GEOGRAPHY OF THE BOSTON MOUNTAINS

DISSERTATION

Presented in Partial Fulfillment of the Requirements for
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By

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* * * * *

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FOREWORD

THE PROBLEM

The Nature of the Region

The Boston Mountains\(^1\) are the elevated and eroded southernmost section of the Ozark Highlands situated mainly in northern Arkansas but extending into eastern Oklahoma (Fig. 1, p. 3). Their east-west length is approximately 200 miles and their north-south width is seldom greater than 35 miles. They rise prominently above the surrounding countryside with boundaries generally well-defined. Maximum elevations within the mountains range from 750 to 2,550 feet; relative relief varies from 300 to 1,500 feet. The summits are flat and elongated; the slopes are steep; the valleys are deep and narrow. A well-developed drainage system carries the water in tributaries of the White and Arkansas rivers.

\(^1\)The name "Boston" is nowhere explained although it must be related to the settlement of Boston in the middle of the mountains. The name apparently came into common usage after 1833, for in Flint's Geography - Timothy Flint, (Boston: E. H. Flint, 1833), p. 280 - we read: "White River has its sources in the ridge called the Black mountains, which divides its waters from those of the Arkansas." Individual members of the mountains bear local names but the only large segment frequently referred to otherwise is the "Cookson Hills" of Oklahoma.
The climate of the region is Humid Subtropical and the natural
vegetation is a broadleaf deciduous forest with pine mixed in the east-
ern area. Soils are immature: thin and stony on the slopes, deep but
without mature profile development in the valleys. Ground water is
relatively abundant but mineral wealth of any consequence is lacking.

Population is sparse compared with the surrounding areas, yet
too great for the land to support adequately. No nucleus as large as
five hundred inhabitants exists within the mountains and if a line were
drawn to connect the major trade centers adjacent to them it would
fairly well outline the mountain area (Fig. 2, p. 4). Agriculture,
much of it of a self-sufficient nature, dominates the economy, supple-
mented frequently by forest industries. Isolation of any but the mar-
ginal areas is fairly great.

In the State of Arkansas as a whole, the Boston Mountains com-
prise a distinct region.² It is assumed that they would stand out
equally well among the regions of Oklahoma although the mountains
are not as extensive or as prominent there. Landforms, microcli-
mate, soils, population characteristics and economy, all serve to
make the Boston Mountains distinct from the surrounding areas.

²O. Orland Maxfield, "The Elements Delimiting the Boston
Mountains of Arkansas as a Geographic Region," Arkansas Academy
Previous Studies Relating to the Area

The Boston Mountains have been almost completely neglected by geographers and have fared little better in the hands of others. Passing mention, usually limited to a sentence giving location within the Ozarks, is found in a few college geography texts.\(^3\) These, understandably, do not find it feasible to give detailed attention to such a small and relatively insignificant part of a larger scene.

Three periodical articles\(^4\) concern themselves solely with the mountains but two are limited to a single topic and the third is only exploratory treating of the general geography of the area. Geologists\(^5\) have done more than any other group in making detailed analysis of the Boston Mountains.


\(^5\) Among the more thorough studies are: Carey Croneis, Geology of the Arkansas Paleozoic Area, Arkansas Geological Survey Bulletin 3 (Little Rock, 1930); Hershey, op. cit.; George G. Huffman et al, Geology of the Flanks of the Ozark Uplift, Oklahoma Geological Survey Bulletin 77 (Norman: 1958); Purdue, op. cit.
Unfortunately, one of the most recent geographical studies to include mention of this area suffers from some inaccuracies which give a misleading impression concerning the region. It specifically excludes any rocks of Pennsylvanian age from the Ozarks, when actually the Boston Mountains are capped almost in their entirety by such rocks, and the maps accompanying the discussion fail to locate correctly either the Ozarks or the Boston Mountains.

The Objectives of the Study

The major objectives of this research are twofold: (1) to study an area which has been neglected among regional divisions of the United States and about which little specific information is known; and (2) to investigate what relationships may exist between the physiography and land use.

It is hoped that in the pursuit of these objectives the total knowledge of regional America may be strengthened, adding new information and perhaps correcting erroneous concepts. By studying the physiographic-land-use relationships, the cultural development of the area may be more clearly explained and a practical understanding of these relationships may be developed.

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7Ibid., pp. 212, 213.

8Ibid., pp. 213, 215, 217.
The Research Methods

The research methods divide logically into the examination of materials already available and field work. The library work was conducted primarily at the University of Arkansas which houses all of the major references to the area. Little additional information on the mountains is contained in the Arkansas Historical Society's library in Little Rock. Maps for a detailed study of the landforms of the mountains are available through the United States Geological Survey. Aerial photographs of the area are obtainable from the Commodity Stabilization Service of the Department of Agriculture and also have been consulted in the local Soil Conservation Service offices. Field work was conducted in the mountains and adjacent areas and consisted of observations of existing conditions and correlating information on maps and aerial photographs with the actual landscape.
PART I

THE PHYSICAL GEOGRAPHY OF THE BOSTON MOUNTAINS
CHAPTER 1

LOCATION AND BOUNDARIES

Location

The Boston Mountains constitute the southern edge of the Ozark Highlands (Fig. 1), occupying a position similar to that of the Cumberland Mountains in the Appalachian Plateaus.¹ Physiographically, they are surrounded by the Springfield Upland, Gulf Coastal Plain, Arkansas Valley, and Osage Plains² to the north, east, south, and west, respectively. They center upon \(35^\circ45'\) North Latitude and lie between \(91^\circ25'\) and \(95^\circ15'\) West Longitude (Fig. 2). Their greatest width is 45 miles along a north-south line extended through Green Forest, Arkansas, although throughout their greater extent the width does not exceed 35 miles. Their maximum east-west length is 200 miles, from a point near the confluence of the Illinois and Arkansas rivers in Eastern Oklahoma, to Federal Highway 67, on the west side of the White River.


²The easternmost section of the Osage Plains adjoining the Ozark Highlands is sometimes referred to as the Prairie Plains.
near Newport, Arkansas. The mountains are a significant feature in the Arkansas counties of Boone, Carroll, Cleburne, Crawford, Franklin, Independence, Jackson, Johnson, Madison, Newton, Pope, Searcy, Stone, Van Buren, Washington, and in the Oklahoma counties of Adair, Cherokee, and Sequoyah (Fig. 2). No one county is entirely within the mountains.

**Boundaries**

All writers who have dealt in some detail with the mountains agree that the boundaries are generally quite distinct and easily delineated. The most complete description of the boundaries is given by Marbut.\(^3\) Demarcation of the extent of the mountains is possible from topographic maps,\(^4\) aerial photographs, and field observations.

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\(^4\)Topographic maps available are the U. S. G. S. quadrangles of Mt. Judea, Ozone, St. Paul, Smyrna, Snowball, and Watalula on the scale of 1:62,500; Batesville, Eureka Springs, Fayetteville, Harrison, Marshall, Morrillton, Mountain View, Muskogee, Sallisaw, Tahlequah, and Winslow on the scale of 1:125,000; the Mississippi River Commission quadrangles of Augusta, Bald Knob, and Newport at 1:62,500 include minor areas of the mountains. The Army Map Service sheets of Harrison, Ft. Smith, Memphis, Russellville, and Tulsa at 1:250,000 also cover this area.
The Northern Boundary

The northern edge is an erosional escarpment and is the most sharp of the boundaries. "A person standing on the high hills almost anywhere along the Missouri-Arkansas line and looking southward sees a flat-topped, wall-like mountain on the horizon." This is an over-simplification, but an accurate first impression. The northern boundary is a marked change not only in topography but also in the nature of the rocks and soils because of the absence of Pennsylvanian and Upper Mississippian rocks to the north except in the outliers. "It is so sharp a boundary, accompanied by such easily recognized differences of country on opposite sides that there can be practically no difference of opinion as to its exact location." Close examination reveals that this boundary, although it is everywhere of unmistakable distinctiveness, does not exhibit the same characteristics throughout its extent.


8 Marbut, _op. cit._, p. 115.
At one time the northern boundary stood at some distance to the north of its present location as the outliers give witness\(^9\) and the escarpment has gradually retreated southward. A group of outliers near Garfield, Arkansas (three miles south of the Missouri border on Federal Highway 62), stands approximately 20 miles away from the escarpment.\(^10\) Many outliers are separated from the mountains by only a small valley as are Kessler and East Mountain at Fayetteville.\(^11\) All of them stand upon the Boone formation of Middle Mississippian age and are composed of remnants of the rocks found in the Boston Mountains.\(^12\) "The height of these outliers very closely approximates that of the plateau of which they were formerly a part."\(^13\) They are somewhat lower, however, declining northward.

The Boston Mountain Front\(^14\) (Fig. 3) is most impressive from the vicinity of Mountain View to the area just south of Green Forest. Its outline on the horizontal plane is very irregular, with reentrants

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\(^10\) U. S. G. S., Eureka Springs quadrangle.

\(^11\) U. S. G. S., Fayetteville quadrangle.

\(^12\) Arkansas Geological Survey, "Geologic Map of Arkansas."

\(^13\) Purdye, *op. cit.* , 697.

\(^14\) Marbut, *op. cit.*, p. 114, uses this term. It is reserved for the northern boundary, only, because its abruptness is not equaled by any of the others.
fifteen to twenty miles in length at a level of more than 1,000 feet below the mountain surface. 15 It is in association with this section of the boundary, also, that the most prominent outliers occur. Within this area, the segment between Marshall and the western limit of Boone County due west of Harrison is especially notable for the steepness of the mountain front and the gorge-like nature of the reentrants. 16 Here, too, the Boat Mountain group, eight miles southeast of Harrison, is the most magnificent of any of the outliers, standing 1,000 feet above the Springfield Upland and about eight miles away from the front 17 (Fig. 4).

The eastern third of the mountain front is less impressive although equally clear-cut. It is more uniform, without deep reentrants or numerous outliers, and stands generally less than 500 feet above the land to the north, declining in elevation eastward. 18

The western third of the escarpment is least simple. The features are not as bold and the impression is one of hills descending to


16 U. S. G. S., Snowball quadrangle is typical.

17 U. S. G. S., Harrison quadrangle.

Fig. 4 - The Boat Mountain Group
the Springfield Upland rather than of a sharp break between the two. Slopes are less steep, frequently broken by rock terraces.\(^{19}\) Relief along the front is between 300 and 500 feet. Outliers occur in greatest number in association with this segment but they appear at varying elevations and are generally smaller in extent than elsewhere. Along the northern edge of the Cookson Hills the continuity of the escarpment is broken by the presence of fault-block hills\(^{20}\) whose northern slopes form the boundary.

