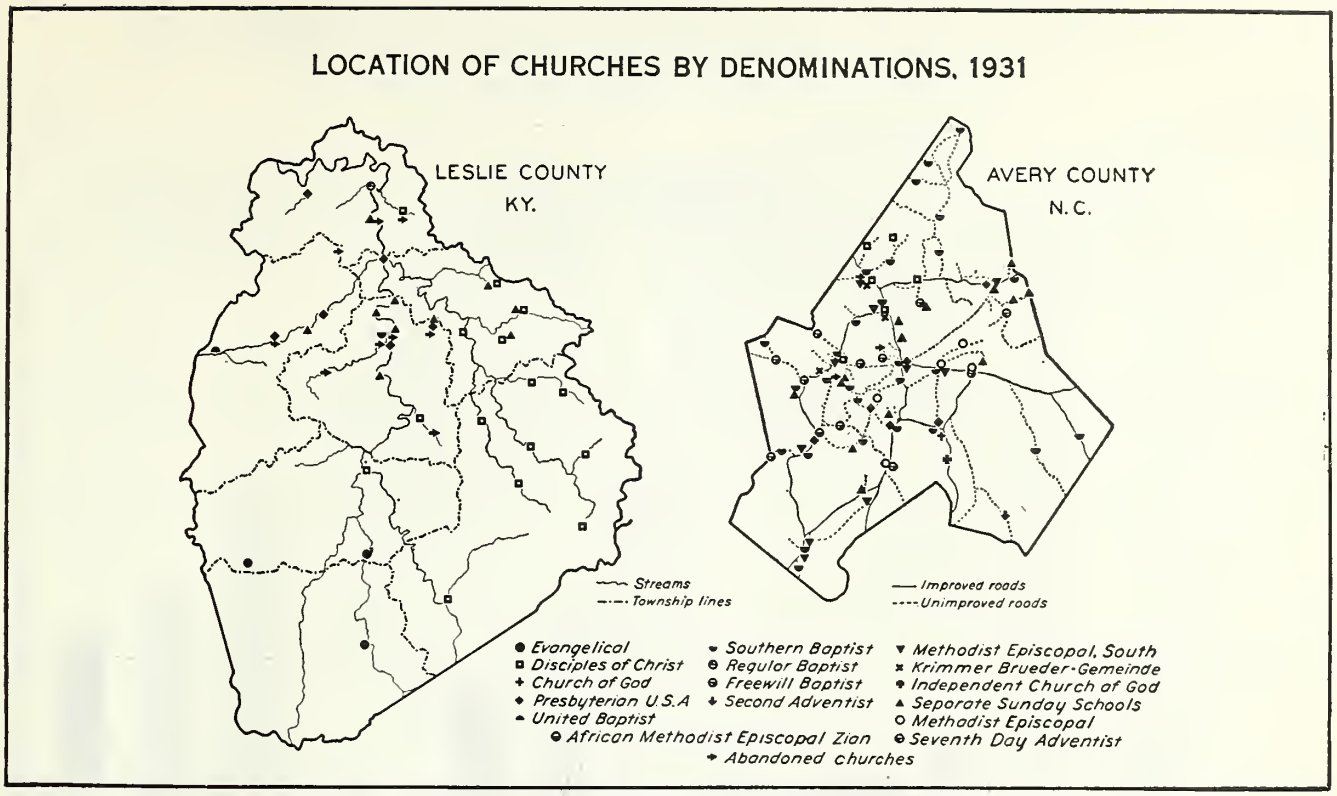

FIGURE 210.—In Leslie County, Ky., where roads lie beside or in the watercourses, the churches stand near the junction of the streams. The southern third of the county, though well populated, has few churches. In Avery County, N.C., a distinctly mountainous district, 11 small centers have 2 to 4 churches each. Churches, and sometimes churches of the same denomination, are close together, even in sections that have paved roads.

tion of churches. On the contrary, at the time of the study a new church had just been built within 3 miles, over a paved road, from another church of the same denomination. This county has 307 churches per 1,000 square miles and 6.2 churches per 1,000 inhabitants.

Moreover, certain country districts have churches very close together. Two small valleys, for example, have Missionary Baptist and Free Will Baptist churches a mile or less apart. In another country district churches of four denominations stand even nearer together. Such cases are to a large extent away from improved roads, but they are not unknown on the highway.

CHARACTERISTICS OF THE CHURCHES

CHURCH BUILDINGS

The usual church building has one room only. It may or may not have cupola or vestibule. In many cases it is propped up on irregular piles of unhewn stones, with an open space beneath. The 1-room building was the kind possessed by about 70 percent of the approximately 1,000 churches in the counties surveyed, and about another 11 percent had no building, but used a schoolhouse or other quarters, so that less than one-fifth of the churches, counting village churches, had a church house of more than one room. For country churches the proportion was less than one-seventh. Figure 211 shows the distribution of churches according to the presence and nature of their buildings separately for churches in large villages, small villages, and hamlets and open country combined.

MINISTERS

Three-fourths of the churches surveyed had ministers living elsewhere who came periodically to preach. The preachers of something more than one-sixth of the churches lived in the same communities as the churches, but each gave part of his time to one or more other churches or to some other occupation. Only 1 church in 50 had a resident minister devoting his whole time to its service, although for towns and rural areas in 21 representative counties in the United States in 1930 (*5, p. 362*), full-time resident ministers served 1 church out of 4, and even in the South, 1 church out of 16. The rest of the churches had no regular minister. The distribution of churches by amount of ministerial service in the counties surveyed is shown in figure 213.

The average yearly remuneration of the ministers—counting what their churches paid them and allowing $200 for a parsonage where this was provided (as in about one-fifth of the cases), and for grants of home-mission aid (as in rather more than one-sixth of the cases)—was $623.83. The ministers of some of the smaller denominations received no pay at all for their services. In addition, about two-fifths of the preachers received less than $500 a year. A little more than one-fourth of them had as much as $1,000, and only one-seventh received $1,500 or more. The distribution of ministers according to remuneration is presented in figure 212.

Five out of eight of the preachers had some other bread-winning occupation, a comparatively high proportion, as figure 214 makes plain. Far more followed farming than any other occupation. Many were labor-

CHURCH BUILDINGS IN HAMLETS AND OPEN COUNTRY AND IN VILLAGES

Percentage of 997 Churches Having no Building, and Having a Given Number of Rooms in Buildings, 17 Highland Counties, 1931

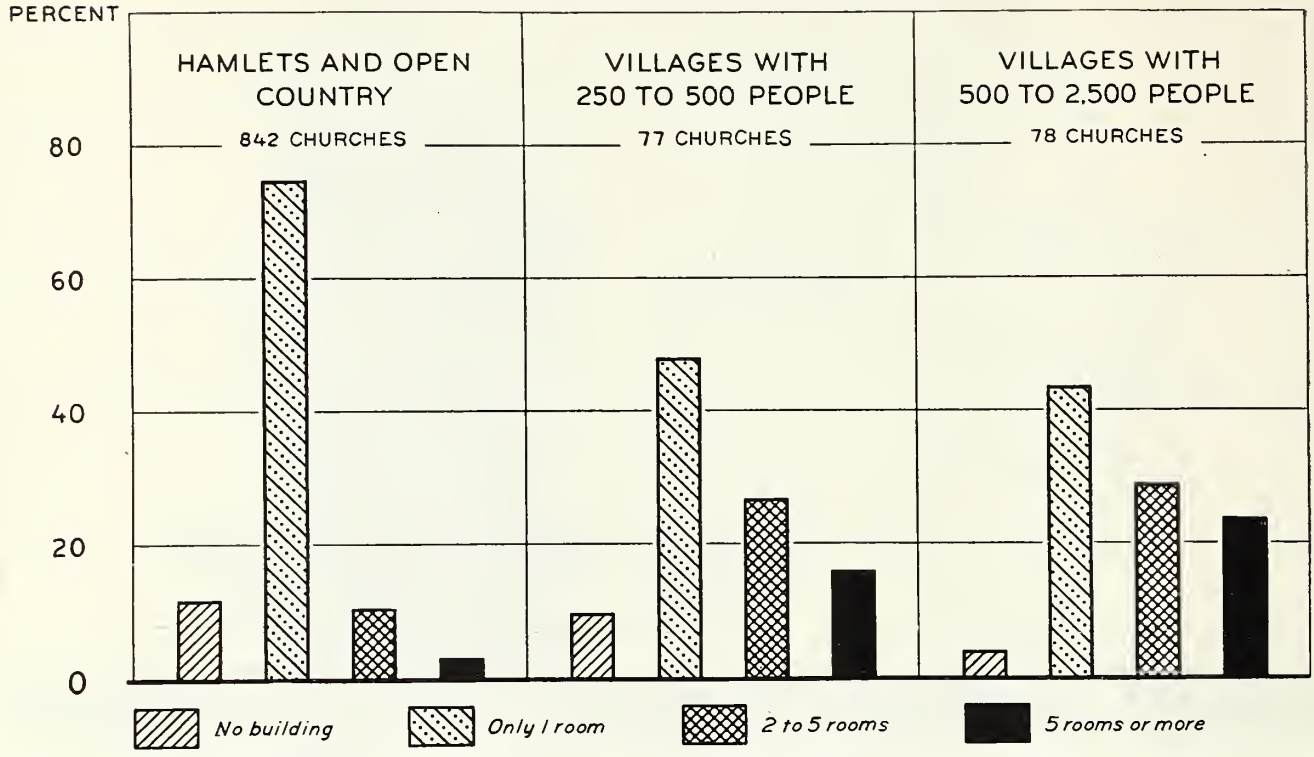

FIGURE 211.—Of the churches situated in the hamlets and open country (about five-sixths of the total number) one-seventh had no building and three-fourths had a building of only one room; so that only about 1 church in 9 had a building of other than the 1-room type. Though the proportion of churches having better buildings was somewhat higher for villages, up-to-date church plants were few throughout the region.

ers or artisans, a few were teachers, and a still smaller number were in some kind of business.