The Southern Boundary

On the south, the boundary is not everywhere as sharply defined, although it can be fixed without much difficulty. "At some places this boundary is marked by an escarpment, at other places the Boston Mountains merge insensibly into the Arkansas Valley, so that the boundary must be fixed arbitrarily."\(^{21}\) There is no "front" as on the north; nor is there a great contrast in rocks between the Arkansas Valley and the mountains because the Atoka formation of Pennsylvanian

\(^{19}\)Ibid.


age is wide-spread over the eastern half of the valley. In the western half of the valley, younger rocks overlie the Atoka. 22 Structure is of little value in determining the southern edge because of folding in both the mountains and the Arkansas Valley. "The folding diminishes in intensity toward the north so gradually that it is impossible to determine from the structure just where the Arkansas Valley province ends and the Boston Mountains begin." 23

Continuity of elevation and degree of slope, both observable in the field and on topographic maps, are the best determinants. The anticlinal ridges of the Arkansas Valley are not continuous with the surface of the Boston Mountains. 24 There is a marked slope, although usually gradual, from the mountains to a lowland belt 25 which separates the mountains from the valley ridges. The exact nature of the southern boundary varies, particularly in the character of slope 26

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22 Arkansas Geological Survey, "Geologic Map of Arkansas."

23 Croneis, op. cit., p. 168.

24 U. S. G. S., Ozone quadrangle.

25 This is developed at the foot of the rather abruptly folded edge of the mountains. The characteristics of structure are discussed later.

which serves to make it of more or less prominence, but the reentrants and outliers which give an irregular appearance to the northern boundary are everywhere absent.

The East and West Boundaries

At both the eastern and western ends of the mountains the northern and southern boundaries meet almost in a point, making it virtually unnecessary to define these limits separately. The Gulf Coastal Plain, almost level and consisting of recent alluvium, bounds the mountains on the east. This line is quite clearly defined by both topography and lithology. On the west, the boundary is between the mountains and the Osage Plains of the Central Lowland. Here the lower Pennsylvanian rocks of the mountains pass beneath the younger Pennsylvanian rocks of the plains.\(^{27}\) Faulting has obscured the original bedrock situation somewhat, but topographically the limit is easily discerned.

\(^{27}\)Huffman, op. cit., p. 11.
CHAPTER 2

PHYSIOGRAPHY AND DRAINAGE

General Geology

Bedrock

All of the bedrock exposed in the Boston Mountains is sedimentary, chiefly sandstone and shale, of upper Mississippian and lower Pennsylvanian age (Table 1). As has been noted previously, bedrock is a major element in delimiting the Boston Mountains on the north because these same formations have been removed from the Springfield Upland except as they cap the outliers of the mountains. Although Pennsylvanian formations - Hartshorne sandstone, McAlester shale, etc.\(^1\) - occur to the south in the Arkansas Valley, they are generally of Middle Pennsylvanian time.

The Atoka Formation. -- The Atoka\(^2\) is the top-most\(^3\) bed in the Boston Mountains and the most widespread in outcrops. The formation

\(^1\) Arkansas Geological Survey, "Geologic Map of Arkansas."

\(^2\) This is called the Winslow formation in earlier writings.

\(^3\) Although no author speaks of any rocks younger than the Atoka as being in the Boston Mountains, the "Geologic Map of Arkansas" prepared by the Arkansas Geological Survey shows a small area of Hartshorne across central Crawford County within the mountains. It is so limited in extent that it will be omitted from this discussion.
<table>
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<th>Thickness</th>
<th>Character of Formation</th>
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<tr>
<td>Lower Pennsylvanian</td>
<td>Atoka Sandstone</td>
<td>1,500' - 9,500'</td>
<td>Thin- to medium-bedded sandstones alternating with clay shale and sandy shale</td>
</tr>
<tr>
<td></td>
<td>unconformity</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Boyd Shale</td>
<td>0-270'</td>
<td>Clay shale with thin coal beds</td>
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<td></td>
<td>Kessler Limestone</td>
<td>0-70'</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Brentwood Limestone</td>
<td>0-85'</td>
<td>Massive limestones</td>
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<tr>
<td></td>
<td>Hale Sandstone</td>
<td>40'-300'</td>
<td>Massive brown sandstone with clay shale, limestones, and conglomerates</td>
</tr>
<tr>
<td></td>
<td>unconformity</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Upper Mississippian</td>
<td>Pitkin Limestone</td>
<td>0-115'</td>
<td>Massive, gray, fossiliferous limestone</td>
</tr>
<tr>
<td></td>
<td>unconformity</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Fayetteville Shale</td>
<td>10'-400'</td>
<td>Black and gray clay shale with sandstone near top, fossiliferous limestone in basal part</td>
</tr>
<tr>
<td></td>
<td>Wedington Sandstone</td>
<td>0-150'</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Mayes Limestone</td>
<td>0-30'</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Batesville Sandstone</td>
<td>0-225'</td>
<td>Sandstone with shale below, limestone in lower part; chert conglomerate at base</td>
</tr>
<tr>
<td></td>
<td>Hindsville Limestone</td>
<td>0-50'</td>
<td></td>
</tr>
</tbody>
</table>

(After Albert W. Giles, "Geologic Formations of Arkansas Valley and Ozark Plateau in Arkansas.")
consists of alternating sandstone and shale beds which have a feather edge thickness on the northern outliers and increase southward to between 750 and 2,250 feet in thickness at the southern boundary where they pass beneath the formations of the Arkansas Valley.

The sandstones generally are medium grained and are brownish in color. At the base of the formation is a conglomerate sandstone, called Millstone Grit in early reports, which forms prominent bluffs (Fig. 5). "The Millstone Grit caps the highest parts of the Boston Mountains and is the most prominent feature of the region. It forms an almost continuous escarpment on the summit of the northern face of the mountains..." 

The shales are black, much like the Boyd and Fayetteville shales beneath. Thin beds of coal may occur but are not of sufficient quantity to be mined, being generally less than two feet thick.

The Boyd and Hale Formations. -- The Morrow group consists of beds of sandstone, shale, and limestone, divisible into the Boyd and Hale formations. This group outcrops over a large area and forms the middle rocks of the Boston Mountain Front.

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4 All material in this section referring to the lithology is based upon Croneis, op. cit., unless otherwise noted.

The Boyd shale is black, carbonaceous and fissile, resembling closely the Fayetteville shale found at a greater depth. Two limestone lentils occur, the Kessler limestone in the upper part and the Brentwood limestone in the lower part. These two are separated by about 20 feet of shale. The Kessler is gray to brown and usually inconspicuous in its outcrops which ordinarily are less than 10 feet. The Brentwood closely resembles the Kessler except it is lighter in color and more massive in its outcrops, in some places 60 feet although usually less than half of that figure.

The Hale formation rests unconformably upon the Pitkin limestone, or if that is absent, upon the Fayetteville shale, and has a wide occurrence across the mountains. The formation consists mainly of shale between two beds of sandstone. The upper sandstone is in some places in Oklahoma sufficiently calcareous to be called a siliceous limestone. The shale bed, containing quite a bit of sandstone, ranges from 20 to 200 feet in thickness and is usually a prominent part of the formation.

The Pitkin Formation. --The Pitkin limestone is the topmost of the Upper Mississippian rocks in the Boston Mountains. In older literature it is referred to as the "Archimedes" limestone. This formation outcrops all along the Boston Mountain Front and both small outcrops and well records indicate its presence south of the mountains' crest.
Typically, the Pitkin is a massive, bluish-gray limestone which stands out as a steep cliff. In places, particularly toward the east, the rock may be sandy. In Oklahoma, it is more shaly.

The Fayetteville Formation.--The Fayetteville shale likewise is exposed all along the mountain front, resting conformably upon the Batesville sandstone. It is mainly a black shale with the Wedington sandstone near the top and the Mayes limestone (mainly toward the west) at the base. The most characteristic bed is the thick, black, fissile, carbonaceous shale between the two lentils. The Wedington sandstone commonly forms bluffs and where the shale has undermined it great blocks have accumulated in the valleys. In Wedington Mountain, west of Fayetteville, the bed is over 150 feet thick. The Mayes limestone is rather widespread in the Fayetteville area and becomes thicker in Oklahoma.

The Batesville Formation.--The Batesville sandstone is the lowest formation exposed in the Boston Mountains and it is apparently lacking in the west where the Fayetteville formation rests upon the Boone. It is thickest near Batesville and is thicker in the outliers than in the escarpment. The rock is light yellow to brown, generally medium-grained. The lower beds are usually softer and thinner and the upper beds harder and more massive. The Hindsville limestone
is the bottommost member, dark gray, heavy-bedded, and coarsely crystalline.

Beneath the Batesville sandstone is the Boone formation. It is nowhere exposed as a part of the Boston Mountains. The Boone formation is mentioned here only because the outliers of the mountains stand upon it and because it generally surfaces the bottoms of the valleys along the northern face of the mountains. A line which generally delimits the Boston Mountain Front by cutting across the mouths of the reentrants will include valleys with limestone floors. It is a gray, massive stone, often containing large amounts of chert left by solution.

Structure

Fenneman\(^6\) follows the work of Purdue\(^7\) in writing that the western end of the Boston Mountains is a flat anticline while toward the east a monocline occurs. Purdue, himself, limits the monocline to the extreme eastern end of the mountains.\(^8\) Bowman leaves probably the most correct impression in stating, "In contrast to the northern part of the Ozark region, which is a low flat dome . . . the Boston

\(^6\)Fenneman, op. cit., p. 636.

\(^7\)Purdue, op. cit., p. 695.

\(^8\)Ibid., p. 696.
Mountains have a monoclinal structure and a corresponding steeper border topography. The three cross-section diagrams in Croneis\textsuperscript{10} show only a monoclinal structure and the northward extension of the rocks dips very slightly, not enough it would seem to indicate an anticline.

Three structural processes have affected the Boston Mountains: (1) general uplift; (2) folding to various degrees; (3) faulting. Folding and faulting occur as minor structural processes within the overall monoclinal uplift. No one of these has been uniform in occurrence throughout the mountains but the variation in the degree of each has not been sufficient to create differences in surface expression within the region.

The massive uplift which occurred in late Tertiary or post-Tertiary time\textsuperscript{11} did little to deform the horizontal rock structure within the mountains. It produced the monoclinal fold on the southern edge but within the mountains the rocks were raised virtually intact. The dip of the rocks at the northern edge and top of the mountains is


\textsuperscript{10}Croneis, \textit{op. cit.}, Plate XXXIII, facing p. 166.

\textsuperscript{11}Purdue, \textit{op. cit.}, p. 701.
slight. On the south the dip is greater, due to the monoclinal downfold.