Of those who gave their whole time to the ministry just about half served four churches or more, a proportion between 3 and 4 times as high as the average in 179 nationally representative counties in 1920, the contrast being shown in figure 215.

On the other hand, only about one-fifth of the ministers without other occupations served one church only, less than half the average proportion. The reason for the comparatively large number of churches served by ministers without other occupation will appear in the section on church expenditures.

Most of the ministers are men of little education. Four-fifths of them have attended neither college nor seminary, and less than 1 in 9 are graduates of both college and seminary. This situation presents a strong contrast to that for rural ministers in the United States as a whole, and even to that in 1926 in the Southern States containing the Southern Appalachians, taken as a whole. The data are presented in figure 217. Two preachers out of five had not com-

ANNUAL COMPENSATION OF MINISTERS

Percentage of 376 Ministers in Each Compensation Group, 1930

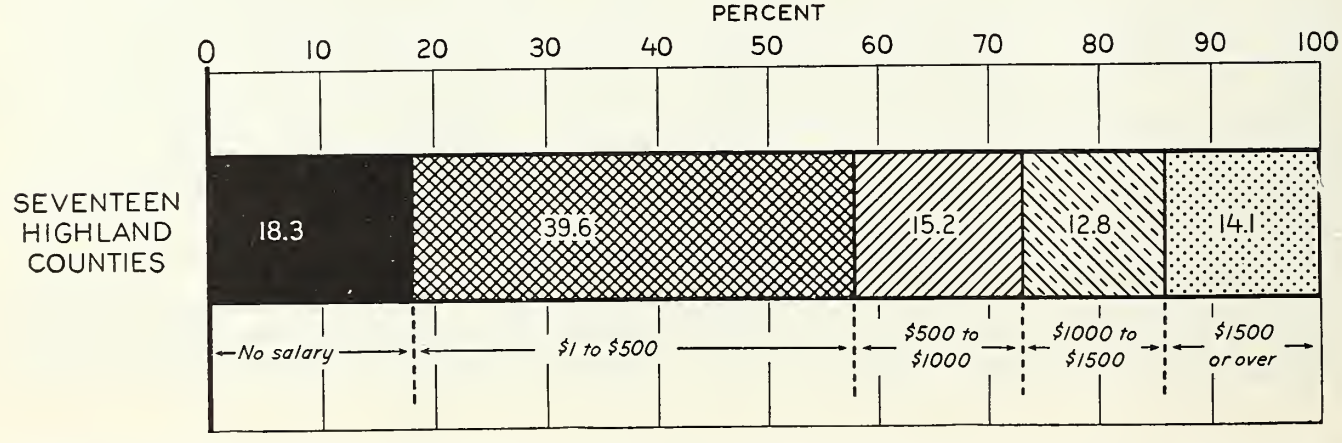

FIGURE 212.—More than 1 in 6 of the ministers preached without pay. In addition, 2 out of 5 received less than $500 a year. Little more than one-fourth had as much as $1,000, and only 1 in 7 were paid as much as $1,500. Home-mission grants, when received, are taken into account, also parsonages, when present, for which $200 is allowed.

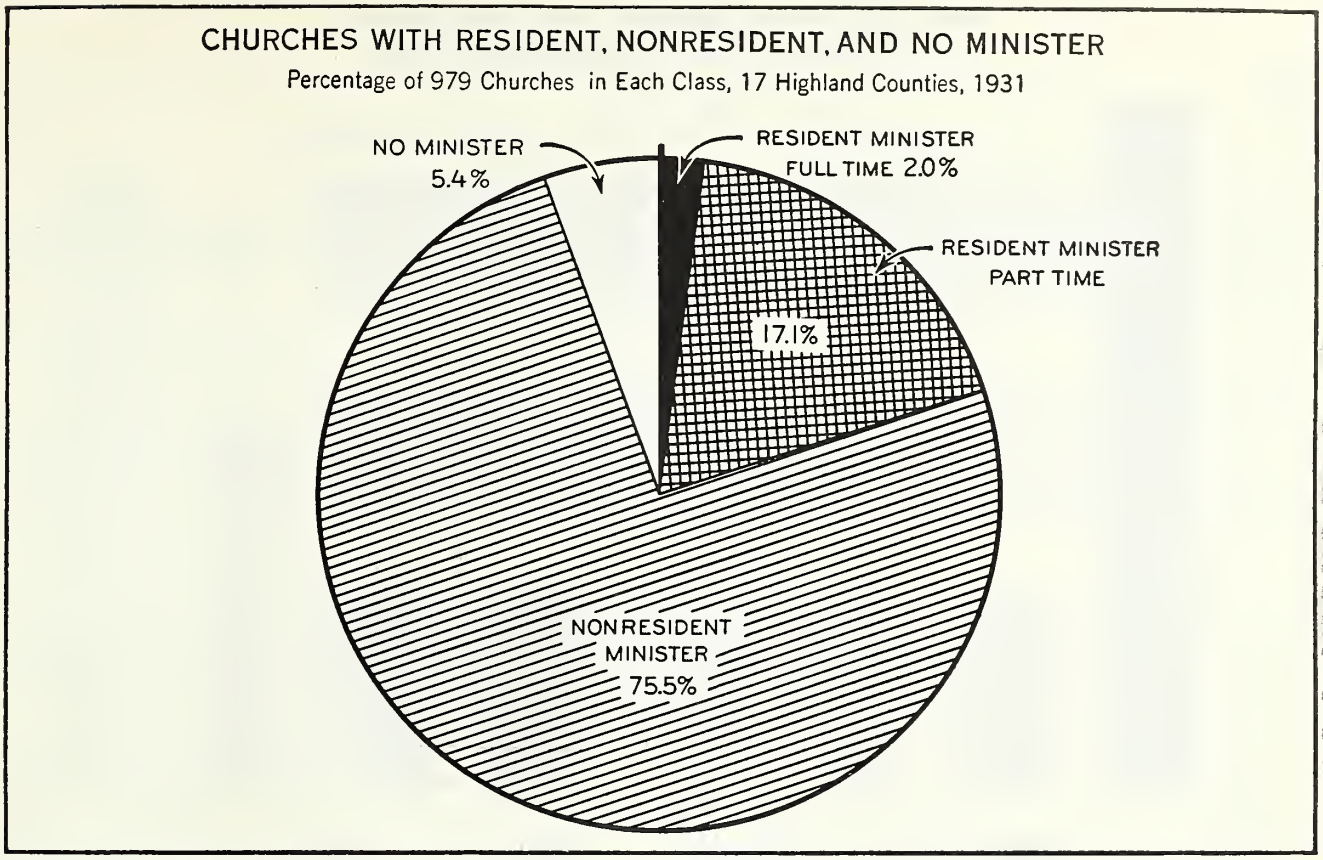

FIGURE 213.—Only 1 church in 50 had a full-time resident minister, whereas the average proportion in 21 representative counties in the United States in 1930 was 1 church in 4 (*5, p. 362*). Three churches in four had nonresident ministers, whereas the general proportion in 21 representative counties in 1930 was about one-half.

pleted elementary school. One in twenty-five had never been to school at all, and several could not even read.

CHURCH MEMBERSHIP

Many of the churches are small, as is natural enough considering the narrowness of the valleys and the presence of competing churches. A full fourth of all the churches in the counties surveyed, counting those in large villages, had fewer than 25 resident members apiece. Three-tenths had 25 to 50 members; about three-tenths had 50 to 100 members; only about one seventh had 100 members or more. The average resident membership of the 993 active churches was only 58. The proportionate distribution by range of membership is shown in figure 216.

Of the total membership, 22.1 percent consisted of persons no longer resident within reach of the church. Many of these nonresident members had moved away years before, and church clerks strongly suspected that some of them were dead. Two-thirds of the resident members belonged to country churches, and an additional tenth to churches in small hamlets; the rest belonged to village churches.

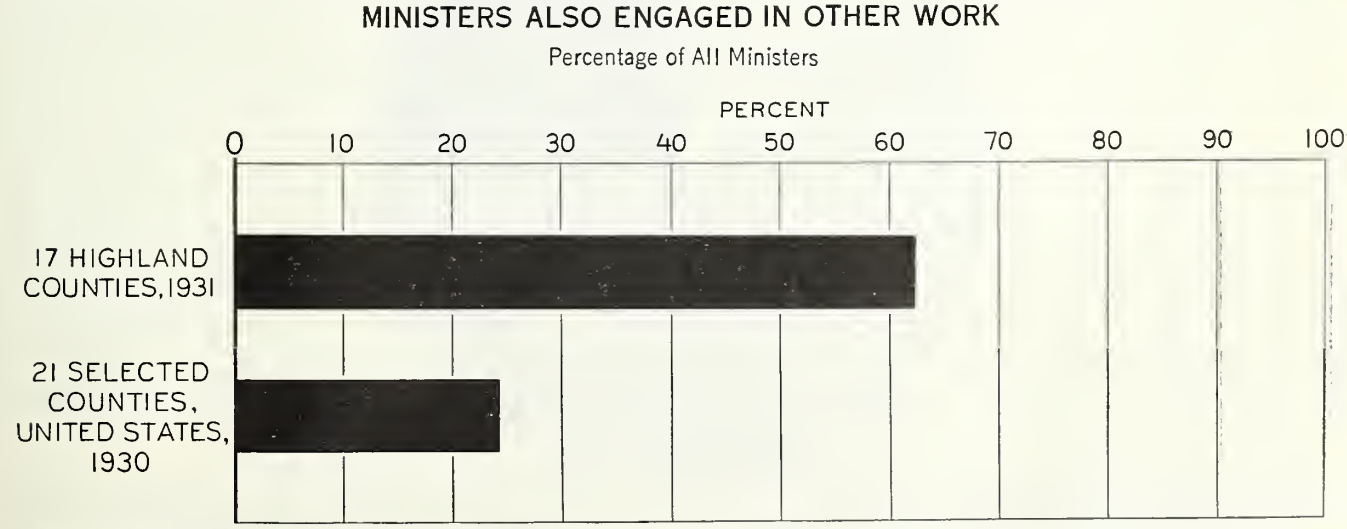

FIGURE 214.—In the Southern Appalachians, 5 preachers out of 8 followed some other occupation in addition to the ministry. The average proportion in 21 selected counties in the United States in 1930 was less than one-fourth. (Based on survey and data from Rural Social Trends by Brunner (*5, p. 364*).)

FIGURE 215.—Of the ministers without other occupation, about one-half served 4 churches or more, though in 179 nationally representative counties in 1920 the proportion was about 1 in 7. Only about 1 in 5 such ministers in the region devoted their whole time to a single church, whereas, in general, 45 percent of the ministers serve 1 church only. (Based on survey and data from the Social Survey in Town and Country Areas *(27, p. 45)*.)

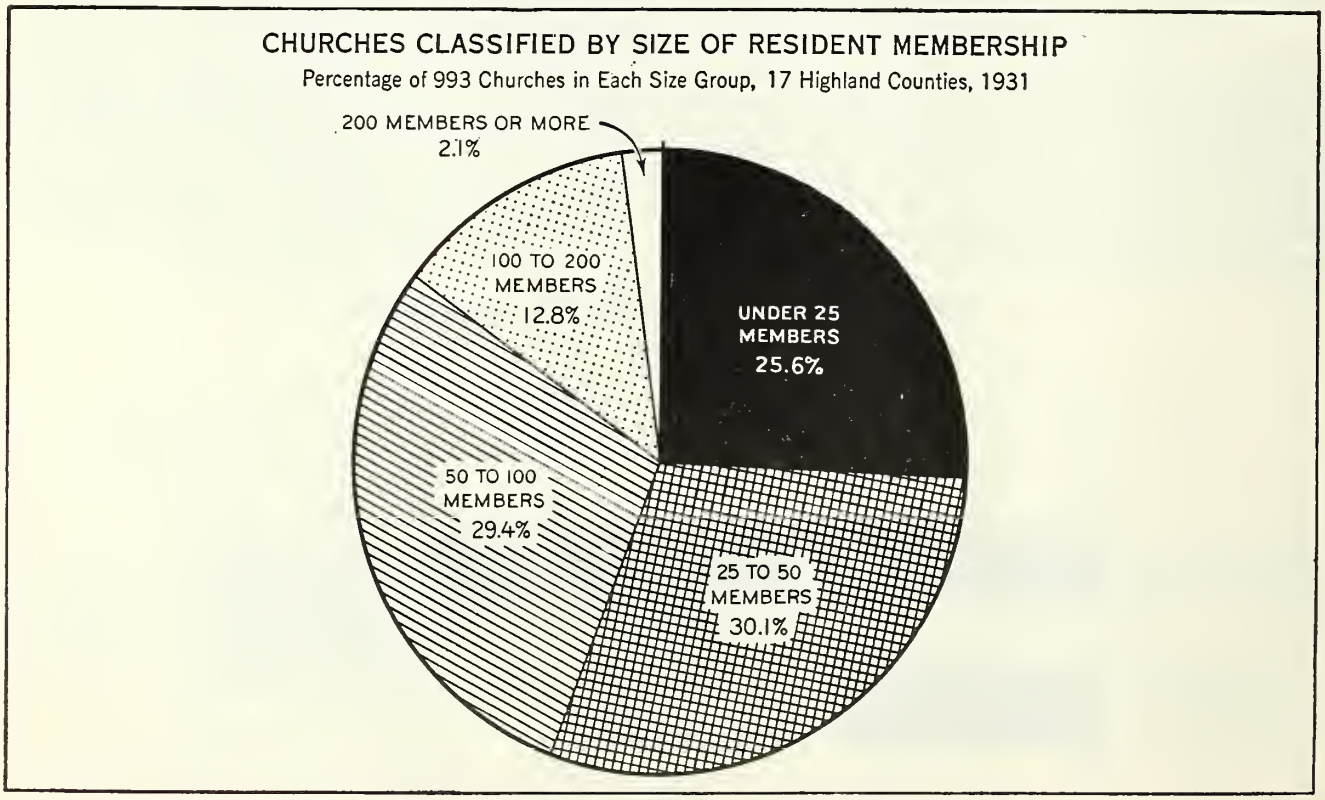

FIGURE 216.—One church in four among those surveyed had fewer than 25 resident members. Three-tenths had 25 to 50 members, and about three-tenths had 50 to 100 members. Only 1 church in 7 had 100 members or more, and only about 1 in 50 had as many as 200 members.

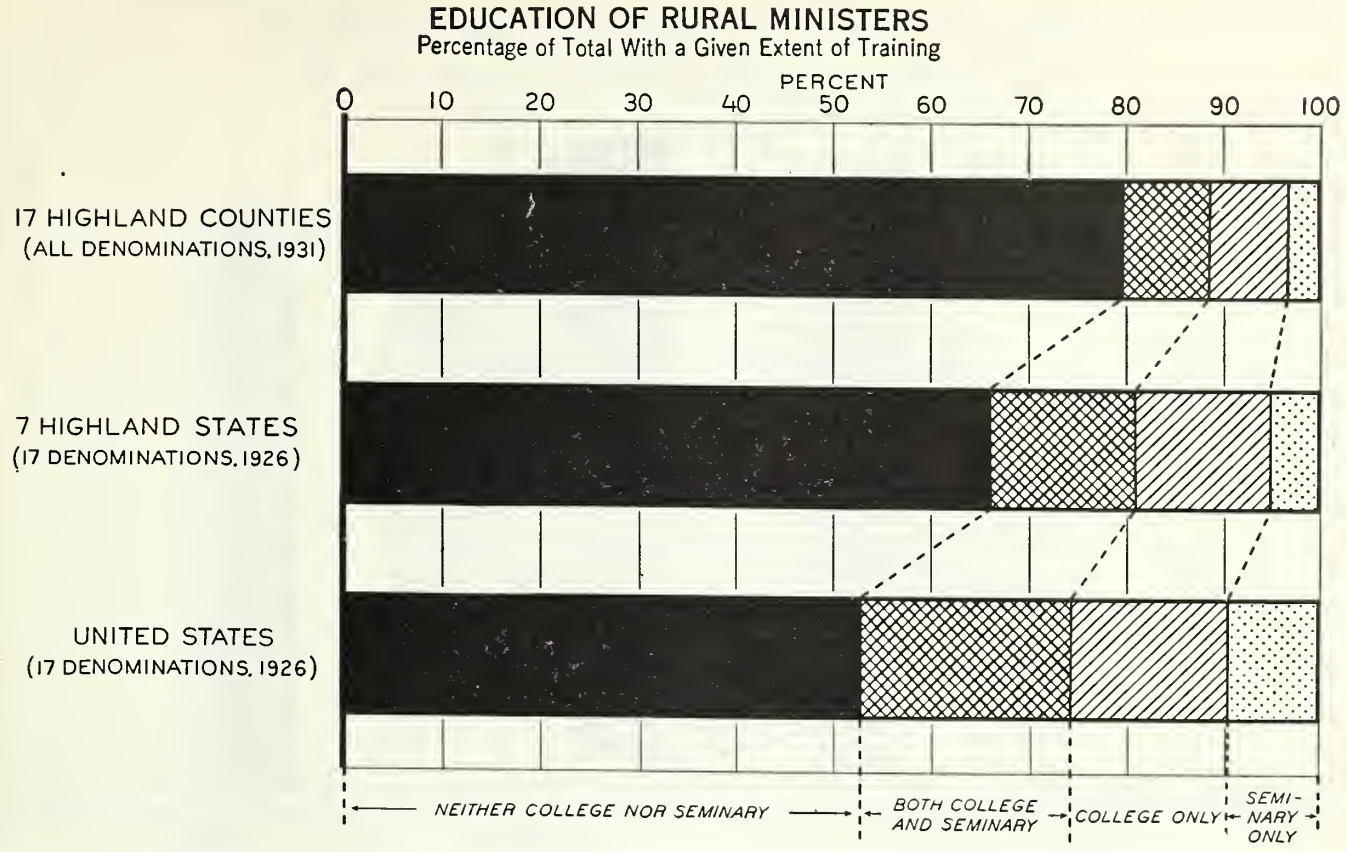

FIGURE 217.—Four ministers out of five have graduated from neither college nor seminary, a proportion much larger than prevails among rural ministers either in the United States as a whole, or in the States of which the region is a part. On the other hand, the proportions that have graduated from college only, from seminary only, and from both these kinds of institutions, are comparatively low among the preachers in the region, particularly among preachers in the more mountainous parts. (Based on survey and data from The United States Looks at its Churches by Fry. (*15, p. 148*).)

CHURCH EXPENDITURES

The members of these churches made a per capita contribution to them of only $4.80 a year, hardly more than one-fourth of the general average for 25 selected counties, forming representative areas in the United States in 1920 (*27, p. 80*). The average annual expenditure per church was correspondingly low, being for the 17 counties only $280.37, or less than one-fourth the general average in 1920. As figure 218 shows, less than 1 church in 8 expended annually as much as $500, and less than 1 in 20 expended as much as $1,000.