"The rocks dip in the main to the south at an angle slightly greater than
the general southward slope of the surface."\textsuperscript{12} This dip is as much as
5 degrees or more but folding and faulting modify it.\textsuperscript{13}

Folding is common in the mountains but folds are a relatively
insignificant factor in the determination of the surface configuration
and occur as detail within the larger picture of the massive uplift.
Folding is most evident in the southern part (Fig. 6) where it is much
like that in the Arkansas Valley except that it is less pronounced, the
folds being short and small.\textsuperscript{14} A study of local folds in the eastern
part shows that they may have dips of as much as 25 degrees.\textsuperscript{15}

Toward the north, folding decreases, "... the folds are
shorter, their axes are less well defined, their dips are lower, and
their trend is much less uniform than in areas farther south."\textsuperscript{16}
Folding is somewhat more pronounced in the lower beds than in the
upper ones. However, the greater part of the folding (and faulting)
occurred after the deposition of the youngest beds and it affects all

\textsuperscript{12} Bowman, \textit{op. cit.}, p. 452.
\textsuperscript{13} Croneis, \textit{op. cit.}, p. 168.
\textsuperscript{14} Ibid.
\textsuperscript{15} J. F. Newsom and J. C. Branner, "The Red River and Clinton
\textsuperscript{16} Croneis, \textit{op. cit.}, p. 168.
of the rocks so that the oldest and youngest have very similar structure. 17

Faulting is common throughout the region but appears particularly in the northern and western sectors (Fig. 6). Cronis suggests that "In the southern part of the Boston Mountains they may be equally numerous, but that region has not been so carefully studied, and the presence of a single formation at the surface makes their recognition in that area somewhat more difficult than in the north." 18

Throughout the region the faults are of the normal type. 19 They generally are downthrown on the south and trend east-west; the maximum displacement is not over 350 feet and the average is considerably less. 20 A recent study by the Oklahoma Geological Survey 21 gives a very detailed picture of faulting in the extreme western area of the mountains. "Faulting is most pronounced" within the Ozark region of Oklahoma "in the Boston Mountain Plateau in Cherokee and Adair Counties where large, parallel, normal faults divide the rocks into a series of fault blocks tilted to the southeast." 22 There is a greater

17 Ibid., p. 169.
18 Ibid., p. 190.
19 Ibid.
20 Ibid.
21 Huffman, op. cit.
22 Ibid., p. 89.
amount of deformation there than is generally indicated elsewhere in the mountains, which is suggested to result from the tension caused by the stretching of the rocks during the filling of the McAlester Basin to the west.\textsuperscript{23}

\textbf{Morphology}

\textbf{Drainage}

The mountains have a well-developed drainage system consisting of tributaries of the Arkansas and White Rivers, the latter being a direct tributary of both the Arkansas and the Mississippi (Fig. 7). Drainage to the north is into the White River by the tributaries of the Upper White River, Kings River, and the many tributaries of the Buffalo. Both the eastern and western ends of the mountains drain to the south. Almost the entire eastern one-fourth drains into the Little Red River which is a tributary of the White River. The western sector is drained largely by the Illinois River which flows into the Arkansas. The waters of the southern slopes all flow into the Arkansas River through such streams as Lee's Creek, Frog Bayou, Mulberry River, and Big Piney Creek.

The drainage divides are along the mountain crests, although not always following the highest points. "The divide between some

\textsuperscript{23}Ibid.
of the White River and some of the Red and Arkansas River tributaries is very narrow, scarcely wide enough for a wagon road, and in a few places these narrow divides have been eroded much below the general level of the mountains, thus forming low gaps in the dividing ridge. 24 Those same wagon roads are automobile roads today, and frequently one can sit in the car and look off to either side into two different drainage systems.

The divides follow a very irregular course and the piracy of drainage areas appears imminent although there is no evidence of it having already occurred. "In western part of state, the south-flowing streams are the stronger, and as a rule are robbing the White River basin of territory in this locality. Father east, in the middle portion of the region, the north-flowing streams are the stronger, and seem to be encroaching upon the drainage area of the Arkansas, while in the eastern part, the south-flowing streams head very near the north escarpment of the plateau. 25

Generally, the streams follow the dip of the rocks although faulting and folding have affected some, especially in Oklahoma and along the southern border. "Stream dissection has cut deep valleys

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25 Purdue, op. cit., p. 697.
through the ridges while major drainage lines are developed in the softer shales and limestone valleys paralleling the faulting. \textsuperscript{26} The effect of faulting on the Little Red River was one of the earliest topics studied in the mountains. \textsuperscript{27}

Within the mountains, most of the stream valleys have the characteristics of middle and late youth. There is considerable gradient to most stream courses, and the major activity is still downward cutting. "The streams south of the divide are swifter and therefore cut faster than those north of it, with the result that the valleys on the south are deeper and more precipitous. The slopes above the streams are interrupted by numerous nearly perpendicular escarpments produced by the differential weathering of the alternating hard and soft beds of rock."\textsuperscript{28}

Elevations

The Boston Mountains have considerable range in elevation producing an irregular profile and variable local relief. Over-all, they are highest in the center, maintaining a height of more than 2000 feet to both the north and south boundaries, and declining to the east and

\textsuperscript{26} Huffman, \textit{op. cit.}, p. 11.

\textsuperscript{27} Newsom and Branner, \textit{op. cit.}

west. A generalized picture of maximum elevations is found in Figure 8, "Maximum Elevations in the Boston Mountains." The single highest elevation is 2,578 feet at a fire lookout tower two and one-fourth miles due east of Redstar in section 23, township 14 north, range 24 west. The next highest elevation of 2,567 feet is at a point along the side of State Highway 16, almost four and a half miles south and slightly west of the previously mentioned location, situated in section 11, township 13 north, range 24 west. These and other maximum elevations appear as low rises on an otherwise fairly accordant surface which declines away from the center of the mountains.

Elevations in excess of two thousand feet are widespread over the central area, as indicated in Figure 8. This area extends to both the northern and southern boundaries and from the longitude of Marshall to that of Fayetteville. A drive on State Highways 16 and 7 in this part of the state affords an excellent view of the summit elevations which these two highways lie upon for many miles. The decline

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29 This, and Figures 8 and 9 which follow, was prepared as an isarithmic map using data from the topographic maps available on the area. Units of nine square miles were used in computing local maximum and minimum elevations and relief.

30 Army Map Service, Russellville sheet.

31 Ibid.
in maximum elevations is very steep along the northern escarpment between Marshall and Green Forest and on the southern border between Clarksville and Ozark. It is less steep though quite noticeable both to the east and west of the core. Maximum elevations at the eastern end are between seven and eight hundred feet and at the western end between nine hundred and a thousand feet.

Minimum elevations range from two hundred and fifty to eighteen hundred feet (Fig. 9). The largest area of high minima is in the northwest central and north central region. Minimum elevations indicate the level of drainage in the mountains. Also, a rough approximation of drainage divides can be obtained from this map because they are indicated by the highest minimum elevations. The general character of stream gradient is also apparent here. This can be determined from the relative rapidity of change in minimum elevations.

**Relief**

Relative relief is a more significant physiographic feature in the Boston Mountains than either maximum or minimum elevations taken alone. Whatever claim the area has to being mountainous in a scientific sense is based upon relative relief and slope. This index to ruggedness also reflects the area's suitability for settlement.
Figure 10. "Relative Relief in the Boston Mountains," depicts the ruggedness of the Boston Mountain terrain. Relative relief ranges from only 200 feet in the few localities of the west to between 1,500 and 1,600 feet in the southwest central area. Relief is greatest, of course, where maximum and minimum elevations appear in the greatest contrast, and does not necessarily reflect the location of the greatest maximum or the least minimum elevations. Frequently, the higher areas have not been as well dissected as the lower ones, creating relatively moderate relief. Thus, at the two highest elevations already mentioned, relative relief is between seven and eight hundred feet because streams have not cut more deeply into the land.

Throughout considerable area in the center of the mountains, relative relief exceeds one thousand feet. In terms of the nine square miles which form the areal unit, this means appreciable slope and roughness. The areas of lowest relief, between two and four hundred feet at the eastern and western ends, appear upon observation to be more rugged than they are because of contrast with adjacent plains of locally less than fifty feet relief. The importance of relief and of slope are discussed later.

Slope

The characteristic of slope is closely related to that of relief. Generally, the greater the relief, the more extensive are steep slopes. Since a more detailed consideration of slope in type localities is made in Part II, only the over-all picture will be noted here.

The flat summits of the mountains often possess scarcely any slope along the major axis of the crest. It is possible to travel a mile in some areas without undergoing as much as twenty feet of change in elevation. In general, however, these crests slope away from the major axis at the rate of fifty to one hundred feet per mile (slope of 0.9 per cent to 1.9 per cent or 30' to 106'). These summits often end in sheer cliffs whose angle of slope is ninety degrees. Such extreme steepness is usually not apparent at the scale of the topographic maps. Slopes of 2,000 feet to 2,500 feet per mile represent the maximum as measured on these source maps.

Below these cliffs the slope is less severe, five hundred to six hundred feet per mile (expressed as slopes of 9.5 per cent to 11.4 per cent or 5°26' to 6°31'). These vary somewhat above and below this general range, being higher on slopes near the heads of valleys and lower on slopes near the mouths of valleys.

The bottomlands which are found along the major streams are quite flat. The slope of these with the gradient of the stream is often
less than twenty and seldom more than forty feet per mile. From one side of the valley floor to the stream bed the slope is usually little over twenty feet per mile. Stream level, itself, is seldom more than a few feet below the valley floor.

**Physiographic History**

Several present-day features are of significance in postulating a physiographic sequence for the area. (1) The mountain crests are flat, generally small, and frequently sinuous for several miles with only minor gaps interrupting them. Some exhibit considerable undissected areas such as the one at Health (sections 15 and 22, township 13 north, range 28 west)\(^3\) which contains a square mile of almost perfect flatness. When in the middle of such an area, it is difficult not to believe that one is standing on a plain (Fig. 11). (2) There is an accordance of summits above whose common level there rise minor undulations (Fig. 12). This is particularly evident in the field from almost any crest and is, of course, substantiated on the topographic maps and by cross-section profiles (Fig. 13). The common surface is highest in the middle of the mountains and slopes away from the center of the arch, especially to the east and west. The general pattern

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\(^3\) U. S. G. S., St. Paul quadrangle.
FIGURE 13. TOPOGRAPHIC PROFILES

A. St. Paul Quadrangle
B. Ozone Quadrangle
C. Snowball Quadrangle
of elevation of the topmost surface is shown on the map of "Maximum Elevations" (Fig. 8). (3) Outliers are fairly numerous to the north of the Boston Mountain Front. Some are separated from the main body by only small valleys while others occur several miles away, as has been previously mentioned. Most are small and isolated but the Boat Mountain group near Harrison is a substantial feature in the landscape. All of these outliers are capped by the same rocks as occur in the mountains, showing a decline in elevation northward. All stand upon the Boone formation of Mississippian age which is the surface formation of the surrounding uplands and disappears under the bottommost beds of the Boston Mountain Front. (4) Valleys in the mountains are youthful. (5) The course of the White River follows a circuitous route, rising in the more westerly section of the mountains, flowing northward around the outermost outliers, thence east around the end of the mountains.

Some basic conclusions can be drawn from these facts, singly and in combination. The flatness and accordance of the mountain summits indicate a former general surface over the entire area composed of Pennsylvanian rocks of the Atoka formation. The outliers are separated from the main body of the mountains by an erosional

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\[34\] Fenneman, *op. cit.*, p. 657.
escarpment, rather than a fault scarp, and are composed of the same stratigraphic column as the mountains whereas the land above which they stand is underlain by the older Boone formation which also underlies the mountains. Thus, the outliers once must have been an integral part of the mountains but now stand separated by erosion. The route of the White River and its tributaries indicates major alteration of the original area with the course of the White River itself... evidently having been determined by the Boston escarpment, which in former periods occupied a position farther north."

No analytical summary of physiographic events in the Ozarks post-dates that by Fenneman. His conclusions regarding the Boston Mountains are based largely upon the work of Hershey and Purdue.

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36 Purdue, *op. cit.*, p. 701.