Toward the salary of the preacher the average church contributed only $154.21; to other local expenditures, $83.54; and to missions and benevolences, $42.62. The proportion of the total expenditure applied to benevolences was only 15.2 percent, just half the average proportion of 30.4 percent for representative areas in the United States (*27, p. 81*), although the South, in general, spends a greater percentage of its total expenditures for churches on benevolence than do churches in general. The small contributions to missions show the effect not merely of the general poverty of the mountains, but of the prevalence and influence of antimissionary sects, which teach that every individual is predestined to salvation or to punishment and that therefore missionary efforts are foolish or even blasphemous.

PREACHING SERVICES

Very few churches have services every Sunday, and such churches are largely confined to the villages. In the counties surveyed this was the practice of only 1 church in 13. The commonest arrangement, in effect for 5 churches out of 8, is to have preaching once a month. Less than a quarter of the churches had services on 2 Sundays of each month; a very few churches, on 3 Sundays a month; and some had preaching irregularly (fig. 219).

The protracted meeting, during which preaching services are held twice a day for a week or 10 days or even longer, is also an inheritance from the past, having its origin in the camp meeting, the first of which was held in Kentucky not far outside the mountains in the year 1800. Almost all the churches in the counties surveyed, except those belonging to antimissionary sects, held protracted meetings; and the average attendance at these greatly exceeded the average number present at the regular preaching services.

SUBSIDIARY ORGANIZATIONS

Next to preaching services, the most important activity of the churches consists of holding Sunday schools; over large parts of the region these are considered among the essentials of existence. In the counties surveyed in North Carolina and Tennessee, and to some extent in other States, Sunday schools were held not only in church buildings but in the schoolhouses of many small isolated neighborhoods. In the 17 counties, 786 Sunday schools were held in connection with churches, and 122 separate from churches. As figure 220 shows, the proportion of churches having Sunday schools is not much lower than the general average.

Sunday schools are few only in the Northeastern Cumberland Plateau, where primitive churches are comparatively strong.

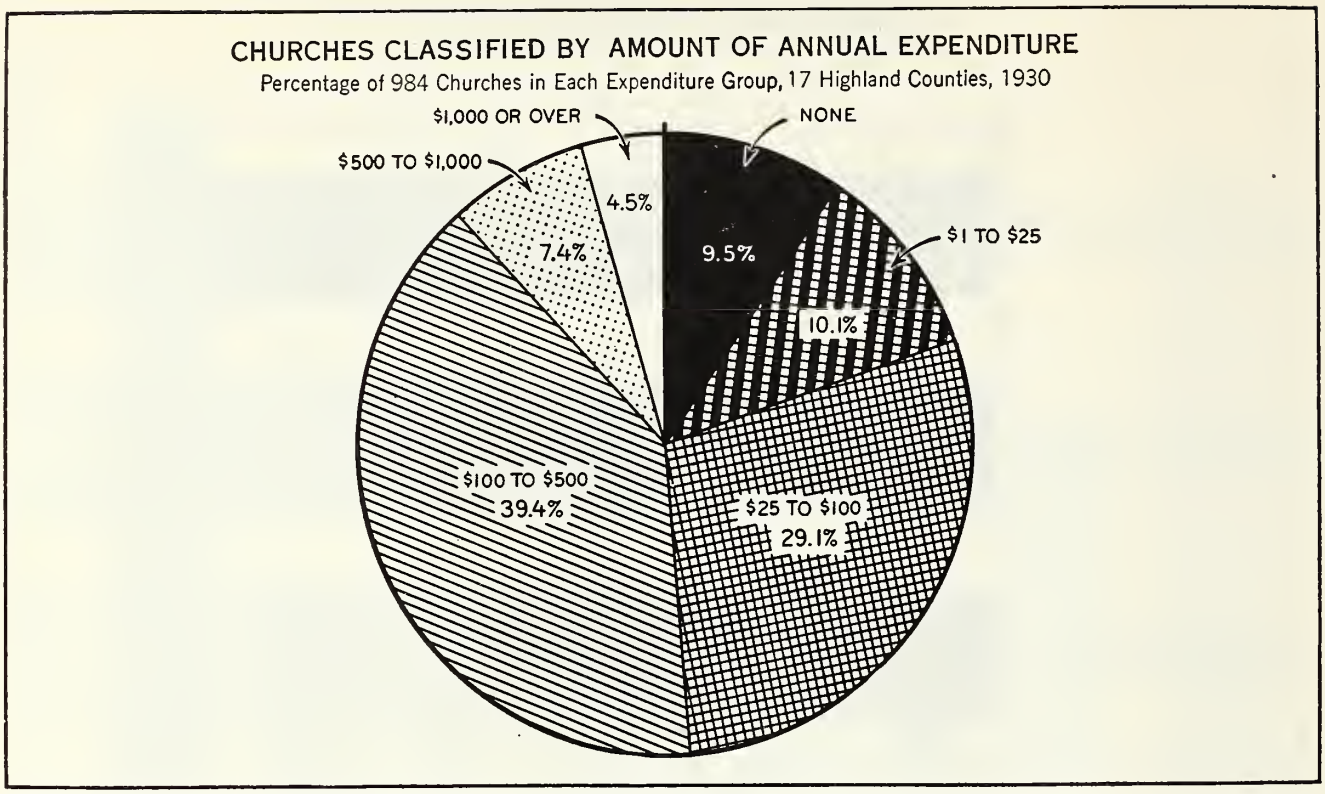

FIGURE 218.—Less than 5 percent of the churches surveyed expended as much as $1,000 a year. Seven percent spent between $500 and $1,000; 39 percent, hetween $100 and $500; and nearly half, 49 percent, expended less than $100. Of the last group, nearly 10 percent had no expenditure whatever.

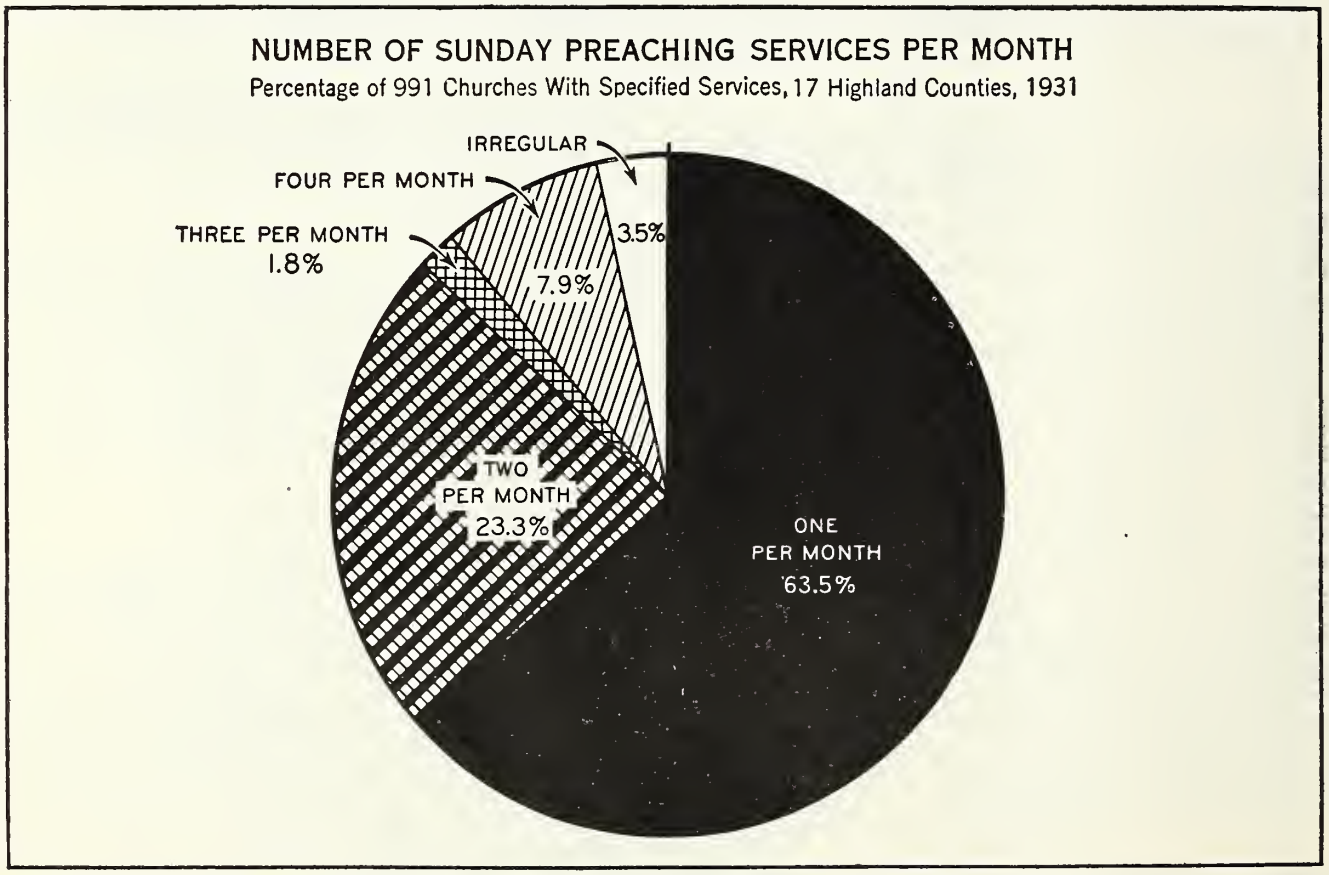

FIGURE 219.—Preaching on only 1 Sunday in the month was the rule for 64 percent of the churches surveyed. Those having preaching on 2, or, far less frequently, 3 Sundays formed 25 percent of the total. Only 8 percent had services every Sunday, a large proportion of them being in villages. Roughly 4 percent of the churches had services irregularly.

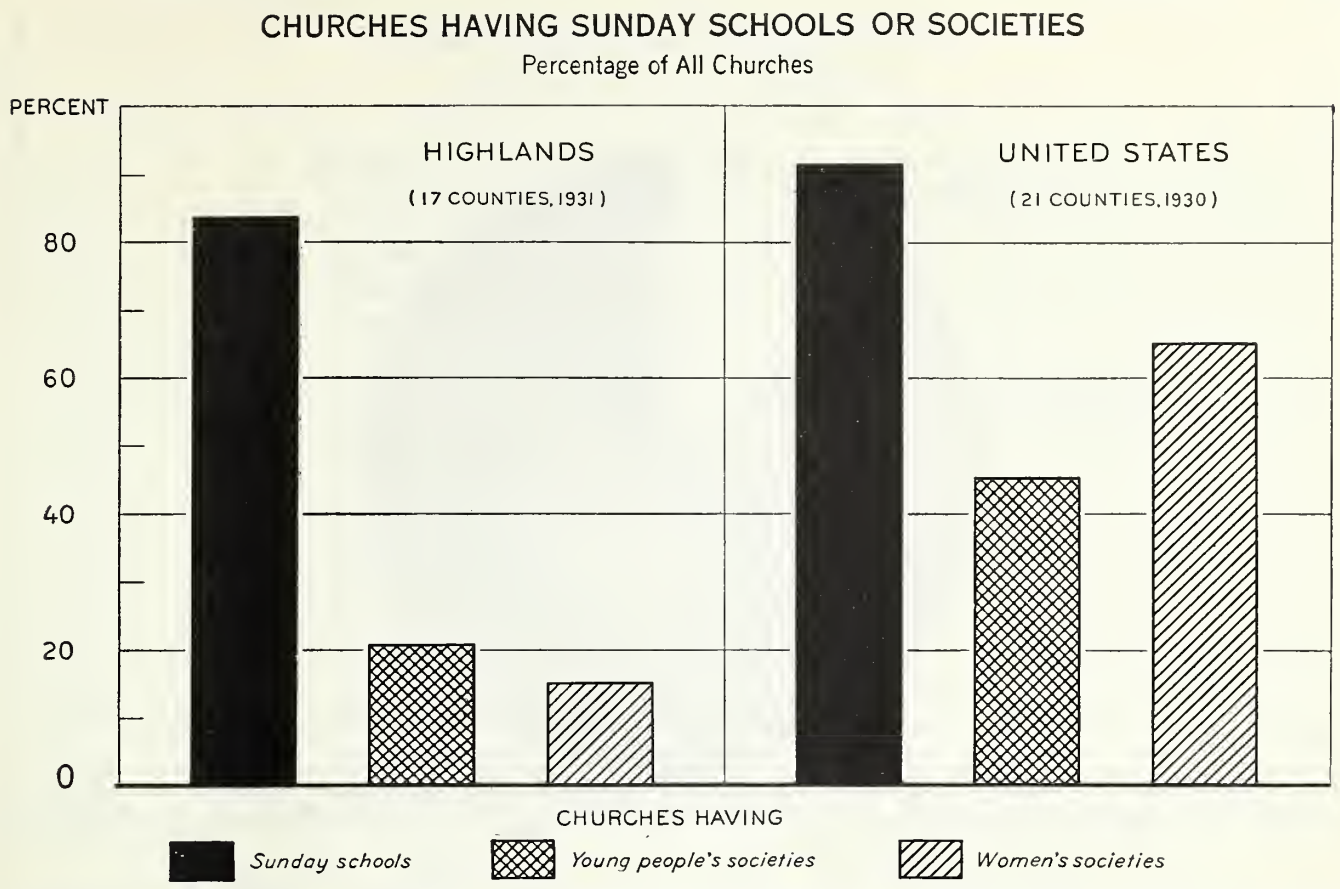

FIGURE 220.—The proportion of the churches in the region that have Sunday schools is not far below the average in 21 nationally representative counties. The proportion having young people's societies, however, is less than half the average; and the proportion with woman's societies is not much more than one-fourth the average. In the Southern Appalachians more churches have young people's societies than have woman's societies; in general, it is just the other way. (Based on survey and published and unpublished data in study of Rural Social Trends, by Brunner (*5*).)

Whole families go to Sunday school. In the counties surveyed, two-fifths of the Sunday-school enrollment consisted of persons over the limit of school age for the State in question, and one-eighth consisted of beginners under school age.

Where predestinarian antimissionary churches predominate, Sunday schools are classed with missions as futile and almost impious devices. Such Sunday schools as were present in districts of this kind in the counties surveyed were conducted for the most part by home-missionary workers. One church in six had no Sunday school.

Far less common than Sunday schools in the region are the other kinds of subsidiary church organizations (fig. 221). Less than one-sixth of the churches had a woman's society; and only 1 church in 142 had both ladies' aid and women's missionary society. Little more than 1 church in 5 had a young people's society; only 1 church in 9 had a society for children; only 1 in 332 had a brotherhood; and only 1 in 16 an organization of any other type. From figure 220 it is clear that the proportion of churches having societies for young people and especially for women is much below that of representative counties in the United States. The explanation for the small number of societies lies largely in the retarded development of the isolated churches of the more mountainous parts of the region and in a public sentiment influenced by antimissionary views.

EFFECTIVENESS OF CHURCHES

Although the significance of the churches in the life of the people cannot adequately be measured statistically, the ratio of church membership to population affords a test of the comparative effectiveness of the churches in enlisting the people in their membership. For rural territory in the United States as a whole, according to figures based on data of the Census of Religious Bodies, the ratio in 1926 of reported church membership, including nonresident members, to population was 47.8 percent (*20*); for 171 strictly mountain counties in the region it was only 36.7 percent. The ratios varied greatly among the counties, ranging from 7.1 to 68.2 percent. Less than one-fourth of the counties had ratios of 45 percent or over, thus approaching or exceeding the national average. Rather more than a fourth had ratios under 30 percent, and 12 of these had ratios of less than 15 percent. Study of figure 222 shows that the counties with lowest ratios are in or near the Cumberland Plateau, and that most of the counties with ratios near or above the national average are found in the Appalachian Valleys and Ridges and in the eastern and southern border counties.[43]

[43] Statements in this paragraph relate to 236 counties, including besides those considered elsewhere, a number in Maryland and Alabama.

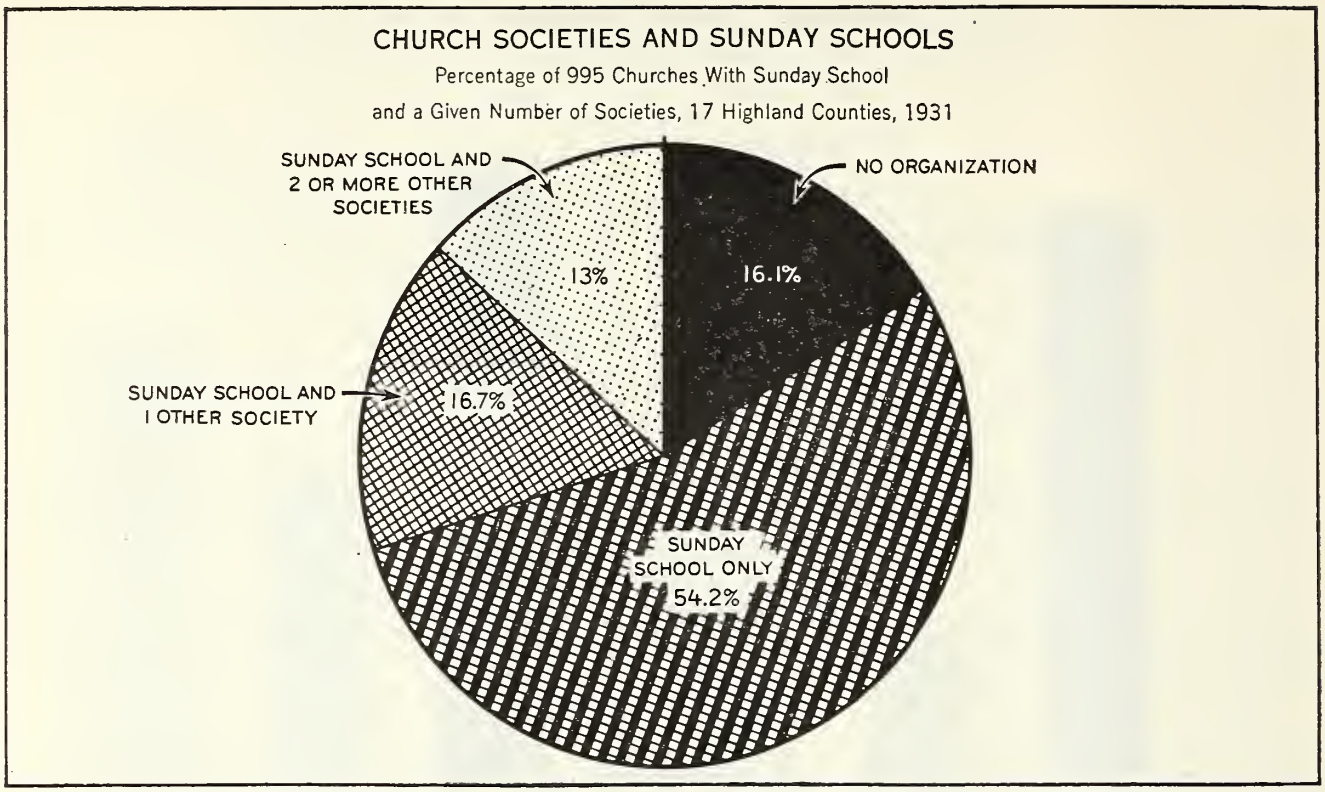

FIGURE 221.—Churches of antimissionary denominations, and weak churches of other bodies which have neither Sunday school nor any other kind of subsidiary organizations, form 16 percent of the total. Churches with Sunday school but no other organization constitute 54 percent; churches with Sunday school and 1 other society, 17 percent; and churches with Sunday school and 2 or more others, 13 percent.