38 Fenneman, *op. cit.*

39 Hershey, *op. cit.*

40 Purdue, *op. cit.*
Neither Atwood\textsuperscript{41} nor Loomis\textsuperscript{42} adds anything to the interpretation Fenneman gives to the physiographic history.

Physiographers agree that the accordant summits of the Boston Mountains represent an erosional surface, "... the evidence of a former peneplain here is about the same as in the Allegheny and Cumberland Mountains ..."\textsuperscript{43} Hershey\textsuperscript{44} goes into considerable detail in discrediting other hypotheses which might explain the uniformity in height of the mountains. He concludes that "... by elimination [sic], the peneplain hypothesis comes to the front as that which furnishes the most natural explanation of the phenomena observed and violates no established principles of physiography."\textsuperscript{45}

Hershey speaks of this summit level - hereinafter referred to as the Boston peneplain\textsuperscript{46} - as being of Cretaceous age.\textsuperscript{47} Fenneman,


\textsuperscript{42}Frederic B. Loomis, Physiography of the United States (Garden City: Doubleday, Doran & Co., 1937).

\textsuperscript{43}Fenneman, \textit{op. cit.}, p. 657.

\textsuperscript{44}Hershey, "Boston Mountain Physiography," p. 164.

\textsuperscript{45}Ibid.

\textsuperscript{46}Fenneman and others fail to provide a name for this surface. It perhaps is adding to confusion to submit one more name to the already long list of presumably similar but locationally separated peneplains. The term is proposed here for simplicity's sake in referring to the regional situation.

\textsuperscript{47}Hershey, "Peneplains of the Ozark Highlands," p. 41.
with the later physiographers following suit, considers it as Tertiary, possibly the equivalent of the Schooley surface in the Appalachians\textsuperscript{48} as is the Ouachita peneplain\textsuperscript{49} of which the Boston may be considered an extension. This high level surface (the Boston) exists at about 2,400 feet in the center of the mountains, declining slightly northward and southward to the mountains' edge, and more rapidly eastward and westward, occurring largely as the maximum elevations (Fig. 8). During the completion of this peneplain, the area now composing the Boston Mountains is conceived to have been lower than that to the north\textsuperscript{50} resulting in a preservation of rocks on the southern margin of the Ozarks\textsuperscript{51} which were removed from the higher areas of the Ozark dome, exposing the Boone chert and lower formations.

Uplift in late Tertiary or post-Tertiary time\textsuperscript{52} followed peneplanation. This uplifting centered in the Ouachitas\textsuperscript{53} and affected only the southern part of the Ozark Highlands, chiefly what is now the Boston Mountains area. At this point in the physiographic history, having committed themselves to a summit surface (the Boston),

\textsuperscript{48} Fenneman, \textit{op. cit.}, pp. 659-660.

\textsuperscript{49} Ibid., p. 687.

\textsuperscript{50} Purdue, \textit{op. cit.}, p. 700.

\textsuperscript{51} Fenneman, \textit{op. cit.}, p. 655.

\textsuperscript{52} Purdue, \textit{op. cit.}, p. 701.

\textsuperscript{53} Fenneman, \textit{op. cit.}, p. 660.
Hershey and Purdue disagree on the total number of surfaces developed, Hershey favoring two\textsuperscript{54} and Purdue, one.\textsuperscript{55} Fenneman considers that there were two, "That two base levels 1000 or more feet apart have left their records in the Ouachita Mountains is too plain to be denied. They must have had some northward extension."\textsuperscript{56}

Both in the field and from topographic maps a second surface appears evident. It occurs some four to five hundred feet below the Boston peneplain, appearing chiefly as rock terraces along the major streams.\textsuperscript{57} This is the Ozark peneplain which is the surface erosion level in the Salem and Springfield Uplands, "The old surface" [the Boston] "in Missouri and adjacent states, having held over from one cycle to the next, is now classified as belonging to the newer cycle."\textsuperscript{58} Presumably, the Boston and Ozark surfaces now merge at what was the northern limit of the Boston Mountains beyond the present outliers.

\textsuperscript{54}See literature previously cited by this author.

\textsuperscript{55}\textit{Ibid.}

\textsuperscript{56}Fenneman, \textit{op. cit.}, p. 658.

\textsuperscript{57}\textit{Ibid.}, p. 657.

\textsuperscript{58}Fenneman, \textit{op. cit.}, p. 659.
The Ozark peneplain is a corerlary of the Lancaster and the Harrisburg. The elevation of the mountains was probably not greatly reduced by this second cycle of erosion although as we have seen the edge of the mountains has retreated. Fenneman considers the survival of the Boston Mountains as similar to that of the Cumberlands.

Another uplift followed the development of the Ozark peneplain, again greater in the southern part of the Ozarks than in the northern. Broad valleys between bluffs were carved, following this, during the Pliocene, which are straths. Later uplift resulted in gorge cutting which the streams in the mountains are still actively engaged in.

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59 Ibid., p. 660.
60 Ibid., p. 658.
61 Hershey, "Peneplains of the Ozark Highlands," p. 41.
62 Ibid.
63 Fenneman, op. cit., p. 661.
64 Ibid.
CHAPTER 3

THE CLIMATIC SITUATION

General Characteristics

The climate of the Boston Mountains is Humid Sub-tropical, Cfa in the Köppen system. Summers are warm to hot; the winters are pronounced but mild. There is no season without precipitation but considerable variation occurs within the year. The region is far enough poleward and interiorward to be near the boundary of the Humid Sub-tropical climate with the Humid Continental (long summer phase) and Middle Latitude Semi-arid climates, to the north and west, respectively. Certain weather phenomena, notably occasional severe winters and extended summer droughts, reflect this peripheral location.

The nature of the climatic situation is analyzed largely through the characteristics of temperature and precipitation found in data reported to the United States Weather Bureau. The stations used to typify the climate are selected on the basis of length of record and location with respect to the mountains (see the Tables of statistics which follow for the length of record and Figure 14 for location and
and elevation). Few data have been kept for the mountains, themselves. Therefore, it is necessary to use stations as close as possible to the mountains. Allowing for variations which the elevations and rougher terrain might create, it is assumed that any given portion of the mountains would be climatically similar to the area adjacent to it. Unfortunately, the length of record is not the same for all stations and the data, therefore, are not strictly comparable. However, except at Marshall, Nail, and White Rock, the records exceed thirty years.

Figure 14 shows the location and elevation of the stations used in this study. Fayetteville, Eureka Springs, Harrison, Marshall, and Batesville are to the north of the mountains; Sallisaw, Ozark, Luther- ville, and Bee Branch are to the south. Muskogee and Newport are at the western and eastern ends, respectively. All of these are within ten miles of the mountains. White Rock and Nail are both in the mountains at approximately 2,400 feet elevation and with essentially the same exposure. However, the record at White Rock has limited value because of its length (fourteen years) while that at Nail, though of longer duration, is not complete. Data for Nail are used when available; those for White Rock are used when necessary to complete the example of the mountain situation.

Statistical information is not available on the microclimatic conditions in the mountains. This investigator, however, through fourteen
years of residence near and travel in the mountains, has had opportunity
to observe something of these conditions and to realize that they are a
significant aspect of the geography of the area. Considering the limited
extent and elevation of the Boston Mountains, microclimatic conditions
would be the most effective means to set the region apart climatically
from the surrounding area.

**Temperature**

The mean annual temperatures (Table 2) vary but little among
the stations, ranging from 57.5° to 61.7°. The stations to the north
and in the mountains average slightly below 60°; those located to the
south and at the ends average 60° and above. A minor difference is
also found in the monthly means. The stations to the north and in the
mountains generally average 2° lower than the others. An exception
is Muskogee at the western end which is more like those to the north
in the cooler season. Elevation causes the mountains to be cooler.
For example, White Rock is 1,889 feet higher than Ozark. This in
itself, disregarding all other factors should make it about 6° cooler.

Figure 15 graphically presents the range in mean monthly tem-
peratures. This shows the greatest variation to be in summer when
the mountains are distinctly cooler and the Arkansas Valley is notice-
ably hotter. In July, 6.8° difference exists between Nail and Sallisaw.
TABLE 2. Mean Temperatures

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(These data are computed from the U. S. Weather Bureau's information on Arkansas and Oklahoma contained in the Climatic Summary of the United States - Supplement for 1931 through 1952.)
Fig. 15 - Variation in Mean Monthly Temperatures
Winter means vary less. The range in October is 3.3° and that in November is 3.4°.

The extremes which temperatures can reach are shown in Tables 3 and 4. The absolute maximum temperatures reached in summer vary from 105° at both Nail and White Rock to 120° at Ozark. Even winter days can be warm as the readings in the high 70's and low 80's testify. Absolute minimum temperatures are by no means mild, the range being from -13° at Muskogee to -24° at both Fayetteville and Marshall. Decidedly cool temperatures have been recorded in the summer months, with most stations having had readings in the 40's. While both absolute maximum and minimum temperatures were perhaps reached only once during the length of record, they do indicate the intensity of heat and cold possible and both reflect upon the interiorward location of the mountains.

Within the mountains, temperatures will vary widely with the orientation of slope, nature of surface materials, relief, presence of water, etc. There are few bare bedrock exposures except along cliffs; otherwise, the ground is sufficiently shaded to keep it from absorbing a great deal of insolation in summer. South-facing slopes, of course, receive the greatest amount. Ferns, most mosses, and most wild flowers do not appear on the south-facing slopes. Here, also, are the purest stands of oaks and hickories. North-facing slopes generally
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(From the U. S. Weather Bureau's information on Arkansas and Oklahoma contained in the Climatic Summary of the United States - Supplement for 1931 through 1952.)
have much more undergrowth. A detailed botanical study of plant communities would yield perhaps the surest evidence of the microclimatic effects. In winter, perhaps the most noticeable effect of temperature differences within a small area is in the duration of snow and icicles on the north-facing slopes. The latter feature, often several feet long as they hang from cliffs, may not completely melt for many days after temperatures in day-time have reached the 50's.

Air drainage creates the most readily observed temperature differences in summer. Nights are notable for the cool breeze which drains down the slopes, beginning an hour or two before sunset. Daytime temperature variations are most easily felt in flying over the mountains in a light plane which is easily affected by air currents.

The average frost-free season varies a maximum of 38 days among the stations, from 225 days at Ozark to 187 days at Harrison (Table 5). The last killing frost in spring occurs in late March or early April. The first killing frost in autumn occurs in late October or early November. It is quite likely that within the mountains air drainage may bring about later and earlier average dates than have been recorded.

The frost-free season is long enough to permit a wide range of crops. Probably the most noticeable effect is upon the exclusion of cotton from the mountains. At one time it was grown in considerable
### TABLE 5

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quantity in the eastern half and along the southern margin as the old, unused gins mutely testify today. Location at the very margin of the area with a frost-free season permitting economic production was, no doubt, one factor in its disappearance from this area.

Precipitation

The mean annual precipitation ranges from 42 inches at Muskogee to 51 inches at Lutherville (Table 6). Everywhere there is sufficient precipitation to qualify it as a humid region. The mean annual amount is highest in the mountains where topography undoubtedly has an effect and toward the eastern end where air masses from the Gulf penetrate more easily. The variation in monthly means throughout the year is shown by Figure 16. The smallest difference (1.09 inches) occurs in April with Muskogee averaging 4.64 inches and Marshall 5.73 inches. The largest difference (2.28 inches) occurs in January when Newport averages 5.00 inches and Muskogee averages 2.72 inches.