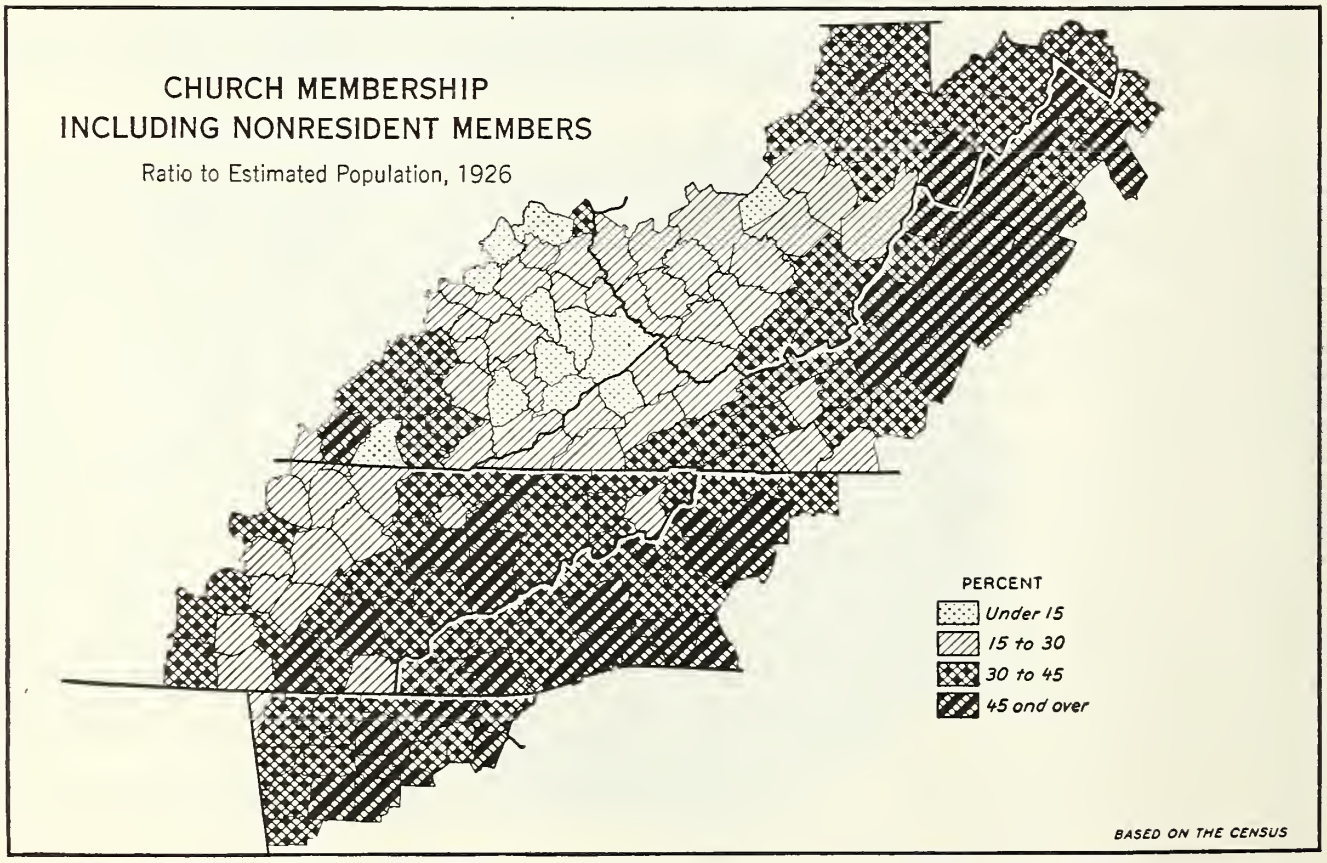

FIGURE 222.—Most counties with ratios of church membership to population ranging below 15 percent are situated in the Cumberland Plateau. Counties with ratios of 15 to 30 percent are almost all west of the Appalachian Valleys. Counties with ratios of 45 percent or over are found almost exclusively in the Appalachian Valleys and Ridges and along the fringe forming the Piedmont Plateau.

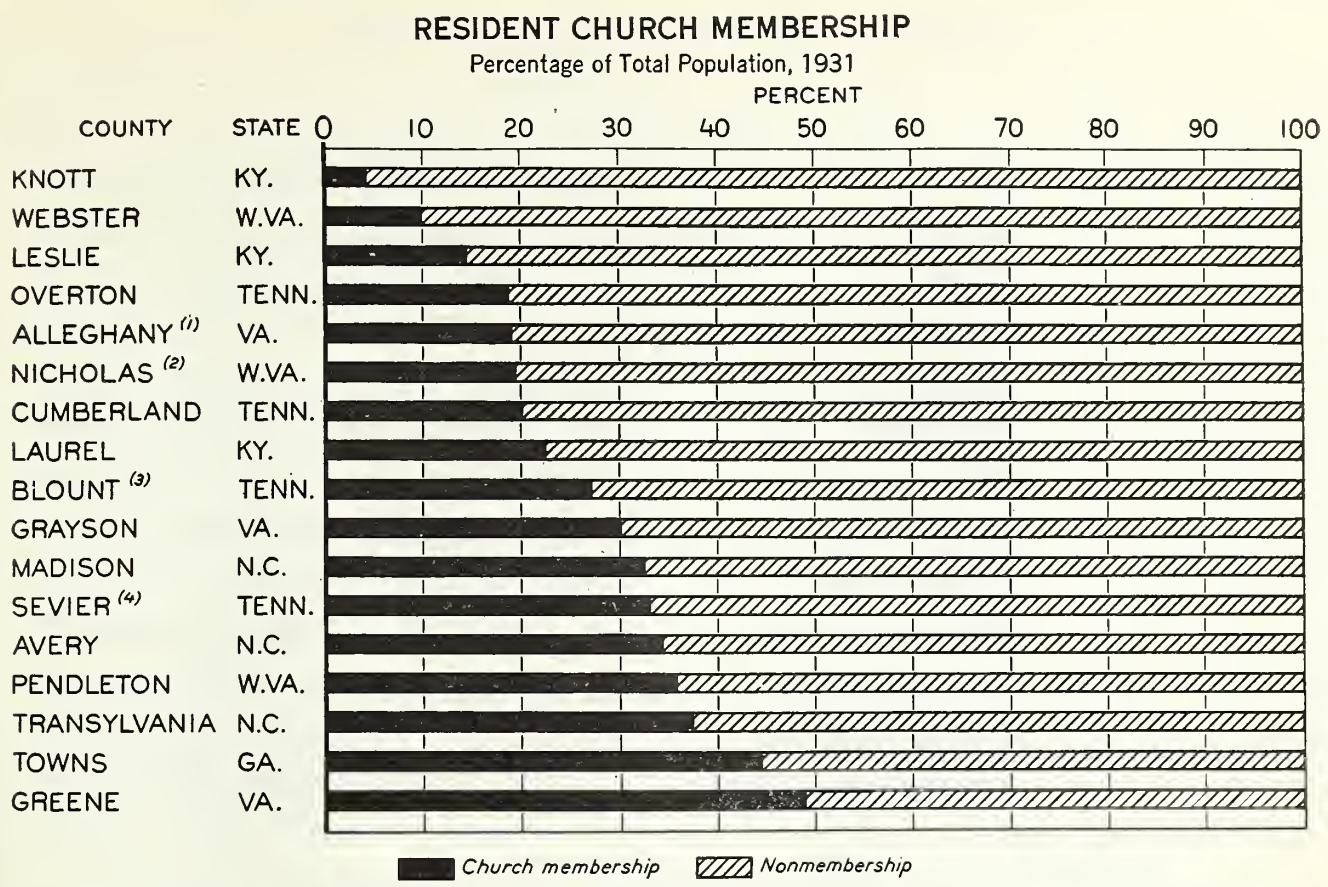

FIGURE 223.—In only 2 of the 17 counties surveyed were 2 out of 5 inhabitants members of the churches. In 6 counties the proportion was less than 1 in 5. The proportions of the people that were church members showed great variation, ranging from less than 5 percent to 49 percent.

For the counties surveyed (fig. 203), the ratios based on data from the religious census fell below the national average in 1926 in all but four instances. For these 17 counties resident church membership was obtained in the survey in 1931, and the proportion of the population enrolled in the churches was calculated. The proportions by counties show great variation; but a considerable majority of them are low (fig. 223).

Figure 224 shows for each of the same counties the ratio of average attendance at Sunday school to population. Attendance at Sunday school is used rather than attendance at preaching services, because Sunday school is the only weekly religious service for a large majority of the communities. In only 1 county was the ratio as high as one-third; and in 6 of the counties it was less than one-fifth. Since attendance is by whole families, a large proportion of the families are outside the influence of Sunday school, even in areas where this institution is highly esteemed.

The results of a third test of the effectiveness of the churches, the proportion of children of school age enrolled in Sunday schools, are presented in figure 225. In only 5 of the 13 counties for which figures were available [44] were as many as half of the school population in Sunday school; in 6 counties the proportion was below two-fifths. Even in the county with the highest proportion, 3 out of 10 children of school age were outside of the Sunday schools.