A pattern is apparent in the annual march of precipitation. All stations shown have an increase during January followed by a decrease in February. This decrease is more marked at Newport, Batesville, and Bee Branch. The trend is upward during March and April. Newport reaches a peak in April; all others except Muskogee, which reaches a peak in June, have a maximum in May. There is a drastic drop at all stations during July, followed by a rise at all except Nail
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(These data are computed from the U. S. Weather Bureau's information on Arkansas and Oklahoma contained in the Climatic Summary of the United States - Supplement for 1931 through 1952.)
Fig. 16 - Variation in Mean Monthly Precipitation
and Harrison in August. Those two do not experience a rise until September. There is a general slackening in early fall with an upswing during December at Newport, Nail, Ozark, Lutherville, Bee Branch, and Batesville.

Most of the precipitation is cyclonic, accentuated by convectional in the warm season and orographic in the mountains. Rain is commonest although hail, sleet, and snow do occur. Table 7 shows the snowfall record for these stations. As is to be expected, the stations in the mountains and to the north have the highest mean annual snowfall. Snow may be expected at all stations in the November to March period. January and February are the snowiest. Hail occurs in both warm and cool seasons, although rarely in the latter. Sleet is of considerable economic importance, particularly as it may affect transportation across the mountains.

The weather pattern is controlled mainly by the movements of anticyclones and cyclones across the area. These do not appear to be in any way affected by the presence of the mountains but air masses do seem to find them somewhat of a barrier. Air masses from the cold interior may find the mountains sufficiently an obstacle to stay the advance of a weak front, thus sheltering the south slopes and the Arkansas Valley. Similarly, air masses from the Gulf may be blocked in their northward advance. It is apparent, for example, that the lowland
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(From the U. S. Weather Bureau's Information on Arkansas and Oklahoma contained in the Climatic Summary of the United States Supplement for 1931 through 1952.)
area immediately to the east of the mountains is more open to the advance of air masses from both the north and the south.

Sleet storms may coat the area north of the crest, leaving the south slopes open. Low clouds may cover the summits when the sky is cloudless at both Ft. Smith and Fayetteville. Local thunderstorms sweeping through the Valley usually do not stray across the mountains. Frequently, opposite weather conditions may be occurring on the north and south slopes. While none of these features may be of great importance in the characterization of weather over a larger area, locally they have significance.
CHAPTER 4

NATURAL RESOURCES

The landforms and climate described in the preceding chapters have strongly influenced man's evaluation and use of the Boston Mountains, and they are two of the most obvious characteristics of the region. The topography is readily observed by even the casual traveler and the climatic characteristics are quite apparent to anyone remaining within the region for any length of time.

However, other elements of the natural setting exist. Natural vegetation, soils, minerals, waters, and wildlife are all associated with the mountains. They constitute the natural resources of the region and it is upon them, finally, that man relies if he derives his livelihood from the area.

Natural vegetation is the only natural resource which is of significance almost everywhere within the mountains. Primarily because of the relief and the slope, which discourage widespread crop agriculture, most of the region remains in forest. It creates a lasting impression upon the traveler and contributes a number of values to the region.
The other natural elements are of relatively limited quantity and/or quality and are usually considered to be of minor importance. The slopes hinder mature soil development and the steady leaching has created soils of low natural fertility. When the nature of the soils is considered along with relief and slope, a low soil productivity rather obviously results. Processes which produce mineral deposits have not been operative or they have created insignificant wealth. Both the metallic metals and the fuels are absent. The water supply is adequate for present needs of the sparse population but is not outstanding. Numerous sites for reservoirs exist should the need arise. Wildlife is varied as to species but offers few opportunities for man's further development of the region.

**Natural Vegetation**

The natural vegetation in the Boston Mountains consists almost entirely of forest dominated by deciduous hardwoods with pine a major element in the extreme eastern and central southern areas. Forest statistics for the mountain area alone are apparently non-existent and are difficult to compute from materials available for a larger region. The studies on the forests of the Ozark Highlands do not break down the materials so that the Boston Mountains are a recognizable unit.

Between eighty and eighty-five per cent of the mountain area is
in woodland.  

Certainly the landscape viewed from any point is dominated by trees. The valley walls are rarely cleared and even in the valleys and on the summits considerable woodland appears.

It may not have been thus always even within the time of settlement. Patches of natural grassland occasionally occur, especially in the western sector, isolated by the surrounding forest. They may once have been more extensive.

According to the old settlers, this mantle of timber has grown largely since the Civil War. Before that time the ridges and valleys supported a luxuriant carpet of wild grasses, with only a few scattered trees. Such names as "Bald Jesse," "Bald Dave," and "Bald Tom," which are applied to heavily wooded knobs and which seem singularly inappropriate today, are relics of these early days when they really had a meaning.  

The theory expressed was that the Indians fired the lands to obtain game more easily and after the Indians had gone, the timber reestablished itself.  

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1Virgil B. Fielder, Type-of-Farming Areas in Arkansas, Agricultural Experiment Station Bulletin 555 (Fayetteville: University of Arkansas, 1955), p. 80. Fielder does not give the estimate stated here but from statistics which he cites concerning farmland in much of the mountain area this would seem to be a reasonable conclusion.


3Ibid.
The deciduous hardwoods are dominated by an oak-hickory association in which individual species vary depending upon the situation. Within this association, sweet and black gum, elm, walnut, black locust, and red cedar are of secondary importance.\textsuperscript{4} White oak (\textit{Quercus alba} \textit{L.}) is the single most valuable species, occupying the better drained clay bench lands and valley slopes.\textsuperscript{5} Post oak (\textit{Q. stellata}) occurs on the flat summits in the western sector with black oak (\textit{Q. velutina}) and hickory (\textit{Carva} sp.). Black-jack oak (\textit{Q. marilandica}) prefers the sandy soils of the southwestern slope of the mountains. Redbud and dogwood, pawpaw and sassafras, add interesting variety to the floral bounty.

In the eastern part of the mountains it is an oak-pine forest. White oak again dominates among the hardwoods and the shortleaf pine (\textit{Pinus echinata}) is the only native pine species.\textsuperscript{6}

A few trees have rather strict requirements. Chinquapins (\textit{Q. muehlenbergii}) grow on the drier sandy soils; red cedar (\textit{Juniperus})

\textsuperscript{4}Curtis F. Marbut, \textit{Soil Reconnoissance of the Ozark Region of Missouri and Arkansas}, (1914), p. 122.

\textsuperscript{5}\textit{Ibid.}, p. 123.

\textsuperscript{6}Fayette M. Meade, \textit{Forest Plantations in Arkansas}, Agricultural Experiment Station Bulletin 512 (Fayetteville: University of Arkansas, 1951), p. 20.
Virginia) prefers soils derived from limestone; sweet gum (*Liquidambar styraciflua*) requires a very moist situation.\(^7\)

A survey of experiments in forest plantations in the Ozarks (including the Boston Mountains) has shown "the general success of the native pine and the rather consistent failure of most hardwoods."\(^8\) No conclusions were drawn with regard to what this might mean in terms of future plant succession within the area. Loblolly pine (*P. taeda*) was found to outgrow shortleaf pine but it cannot withstand the ice storms\(^9\) which the shortleaf pine does relatively well.

As previously stated, no micro-climatic studies have been made and similarly no micro-vegetative studies exist. It is observed, however, even by the non-botanist, that plant communities, especially at the herb level in the forest, vary considerably, depending upon degree and orientation of slope, and the presence of springs or streams.

A significant factor in the existence of the forest in a large area is the presence of the Ozark National Forest (Fig. 17). This subject will be treated in a later chapter.


\(^{8}\) Meade, *op. cit.*, p. 49.

\(^{9}\) Ibid., p. 50.
Soils

The soils of the Boston Mountains are pedalfers, and are grouped among the Red and Yellow Podzolic soils by all references. Soils and Men,\textsuperscript{10} while correctly identifying the soils as to group, incorrectly includes most, if not all, of the Boston Mountains in the Clarksville-Lebanon Association.\textsuperscript{11} This association has parent materials of "limestones and dolomites"\textsuperscript{12} whereas the Boston Mountains are everywhere surfaced in shale and sandstone. This is another good example of how little care has been taken in delineating the Boston Mountains in particular and the Ozarks in general.

It appears that the mountains should have been included with the Hanceville-Conway Association of the Ouachita area whose parent materials are "Sandstones and shales, in places interbedded. Sandy materials predominate."\textsuperscript{13} The description of this association makes no mention of the southern Ozarks but the parent material relationships are obvious.


\textsuperscript{11}Ibid., see both the map at the back of the book and the discussion of this association, pp. 1061-1062.

\textsuperscript{12}Ibid., p. 1062.

\textsuperscript{13}Ibid., p. 1065.
In the 1957 agricultural yearbook, Soil, the Boston Mountains are mentioned once. However, the discussion includes all of the Ozark region and no special mention is made of the sandstone and shale soils of the Boston Mountains. The impression is left that the mountains probably share the limestone soils found elsewhere in the Ozarks.

The soils have developed primarily from sandstone and shale. Limestone, of limited occurrence, is the parent material in few instances, chiefly on the sides of the mountains. The humid climate has provided adequate precipitation for extensive leaching and the soils are thus non-lime accumulating. Their natural fertility is low. For the most part they are also low in humus and have a poor moisture holding capacity, especially those soils developed from sandstone.

Throughout the mountains the soil is largely immature. Slopes, everywhere except on ridge tops and in the valley bottoms, are conducive to constant erosion of the weathered material. In valleys, deposition of eroded materials makes mature soil profile development almost impossible.

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15 Ibid., p. 572.
A detailed study of the soils of Arkansas remains to be made. Until 1959, only a general lithologic classification\textsuperscript{16} was available except for the work, largely of a reconnaissance nature, published by Marbut\textsuperscript{17} nearly fifty years previously. The lithologic classification not only was very broad in delineation of soils but extremely general in describing them. It recognized two soil types associated with the Boston Mountains: (1) sandstone and shale soils; and (2) soils from interbedded shale, limestone, and sandstone. This same classification labeled most of the mountain region as "non-agricultural" while certain portions in the east were judged to be "unproductive," of "low productivity," and of "moderate productivity."

The publication of a new soils study\textsuperscript{18} is the first really careful analysis of the soils of Arkansas since that by Marbut referred to above. The new study still is rather general, the descriptions lacking sufficient detail. Also, the map fails to show boundaries between

\textsuperscript{16}Agricultural Experiment Station, University of Arkansas, Map of "Arkansas Soils, Soil Productivity, and Type of Farming Areas" (Fayetteville: not dated).

\textsuperscript{17}Curtis F. Marbut, \textit{op. cit.}

associations except where there is a major difference in type of bedrock. However, the descriptions of soil associations which follow are all based upon this latest report.

The Wedington-Fayetteville association occurs on the north edge of the mountains in Madison, Washington, and Crawford counties in areas of moderate to steep slope. The Wedington soils are on the uppermost surface and on the hillsides, having largely developed from sandstone. They are frequently shallow and very stony. They consist of a dark grayish brown sandy material overlying a mottled red and gray clay. The Fayetteville soils occur on the benches and are derived from shale and limestone. They are deep soils, usually mature, of reddish brown sandy loam surfaces with reddish brown sandy clay loam subsoil.

The Wedington-Hector soil association is the most widespread in the mountains, extending throughout the central and southern portions. The Wedington soils are, of course, the same as those described in the previous association. The Hector soils, also derived from sandstone, are quite shallow, seldom over 20 inches deep. They are naturally sandy loam soils.

The Linker-Hector association is very limited in occurrence in the mountains, found only in Boone and Stone counties. The Hector soils remain the shallow soils described above. The Linker soils,
however, are deep soils of the hilltops and ridges. They consist of grayish sandy loam over red and reddish brown sandy clay loam subsoils.

At the eastern end of the mountains, in Cleburne and Independence counties, the Hector-Pottsville and Linker-Hector-Cleburne associations occur. The Pottsville soils are from 8 to 20 inches deep with shale beneath. They are grayish brown sandy loams with yellowish brown sandy loam subsoils. The Cleburne series is fairly deep with brownish gray or pale brown sandy loam surfaces and brown and yellowish brown friable sandy clay loam subsoil.

In general, the soils are fairly shallow; even on the flatter surfaces they are usually from 2 to 6 feet deep. Sandy loams with some clay are commonest, the latter largely in connection with shale outcrops. However, the sandy soils usually possess subsoils with considerable quantities of clay as a result of illuviation. The associations are termed slowly and moderately permeable. In most instances, permeability is observed to be sufficient for drainage to

19Marbut, op. cit., p. 126.

20Ibid., p. 124.

21Soil Conservation Service, U. S. D. A., and University of Arkansas Agricultural Experiment Station, op. cit.
leave country roads free of mud and often almost dusty within a short
time after a heavy rain.

Many areas consist of sheer bluffs where no soil can form. Talus slopes undergo almost constant movement of material so that it is almost impossible for mature soils to form although the soil material may be quite deep. Although alluvial soils are not recognized separately in the current classification, they are significant in most valley bottoms and constitute the most productive farm land.

The use of the associations and their productivity depend less upon the nature of the soils themselves than upon other factors of production. Slope is particularly important in determining which areas will be tilled. The large percentage of the area remaining in forest indicates that there is only local interest in the soil for crop farming. Many fields once cleared for crops now are in pasture. Soil erosion is severe only in local instances because of the absence of crop farming.

**Water Supply**

Previously discussed aspects of climate, drainage, bedrock, and soils largely determine the nature of the water supply. Thus far, man has created few artificial water supplies within or along the margins of the mountains (Fig. 17).
The surface waters are the streams, tributaries of the White and Arkansas rivers. In their upper reaches the streams are intermittent, a characteristic resulting from the great porosity of the stream beds as well as from the fluctuation in water supply. Except where the streams occasionally flow on solid bedrock, the beds are filled with sand and gravel which allow much water to move underground. Only during abnormally rainy summers will the streams maintain a surface flow throughout their entire courses. In any summer, pools will stand in the deeper holes of the stream beds.

Greers Ferry Dam on Little Red River near Heber Springs has created a lake backing water into the southern edge of the mountains between Clinton and Heber Springs. Tenkiller Ferry Reservoir, a man-made lake on the Illinois River in eastern Oklahoma, is situated along the western edge of the mountains. Lake Ft. Smith and Lake Shepherd Springs, both created to provide water for Ft. Smith, are to the east of Highway 71, just south of the Boston Mountain crest. Other lakes, such as Shores Lake northwest of Ozark and that at Devils Den west of Winslow, all man-made, are of little significance except for recreation.

The sandy nature of most of the soil and the sandstone outcrops throughout most of the mountains permit a great deal of the precipitation to be absorbed. Therefore, there is an abundant ground water supply. Springs are common along hillsides, especially at the bottom
of sandstone strata, and water is easily secured in wells on the flat-topped mountains.\textsuperscript{22} Perennial springs are numerous and wet-weather springs are everywhere. Many farmsteads depend upon springs both for the household and livestock water demands.

Except where wells are improperly cased or covered, or where spring pools may collect dead vegetation, the water is unpolluted. It is relatively free from any "taste" that a concentration of any one mineral might create, also.

Since the population of the mountains is small and scattered and there are no trade centers of large size, the problem of adequate water supply is not generally important. Only where supplemental irrigation is practiced, as on pastures, might it become a major consideration in land use. Excessively long droughts, of course, may cause even the most reliable spring to falter.

\textbf{Minerals}

The mineral wealth of the mountains is virtually non-existent except for building stone. Sandstone, in particular, is used locally for buildings, mainly houses and underground cellars. Both limestone and sandstone are available in slabs of convenient thickness so that very little dressing is required.

Occasional outcrops of the Pitkin and Fayetteville formations yield marble. The Pitkin marble is gray to black and coarse, lacking the texture of a true marble, and uneven in color.\textsuperscript{23} The Fayetteville formation contains a black marble of a deep color and fine texture. Commercially, it is designated as "Arkansas Black" marble and cannot be differentiated from imported "Belgian Black" marble.\textsuperscript{24} This stone is obtainable in a zone usually less than 2 miles wide extending from Batesville to near Marshall.\textsuperscript{25} The extent of folding is very minor in these marble-yielding strata and the occurrence of the good grade of black marble is rather surprising.

There is much speculation over the possibilities for oil and gas, especially since gas occurs in the western part of the Arkansas Valley. The structure of the rocks would seem to preclude the assumption that major deposits of either occur. However, indications of gas and oil do appear and Croneis states that "There is a fairly good chance for gas in the Boston Mountains, and small pools of high-grade oil


\textsuperscript{24}Ibid., p. 9.

\textsuperscript{25}Ibid., p. 3.
are possible.\textsuperscript{26} A number of formations contain traces of oil and gas. "The Fayetteville black shale is an ideal source. . . . At almost all of its exposures the fresh shale gives off a strong odor of petroleum. . . ."\textsuperscript{27} The same report also regards the Wedington sandstone as a potential source.\textsuperscript{28} Near Winslow, a test well entered the Wedington at 820 feet and obtained a good showing of oil and gas at 885 feet.\textsuperscript{29} Another well, near Witter, which is south of Huntsville, obtained a showing of oil and gas at 200 feet.\textsuperscript{30} The Hindsville limestone is also considered a potential source.\textsuperscript{31}

Yet, it remains to be proved that commercial reserves do exist. It would seem, from the evidence which has appeared occasionally in drilling water wells, that small pockets of gas are present. This has never been sufficient to develop into a commercial enterprise nor has it stimulated widespread drilling in search of gas. No production of petroleum occurs at all. Obviously, the fuels should not be listed among the natural wealth of commercial value at the present time.


\textsuperscript{27}Carey Croneis, Geology of the Arkansas Paleozoic Area, p. 72.

\textsuperscript{28}Ibid.

\textsuperscript{29}Ibid., p. 73.

\textsuperscript{30}Ibid.

\textsuperscript{31}Ibid., p. 65.
Wildlife

The wildlife resource of the Boston Mountains consists of an abundance of species but it does not excite or even attract much attention as a whole. A list of all species of fowls and land animals would be lengthy and purely academic and is not considered of sufficient value to be included here.

Characteristic wildlife are: bobwhite quail, fox and gray squirrels, cottontail rabbit, mourning dove, Virginia white-tailed deer, eastern wild turkey, black bear, American elk (very few), Eastern wolf, coyote (very few), bobcat, opossum, raccoon, mink, red and gray foxes, skunk, muskrat, and otter.32

The streams generally abound in fish. The most important game fish are large mouth and small mouth bass. Varieties of perch and catfish occur. Gar, carp, and suckers are the chief rough fish.

Except for deer, the various forms of wildlife are of importance only locally. People from other parts of the state, and some from

32 Although native to the state as a species, some of the present bears were brought from Minnesota in 1959 in the hope that the number of bears in the mountains might increase more rapidly.

33 This list is compiled from the discussion found in A Survey of Arkansas Game by the Arkansas Fish and Game Commission (Little Rock: 1951).
other states, come to the mountains during the deer hunting season. Wildlife provide a very small portion of the food supply for the populace and the bounty from wolves or the income from skins is a negligible aspect of the economy.

A few wildlife refuges have been set aside within the mountains (Fig. 17). Throughout the area, the absence or sparseness of settlement, the rather minor network of highways, and the preponderance of land in forest, make the mountains a favorable habitat for wildlife. Ecological studies of the wildlife have not been made but it would be interesting to learn, for example, what effects the additional number of black bears will have on other animals.
PART II

CULTURAL ASSOCIATIONS IN THE BOSTON MOUNTAINS
CHAPTER 5

POPULATION AND SETTLEMENT

Europeans Enter Arkansas

The three stars in the lower part of the diamond on the Arkansas flag represent the three nations of which Arkansas has been a part: France, Spain, and the United States. As a component of the vast Louisiana Territory it was a relatively insignificant pawn of empire and was of little importance, moreover, until settled as a part of the United States by the American pioneer.

The first white settlement in Arkansas was founded in 1686 by members of a French exploring party under de Tonti.¹ This settlement was located on the left bank of the Arkansas River approximately twenty miles upstream from its confluence with the Mississippi. It was named by the French, "Aux Arcs,"² but later Americans called it "Arkansas Post." The term "Aux Arcs" was spelled phonetically "Ozarks" by the English-speaking people and later applied to the highlands to the northwest.

²Ibid.
For nearly a century, until the Treaty of Paris in 1763, the area later known as the Louisiana Purchase belonged to France. French interests were not centered on agriculture but on furs and trade. Thus, little attention was given to the possibility of settling the Mississippi Valley in the manner in which the English were occupying the eastern seaboard. New Orleans was the down-river focus of settlement; Kaskaskia and Vincennes were centers in the north; Arkansas Post, of little importance, was situated midway between.

The major attempt at colonization of the Arkansas area during the French period was part of a scheme now referred to as "The Mississippi Bubble."³ The Mississippi Company had been organized by a financier named John Law and granted its charter by the King of France, Louis XV. Law obtained for himself a tract of land seven miles upstream from Arkansas Post and settled a large colony of Germans there. The colony itself prospered but when Law's financial ventures failed the colonists abandoned the area for a site near New Orleans.

France ceded Canada to the English and Louisiana to Spain in 1763 as a result of the Seven Years' War. Spain acquired the area with reluctance, primarily to keep the English from obtaining it. Spanish control brought to the Arkansas area a colonial administrator and a regiment stationed at Arkansas Post but no colonization by Spaniards. The French continued to move in, coming from Canada and New Orleans, apparently to escape the tighter controls of the new rulers in those more densely settled and prosperous areas. The isolated homesteads were situated mainly along the rivers, such as the Black and St. Francis in the lowlands of northeastern Arkansas. The mountains, and the highlands in general, were avoided. Later, when the United States obtained the area, all valid grants made under Spanish law were held valid by the United States. However, people came slowly. A census by the Spanish governor in 1785 counted only 196 persons in the Arkansas District of Louisiana.