[44] Since the remaining four counties were not completely surveyed, they could not be included in this particular inquiry.

The results of the three tests show considerable agreement. The 6 counties ranking lowest in each of the tests are all among 9 counties; and the 6 counties ranking highest in each of the tests are all among 8 counties.

CHANGES IN CHURCH MEMBERSHIP, 1906–31

Between 1906 and 1926 church membership increased almost twice as fast as the population, gaining 68.1 percent while the population rose 39.4 percent. The relative strength in membership of the groups of denominations changed somewhat. The Baptist denominations made a relative gain of two points; the Methodist, Presbyterian, and "Christian" bodies each experienced a relative loss. The other Protestant bodies combined, increased somewhat in relative strength, as did the non-Protestant bodies.

The ratio of church membership to population for the 171 mountain counties taken as a whole rose from 30.4 percent in 1906 to 32.9 percent in 1916, and to 36.7 percent in 1926, the trend corresponding to a gradual rise in the national ratio. For separate counties the ratios for 1926, compared with those for 1906, were higher by one-tenth or more in 7 counties out of 10. They failed to change as much as one-tenth in nearly one-fourth of the counties, and dropped one-tenth or more in about 1 county in 20.

Whether proportionate gains in enlistment can be maintained is uncertain, for the facts presented in this section show that the churches, set in the midst of rapidly changing conditions, are doing almost nothing to adapt themselves to their altered environment.

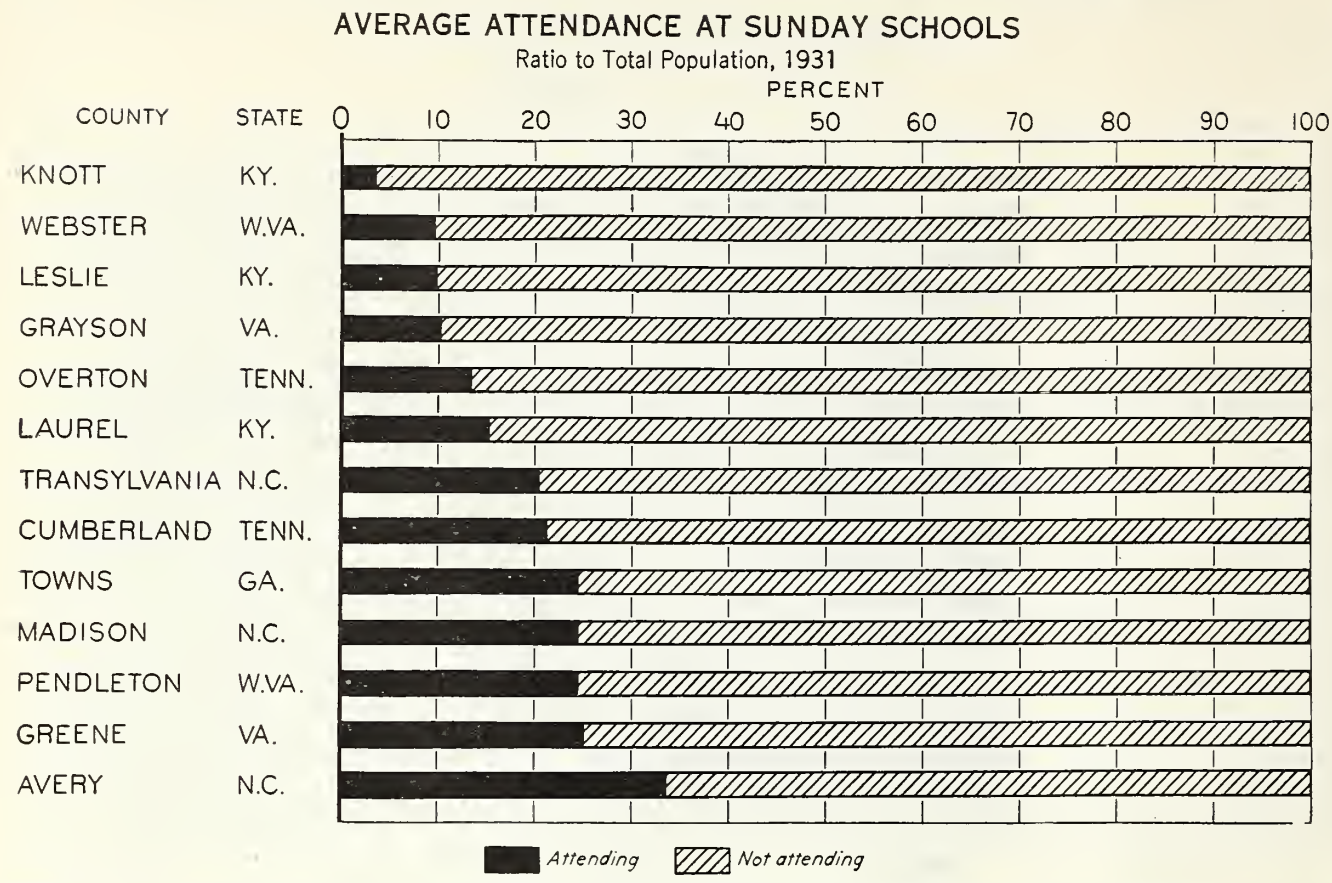

FIGURE 224.—The average attendance at Sunday school, the only weekly religious service for most localities, was less than one-third of the total population in all but 1 of the 17 counties surveyed. In half a dozen counties the average attendance at Sunday school was less than one-sixth of the population.

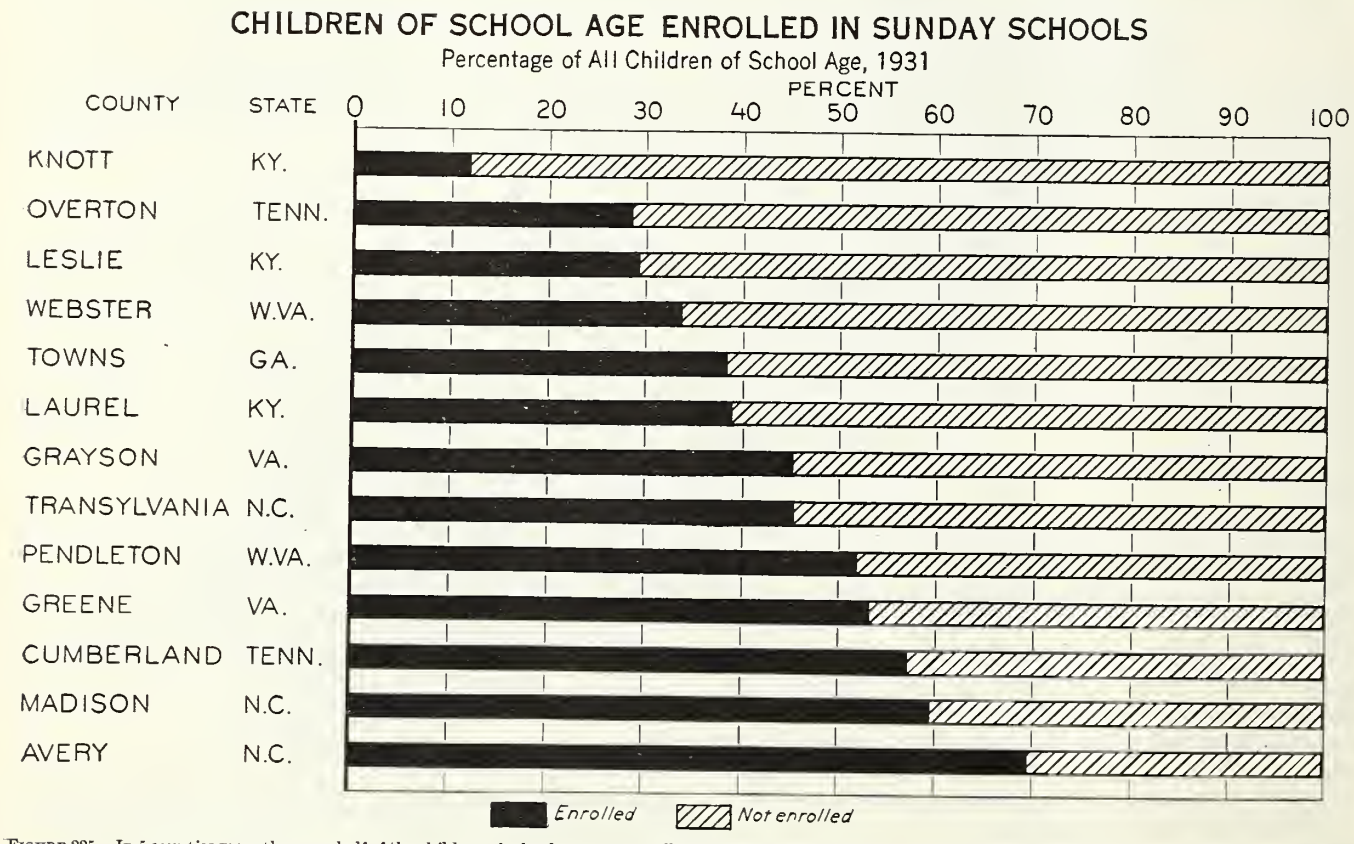

FIGURE 225.—In 5 counties more than one-half of the children of school age were enrolled in Sunday schools; but in 6 counties this was true of fewer than 2 in 5. The highest proportion was about seven-tenths; and the lowest, which was that of a county where antimissionary Baptist churches predominated, was 12 percent.

LITERATURE CITED

(1) Allred, C. E., and Fitch, J. C.
1928. effects of industrial developments on rural life in sullivan county, tennessee. Tenn. Univ., Rec. Ext. Ser. v. 5, no. 3, 45 p.