The Spanish hoped to attract Americans to the area. After the American Revolution, Spain schemed to obtain the area between the Appalachians and the Mississippi from the new nation by taking advantage of discontent among the few American settlers already there. Many inducements were offered to Americans to settle on Spanish lands, including free land and no taxes. A number came, settling mainly in the northeastern part of the state. In the boot-heel of
Missouri, the town of New Madrid was founded by an Ohioan who obtained a Spanish grant. It quickly outgrew the settlement of Arkansas Post.

The return of Louisiana to France was made by secret treaty in 1800. The delay in transferring authority was so great that only a few days elapsed between the raising of the French and American flags (as a result of the Louisiana Purchase, 1803) in New Orleans.

Rule by France and Spain had only a few noteworthy effects on the Arkansas area and left no imprint at all upon the Boston Mountains. The French contributed families and place names, especially in the northeastern part of the state and in the Arkansas Valley. The latter are very much in evidence, as for example, Vache Grasse, Fourche la Fave, Poteau, and Petit Jean. The Spanish encouraged the Americans to look westward across the Mississippi even before the land to the east had been taken up. Some intermarriage took place between the Europeans and the Indians. But apparently there was no thought of removing the natives as the Americans were so soon to do.

Purchase of the Louisiana country by the United States did not result in any immediate influx of settlement into the Arkansas area. The region passed through various administrative stages. The Louisiana Purchase was first divided into the Territory of Orleans and the District of Louisiana, the boundary being that between
Louisiana and Arkansas today. Later, the District of Louisiana became the Territory of Missouri and much of the present state of Arkansas became the County of Arkansas. When Missouri asked for admission to the Union, Arkansas requested that she not be included because of the slavery issue and an act setting up the "Arkansaw sic Territory" was passed in 1819.

Little was known of the Arkansas country in the first years of its possession by the United States. A party under James B. Wilkinson was detached from Zebulon Pike's expedition to the west to descend the Arkansas River. The Wilkinson trip was made in the winter of 1806-1807 and reported only scanty information concerning the narrow area along the river. Southern Arkansas was explored by William Dunbar, who was commissioned by President Jefferson to explore the Ouachita River in southern Arkansas.

For over a century after its founding, Arkansas Post was the only white town within the present bounds of the state. Except for the

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who migrated far ahead of the frontier, American settlers did not reach the Mississippi River until the end of the eighteenth century and did not invade Arkansas until the second decade of the nineteenth century. Even then, settlement spread slowly along the Mississippi and Arkansas rivers and into the more elevated and better drained lands of the inner coastal plain. The navigable rivers were the best avenues of travel; where they were not present, as in the mountains, few early settlers entered.

The westward migration of the American people was timed with respect to economic and social conditions in the older areas of settlement and also with respect to the availability of land ahead of the frontier. Arkansas, as part of the Louisiana Purchase, had not been open to Americans until 1803 unless they wished to reside on foreign soil.

Availability of western land also was often closely related to the removal of the Indians from the frontier. The original Indian groups in Arkansas were the Osage to the north of the Arkansas River, the Quapaw south of the Arkansas River, the Caddo in the extreme southwestern part of the state, and a few mound builders in the northeastern lowlands. Relatively few marks of their occupancy remain upon the

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land and there is no evidence of early Indian settlements in the Boston Mountains themselves. Undoubtedly, the Indians traveled the mountains in search of game but their occupancy must have been nomadic and sporadic. To the north of the Boston Mountain Front on the Springfield Plateau chert (flint) is available. It is evident from the many artifacts found there that the Indians must have frequented that area to obtain the raw materials for weapons and tools.

As white settlement advanced into Arkansas only the Osage and Quapaw Indians were of much concern to settlers because of the prior claim they had to the land. Particularly, settlement in the Boston Mountains was dependent upon Osage cessions of land. The mound builders had almost completely disappeared; the Caddo people held only an insignificant portion of the state.

The Indian Removals

A history of the Indian lands in Arkansas in many ways follows the pattern over the country at large. Everywhere that the white man advanced the Indian was forced to give up his territory. Such relinquishment usually was at a price far less than the actual value of the land and more often than not was accompanied by deceit. In the case of Arkansas, land acquired from the original inhabitants was sometimes awarded to late-comers forced out of lands farther east, who,
in turn, eventually had to relinquish it. There is no question but that early policy, especially under President Jackson, was to affect the removal of all Indians from eastern United States. This policy was advocated in the face of population growth in the east and areal expansion to the west which appeared to create land for the displaced Indians. It was only a matter of time until the same problems arose in Arkansas.

The Indians gave up their claims to lands in Arkansas through a series of treaties, most of which were arranged in the two decades between 1808 and 1828. The relinquishment of land was not always in accord with the majority opinion; few could conceive of what the agreements would actually mean for the people.

The Osage Indians were the first group affected since they held northern Arkansas and the first settlers were inclined to favor that part of the state and demand land there. The Osage relinquished most of their land north of the Arkansas River, including all but a small portion of the Boston Mountains, by the Treaty of Ft. Clark on November 10, 1808. This area was then legally open to white settlers.

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7 The Indian lands were an issue during the presidential campaign of 1828. President Jackson signed a "Removal Bill" in May, 1829, as a major step in clearing the Indians from the eastern part of the nation.

However, population pressure was extremely light along the western frontier at that time and few took advantage of the opportunity to acquire land in Arkansas.

Previous to this first (of three) treaty with the Osages, a group of Cherokee Indians had fled to the swamps of the St. Francis River after taking part in a massacre at Muscle Shoals on the Tennessee River in 1794. In the following years, this band was augmented by others who wished to escape the white man's encroachment upon the Cherokee Nation in the east. In 1808, some of these western Cherokees petitioned President Jefferson for land elsewhere, that they might move from the swamps. An exploring party was authorized to investigate the suitability of the former Osage lands situated between the White and Arkansas rivers, an area largely within the Boston Mountains.

On July 8, 1817, a treaty was signed with the Cherokee Nation granting it a large tract which included the heart of the Boston Mountains. A line extending northeastward from a point near the present

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10 Herndon, op. cit., p. 63.

11 Ibid.

12 Ibid., p. 64.
city of Morrillton to the White River near Batesville was the eastern boundary. The western boundary, which was undecided until 1825, began at a point ten miles upstream from Ft. Smith, extending northeastward parallel to the eastern boundary to the White River. The Arkansas and White rivers were the southern and northern boundaries, respectively. The land thus enclosed was to compensate the Cherokee Nation, acre for acre, for eastern land the Nation was ceding to the United States.  

A few white settlers living within the newly designated Cherokee lands, having come in the decade between the Osage and Cherokee treaties, were forced to move. There is no record of the exact number of Cherokee Indians who made a new home in this grant. Between two and three thousand were already in Arkansas at the time of the treaty. Approximately six thousand Cherokees were living in the tract by 1819. Conflict soon arose between the Cherokee and Osage Indians because the latter felt that the lands which they had ceded in

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13 Ibid.


15 Ibid., p. 218.
1808 should not have been granted to other Indians.  
In addition, a small area in the southwest corner of the Cherokee land was not actually included in the Osage cession of 1808.

By the Quapaw Treaty of August 24, 1818, most of the state south of the Arkansas River was obtained from the Indians. The Quapaws reserved a tract southeast from the Little Rock area but this, too, was given up by treaty on November 15, 1824.

In a second treaty with the Osage, September 25, 1818, an area involving the greater part of Washington and Crawford counties was obtained. This same treaty also released to the United States the Osage lands east of the Verdigris River in Oklahoma.

The Choctaw Treaty of October 18, 1820, like the Cherokee Treaty of 1817, brought Indians into Arkansas rather than removing them. By this pact southwestern Arkansas and the southern half of Oklahoma were given to the Choctaws in exchange for eastern lands. This treaty was strongly opposed by the white settlers living in Arkansas who wished to rid the state of Indians, not bring more in. However,

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16 Brown, op. cit., p. 474.
17 Herndon, op. cit., p. 64.
18 Ibid.
19 Ibid., p. 65.
20 Ibid., p. 66.
by a second treaty, signed January 20, 1825, the Choctaws gave up their lands in Arkansas but retained those to the west. 21 Thus, all land south of the Arkansas River was cleared of Indians in early 1825, except for the Caddo area in the extreme southwest, while much of the land north of the Arkansas River was still in Indian grants.

The last vestige of Osage territory in Arkansas was taken from that tribe by treaty on June 2, 1825. 22 This affected a small area in northern Washington County and the western three-fourths of Benton County. Much more extensive lands to the north and west of Arkansas were given up, also.

Discontent among white settlers was directed toward the Cherokees living on the land which had been awarded to them in 1817. This large block of northern Arkansas contained the last Indian lands in the state except for a very small tract in the southwest corner. As a result of agitation to open the land to white settlement, negotiations were entered into and the Cherokee Nation ceded to the United States all of the land obtained in 1817 by a treaty signed on May 6, 1828. 23 This, then, made the Boston Mountains available for settlement. In return,

21 Ibid., p. 69.

22 Ibid., p. 68.

23 Ibid., p. 71.
the Cherokees received land in the Indian Territory (eastern Oklahoma), including the western end of the Boston Mountains. The Cherokees in Arkansas moved to this new area, joined by an almost steady stream from the Eastern Nation over the next decade.

The Eastern Nation existed as an independent republic within the State of Georgia which greatly resented its presence. Although the land had been granted to the Indians by the Federal Government, Georgia moved to abolish the Indian claims and to make living so unpleasant for the Cherokees that they would move. The Federal Government did little to protect the rights of the Indians in this crisis.

As a climax to the troubles of the Cherokee people, gold was discovered on their land in Georgia in 1829.\textsuperscript{24} This was all that was needed to precipitate a rush of white settlers who completely ignored all rights of the Indians. The Federal Government arranged the Treaty of New Echota in 1836 with a compliant, though not representative, body of negotiators from the Eastern Nation.\textsuperscript{25} The Cherokees sold to the United States all of their remaining territory east of the Mississippi and promised to join the Western Nation where some


\textsuperscript{25}\textit{Ibid.}, p. 99.
additional land was granted to take care of the enlarged population.

By 1838, many Cherokees had already migrated and a majority of the remainder set out in the autumn of that year upon the "Trail of Tears." Two different routes of migration were followed, one which took them through the Arkansas Valley and one which skirted the northern edge of the Boston Mountains. It was a very severe winter and the Indians were without proper food, clothing, or means of transportation. More than four thousand died during the ordeal, including the wife of John Ross, head chief of the Cherokees, who is buried in Little Rock.

The lands in the Indian Territory were considered by the Indians to be inferior for farming to those that had been abandoned in Georgia. The scrub oak-hickory forest and short prairie was an unfamiliar environment. Many of the eastern Cherokees had possessed plantations or large farms with fine homes and were as prosperous as many Americans. In 1835, for example, there were 1,592 Negro slaves in the Cherokee nation. Small compensation was received for their

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26 The Federal Government, prodded by Georgia, sent an army contingent to hasten the evacuation. People were forcibly herded into compounds and little attention was given to living conditions. Many Indians fled to the adjacent Great Smokies. Later, those who had escaped the removal and those who made their way back from the Indian Territory were granted reservation lands in North Carolina.