(2) American Medical Association.
1931. american medical directory for 1931. Ed. 12, 2,425 p. Chicago.

(3) Barton, L. M.
1929. a study of all american markets, including all cities and towns of 1,000 population or more in the united states, arranged by markets and states. 640 pp., illus. Chicago.

(4) Brown, D. M .
1927. educational, economic, and community survey, bledsoe county, tennessee. Tenn. Univ. Rec. Ext. Ser. v. 4, no. 2, 39 pp.

(5) Brunner, E. De S., and Kolb, J. H.
1933. rural social trends. 386 pp., illus. New York and London.

(6) Campbell, J. C.
1921. the southern highlander and his homeland. 405 pp., illus. New York.

(7) Clayton, C. F., and Nicholls, W. D.
1932. land utilization in laurel county, ky. U.S. Dept. Agr. Tech. Bull. 289, 100 pp., illus.

(8) Combs, J. H.
1913. the kentucky highlanders. 44 pp. Lexington, Ky.

(9) Committee on the Cost of Medical Care.
1933. medical care for the american people. Committee on the Cost of Medical Care Pub. 28, 213 pp. Chicago.

(10) Cornell, F. D., Jr.
1926. farm water supply and sewage disposal in west virginia. W.Va. Agr. Expt. Sta. Bull. 206, 27 pp., illus.

(11) Estabrook, A. H.
1928. is there a mountain problem? Berea College Berea, Ky. Mountain Life and Work. v. 4, no. 2, pp. 5–13, 35–36.

(12) Engel, E.
1895. die lebenskosten belgischer arbeiter—familien früher und jetzt. Bull. Inst. Internatl. Statis. 9: 42.

(13) Frost, N.
1915. a statistical study of the public schools of the southern appalachian mountains. U.S. Bur. Ed. Bull. 1915, no. 11 (whole no. 636), 71 pp., illus.

(14) Frothingham, E. H.
1931. timber growing and logging practice in the southern appalachian region. U.S. Dept. Agr. Tech. Bull. 250; 93 pp., illus.

(15) Fry, C. L.
1930. the u.s. looks at its churches. 183 p., illus. New York.

(16) Furman, L.
1923. quare women, a story of the kentucky mountains. 219 pp., illus. Boston.

(17) Gannett, H.
1905. the origin of certain place names in the united states. (Second edition.) U.S. Geol. Survey Bull. 258, 334 pp.

(18) Garnett, W. E., and Seymour, A. C.
1932. membership relations in community organizations. a study of factors affecting organized attitudes. Va. Agr. Expt. Sta. Bull. 287; 63 pp., illus.

(19) Hatcher, O. L., ed.
1930. a mountain school; a study made by the southern women's educational alliance and konnarock training school. 248 pp., illus. Richmond.

(20) Hooker, E. R.
1931. hinterlands of the church. 314 pp., illus. New York.

(21) ———
1933. religion in the highlands. 319 pp. New York.

(22) Jones, E.
1924. principles of railroad transportation. 607 pp. New York.

(23) Kephart, H.
1929. our southern highlanders; a narrative of adventure in the southern appalachians and a study of life among the mountaineers. New and enl. ed., 469 pp., illus. New York.

(24) Kincer, J. B.
1922. precipitation and humidity. part ii, climate; sec. a, U. S. Dept. Agr., Atlas of American Agriculture, Advance Sheets, no. 5, 48 pp.

(25) Kirkpatrick, E. L., McNall, P. E., and Cowles, M. L.
1933. farm family living in wisconsin. Wis. Agr. Expt. Sta. Research Bull. 114, 46 pp., illus.

(26) Lee, R. I., and Jones, L. W.
1933. the fundamentals of good medical care. Committee on Costs of Medical Care Pub. 22, 302 pp. Chicago.

(27) Morse, H. N.
1924. the social survey in town and country areas; 134 pp., illus. New York.

(28) National Commission on Law Observance and Enforcement.
1931. report on criminal statistics, no. 3. april 1, 1931. 205 pp. Washington, [D.C.]

(29) Nesbitt, F.
1929. the chicago standard budget for dependent families. . . Chicago Council of Social Agencies Bull. 5, 3d rev. ed., 52 pp. Chicago.

(30) Nicholls, W. D., and Hawthorne, H. W.
1930. farm management and incomes of farm families in laurel county, kentucky. Ky. Agr. Expt. Sta. Bull. 305, pp. [223]–283, illus.

(31) Oyler, M.
1930. cost of living and population trends in laurel county, kentucky. Ky. Agr. Expt. Sta. Bull. 301, pp. [69]–90, illus.

(32) Peck, M., Frank, B., and Eke, P. A.
1932. economic utilization of marginal lands in nicholas and webster counties, w.va. U.S. Dept. Agr. Teach. Bull. 303, 64 pp., illus.

(33) Peters, J. S., and Stinespring, W. F.
1924. an economic and social survey of rockingham county. Va. Univ. Rec. Ext. Series V. 9, no. 1, 131 pp., illus.

(34) Polk, R. L. and Company.
1928. polk's dental register and directory. Ed. 14, 1195 pp. Chicago.

(35) Poole, E.
1932. nurses on horseback. 168 pp., illus. New York.

(36) Raine, J. W.
1924. the land of saddle-bags; a study of the mountain people of appalachia. 260 pp., illus. New York.

(37) Rand McNally & Company.
1880–1931. commercial atlas of america. 1880. 1900, 1930, 1931 editions. Chicago.

(38) Roberts, L. J.
1922. the nutrition and care of children in a mountain county of kentucky. U.S. Dept. Labor, Children's Bur. Pub. 110, 41 pp., illus.

(39) Ross, M. H.
1933. machine age in the hills. 248 pp., illus. New York.

(40) Sherman, H. C.
1932. chemistry of food and nutrition. Ed. 4, Rewritten and enl., 614 pp. New York.

(41) Southern Historical Publication Society.
1909. the south in the building of a nation. 12 v. Richmond.

(42) Stevens, G. R.
1930. an economic and social survey of roanoke county. Va. Univ. Rec. Ext. Series v. 15, no. 1; 130 pp., illus.

(43) Stiebling, H. K., and Ward, M. M.
1933. diets at four levels of nutritive content and cost. United States. Dept. Agr. Circ. 296, 59 pp., illus.

(44) Taylor, C. C., and Zimmerman, C. C.
1923. economic and social conditions of north carolina farmers. based on a survey of 1,000 north carolina farmers in three typical counties of the state. N.C. Dept. Agr. Tenancy Comm. 87 pp. [n.p.]
(45) Thomas, W. R.
1926. life among the hills and mountains of kentucky. 414 pp., illus. Louisville, Ky.
(46) United States Department of Agriculture.
1926–33. agriculture yearbooks. 1925–33.
(47) ——— Forest Service.
1933. a national plan for american forestry. Letter from the Secretary of Agriculture transmitting the report of the Forest Service . . . on the forest problem of the United States. [U.S.], Cong. 73, 1st sess. Senate Doc. 12, 2 v., illus.
(48) ——— Weather Bureau.
1914–30. monthly and summary reports of the climatological data for the united states. U.S. Dept. Agr., Weather Bur.
(49) ——— Weather Bureau.
1926. summaries of climatological data by sections. U.S. Dept. Agr., Weather Bur. Bull. W., ed. 2 v. 3, secs. 69–106.
(50) United States Department of Commerce, Bureau of the Census.
1900–30. [decennial census reports.] U.S. Bur. of the Census, 12th–15th Census.
(51) ———
1923. prisoners, 1923. U.S. Bur. of the Census. 363 pp. Washington, [D.C.].
(52) ———
1930. religious bodies: 1926. 2 v. Washington, [D. C.]
(53) ———
1932. mortality statistics: 1929. Ann. Rept. 30 531 pp., illus.
(54) ——— Bureau of Foreign and Domestic Commerce
1929. market data handbook of united states. U.S. Dept. Com., Bur. Foreign and Dom. Com. Ser. 30, 534 pp.
(55) ——— Bureau of Mines.
1900–30. mineral resources of the united states. [Issued in two parts each year.]
(56) United States Treasury Department, Public Health Service.
1920–33. annual reports of the surgeon general of the public health service of the united states.
(57) ———
1920–33. public health reports. v. 35–48.
(58) Vance, R. B.
1932. human geography of the south; a study in regional resources and human adequacy. 596 pp., ills. Chapel Hill, N.C.
(59) Wait, C. E.
1909. dietary studies of families living in the mountain region of eastern tennessee. U.S. Dept. Agr., Off. Expt. Stas. Bull. 221; 21–116, illus.
(60) White, H. C.
1909. dietary studies in georgia. U.S. Dept. Agr., Off. Expt. Stas. Bull. 221: 117–136.
(61) Willeford, M. B.
1932. income and health in remote rural areas; a study of 400 families in leslie county, kentucky. (Thesis (Ph.D.) Columbia Univ.) new york.

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TOPOGRAPHY

THE SOUTHERN APPALACHIANS

Scale 1:1,250,000

10 0 10 20 30 40 50 60 70 80 90 100 Mi.

National Forests — National Parks — Indian Reservation

KNOXVILLE Cities with a population of more than 100,000
Roanoke " " " " 50,000 to 100,000
Greenville " " " " 25,000 " 50,000
Bluefield " " " " 10,000 " 25,000
Livingston " " " " 5,000 " 10,000
Logan " " " " 2,500 " 5,000
Hindman " " " " less than 2,500

Railroads
Highways and main roads

Contour interval 500 feet
Conic equal-area projection

1933

U. S. DEPARTMENT OF AGRICULTURE
Bureau of Agricultural Economics
Prepared by F. J. Marschner

ENGINEER REPRODUCTION PLANT, U. S. ARMY, WASHINGTON, D. C.