27 Eaton, op. cit., p. 124.

28 Royce, op. cit., p. 289.
possessions which they were forced to leave behind and it was an impoverished people who made the trek west. Dissatisfaction with the terms of the treaty, the sale of the land, and the removal to the west, disrupted political organization. However, the nation managed to adjust to the new situation and progress under wise leadership although it never again had the unity or prosperity which had characterized the Eastern Nation. A capital was built at Tahlequah, Oklahoma, six miles north of the Boston Mountains, which later became the county seat of Cherokee County.

The last chapter in the Indian lands of Arkansas was the Caddo Treaty of July 1, 1835, which affected only the extreme southwest corner of the state.\textsuperscript{29} This land was already effectively settled by the white man and the treaty was only a formality to legalize the titles.

The Oklahoma section of the Boston Mountains was a part of the Indian Territory until it was merged with the Oklahoma Territory in 1906.\textsuperscript{30} By 1889, there were two white settlers for every Indian in the Territory, although most had entered illegally.\textsuperscript{31} The Indians

\vspace{0.5cm}

\textsuperscript{29}Herndon, \textit{op. cit.}, p. 71.


had hoped to gain recognition for the Indian Territory as a separate state with the name of "Sequoyah" but the white settlers were strongly opposed and Congress would not approve the petition of the Indians.

The removal of the Indians from Arkansas was both a prelude to and a result of the advance of white settlement. Obviously, the movement of both the Cherokees and Choctaws to lands in Arkansas reflects the pressure on land farther east. Finally, settlement demanded the Arkansas lands themselves and the Indians were pushed westward into the Indian Territory. This new land they managed to hold while white settlement surrounded them and passed farther west, creating an island of Indian settlement.

The Indians had little direct influence upon Arkansas' settlement except as their removal made land available. In general, the Indians were removed well in advance of the need for the land. Relations between the white man and the Indian were peaceful and the Indians' occupancy of the land did nothing to alter it. There were uncounted numbers of the population in Arkansas having Cherokee blood and a few trace lineage to the Choctaws. In eastern Oklahoma, of course, the Indian bloodlines are very prominent.
Pioneer Settlement and Growth

The State

Sufficient has been said concerning the removal of the Indians to indicate that there was actually little delay in making land available to the pioneers. Although there was much popular agitation and political pressure for the removal of the Indians, the population pressure along the advancing frontier was not very great. At the time of the Louisiana Purchase, much popular sentiment was against such "folly," the feeling being that the expanse was too vast ever to be effectively settled.

In 1800, Kentucky and Tennessee had populations of 220,955 and 105,602, respectively. Even though these numbers were not large enough to crowd those states, many people with the pioneer spirit were feeling the necessity of moving on and Arkansas was located in the direct line of migration. Mississippi had only 7,600 people in 1800 but most of that state was held as Choctaw tribal lands. The area of Indiana, Michigan, and Illinois had only 5,641 persons in 1800. Thus, there was still ample room for population expansion east of the Mississippi River.

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33Ibid.

34Ibid.
By 1810, only 1,062 persons were reported living in Arkansas, and at that time the Arkansas district even included southern Missouri. The rivers were the major routes of travel and the few settlers were located mainly along the Arkansas River and the streams of the northeastern part of the state. There is no record of a settlement in the Boston Mountains at that time.

A band of eight families from North Carolina settled on the south side of the Arkansas River at Crystal Hill in 1806. This settlement was so isolated that it is reported that when Major Gibson of the United States Army stopped at Crystal Hill in 1815 he found that the people had not heard of the War of 1812. One family moved upstream from Crystal Hill to found Cadron in 1815. The site of Batesville, only a few miles to the north of the mountains, had been settled by Kentuckians as early as 1810.

In 1814, three families of eighteen persons left middle Tennessee in a flatboat and spent the winter of 1815-1816 at the Cadron settle-

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35 Ibid.
37 Ibid.
38 Ibid., p. 48.
39 Herndon, op. cit., p. 872.
ment. 40 In the spring of 1816 they went farther up the Arkansas and founded a settlement on Mulberry Creek, a tributary of the Arkansas flowing from the Boston Mountains, in Franklin County. 41 At the signing of the Cherokee Treaty of 1817, which gave the Indians a large tract north of the Arkansas River, this settlement, then consisting of eighteen families, moved to the south side of the Arkansas River. However, the people re-occupied the Mulberry Valley after the Cherokee Treaty of 1828.

A settlement at Dardanelle dates possibly to 1817. 42 In 1818, there was a settler where Van Buren now stands. 43 Thus, settlements were widely scattered throughout the Arkansas Valley by 1820. Although a settler's cabin was located at Little Rock as early as 1812, the city was founded in the Spring of 1820 in a land speculation scheme which had many shady manipulations. 44 It was rapidly promoted as the most centrally located town in the state, advancing its claim for

40 Ibid., p. 756.

41 Ibid.

42 Shinn, op. cit., p. 142.

43 Herndon, op. cit., p. 748.

44 For a complete and detailed description of the founding of Little Rock, see Dallas T. Herndon, Why Little Rock Was Born (Little Rock: Central Printing Co., 1933).
the capital over nearby places such as Cadron and Crystal Hill, and was designated as the capital city on October 25, 1820.

An abundance of cheap and good lands attracted the early settlers who were willing to use horseback and flatboat to journey to Arkansas. Following the severe New Madrid earthquake of 1811, the United States government in 1815 issued land certificates for tracts up to one hundred and sixty acres to those who lost their homes in the disaster. From 1817 to 1825, land bounties granted to soldiers of the Revolution and the War of 1812 stimulated a boom. The bounty lands, some sixty sections, were surveyed mainly on the St. Francis and White Rivers in the northeastern part of the state. Following this, surveys of the pre-emption lands were begun in 1819, ushering in an era of speculation with the Pre-Emption Law of 1820.

At first it was virtually impossible to bring a wagon to Arkansas because of the lack of trails and the problem of crossing the Mississippi River. By 1815, however, the situation began to change. A

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45 Shinn, op. cit., p. 105.


47 Shinn, op. cit., p. 106.

48 Ibid.
military road built south from St. Louis through Ste. Genevieve to Davidsonville in 1817\textsuperscript{49} reached Cadron in 1820 by way of Batesville, and in 1821 it extended southward to Fulton on the Red River in Hempstead County. \textsuperscript{50} Ferries began to operate across the Mississippi River during this same period.

Arkansas Post and Davidsonville were designated as post offices in 1819. The mail ran once a month between St. Louis and Monroe, Louisiana, delivered in Arkansas on the way. The \textit{Arkansas Gazette}, the state's oldest newspaper, was first published at Arkansas Post on November 20, 1819. \textsuperscript{51} It was issued in both French and English symbolic of the population in that village. Obviously, there could be little circulation beyond the immediate locality. By mid-1820 there were six post offices in the state: Cadron, Clark Court House, Hempstead Court House, and White River Post Office in addition to the two aforementioned. \textsuperscript{52} At this time, of course, the Boston Mountains were a part of Cherokee lands and without white settlement.

\textsuperscript{49}Ibid., p. 104.

\textsuperscript{50}Ibid.

\textsuperscript{51}Ibid., p. 13.

\textsuperscript{52}Ibid., p. 19.
Such settlements as have been mentioned indicate the extent of community development in pioneer days. Most of the people lived on relatively isolated homesteads. It is interesting to note that all of the towns which have been mentioned, except for Little Rock, have faded into oblivion or exist merely as historical sites. Early locations did not prove to be the best ones in the long process of the state's settlement and development, mainly, no doubt, because they were chosen without respect to the situation beyond the immediate locale.

The nature of early settlement can best be viewed through the accounts of travelers of the time. Journals of Thomas Nuttall, Amos Stoddard, Henry R. Schoolcraft, and Major Stephen Long are notable examples of first-hand observations of the Arkansas scene in the early 1800's. Although their travels were limited in scope, they saw the parts of the state which had white settlers. This did not generally include any part of the Boston Mountains. Life was primitive,

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54 Amos Stoddard, *Sketches, Historical and Descriptive of Louisiana* (Philadelphia: Mathew Carey, 1812).


given mainly to obtaining the basic necessities and simply staying alive. Homes were crude log huts. Roads were little more than trails. The facilities for travelers scarcely existed. Yet, hospitality was never lacking and the settlers, extremely isolated, generally were eager for news of the world outside.

Most of the settlers came from states directly to the east, from Tennessee and the Carolinas, especially. Worn-out land and increasing population pressure encouraged people to try their fortunes farther westward as the government made land available.

At all times, the state's population has been largely of European stock, chiefly Anglo-Saxon because these were the people who had earlier settled the eastern states. The South as a whole, and Arkansas in particular, has never had large numbers of "foreign born" or of peoples of East and South European ancestry. The mountains, especially, are peopled with "native" American stock.

The Negro population, of course, is significant in the state as a whole, though noticeably absent from areas where the cotton economy has never penetrated. The uplands, which have the lowest percentages of tenancy in the state and the highest degree of self-sufficiency, have never had many Negro inhabitants. Where counties are situated in both uplands and lowlands, nearly all Negroes reported
live in the latter areas. There probably is not a single Negro living in the Boston Mountains today.

The population of Arkansas more than doubled at each census through 1860. During this time, lands everywhere throughout the state were being taken up. Although the lowlands received the most settlers, as in earlier days, the Ozark and Ouachita highlands were not by-passed. Obviously, natural resources and accessibility were major factors determining the desirability of an area for settlement.

TABLE 8

POPULATION OF ARKANSAS, 1810-1960

<table>
<thead>
<tr>
<th>Year</th>
<th>Population</th>
</tr>
</thead>
<tbody>
<tr>
<td>1810</td>
<td>1,062</td>
</tr>
<tr>
<td>1820</td>
<td>14,273</td>
</tr>
<tr>
<td>1830</td>
<td>30,388</td>
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<td>1840</td>
<td>97,574</td>
</tr>
<tr>
<td>1850</td>
<td>209,897</td>
</tr>
<tr>
<td>1860</td>
<td>435,450</td>
</tr>
<tr>
<td>1870</td>
<td>484,471</td>
</tr>
<tr>
<td>1880</td>
<td>602,525</td>
</tr>
<tr>
<td>1890</td>
<td>1,128,211</td>
</tr>
<tr>
<td>1900</td>
<td>1,311,564</td>
</tr>
<tr>
<td>1910</td>
<td>1,574,449</td>
</tr>
<tr>
<td>1920</td>
<td>1,752,204</td>
</tr>
<tr>
<td>1930</td>
<td>1,854,482</td>
</tr>
<tr>
<td>1940</td>
<td>1,949,387</td>
</tr>
<tr>
<td>1950</td>
<td>1,909,511</td>
</tr>
<tr>
<td>1960</td>
<td>1,786,272</td>
</tr>
</tbody>
</table>

(These data have been taken from the published reports of the U. S. Census Bureau.)

The decade 1860 to 1870 was, of course, the period of the War of the Rebellion. Normal processes of migration were disrupted and
the rigors of war took their toll. The highlands of Arkansas, essentially non-cotton and non-slave regions, were less sympathetic to the Confederate cause than were the lowland regions. Many families had members in both armies. Northwest Arkansas was the scene of several engagements, especially the Battle of Pea Ridge (Elkhorn Tavern), but the war was not carried into the Boston Mountains. Again, briefly, the Cherokee Indians entered the scene, fighting in the Battle of Pea Ridge and others for the Confederacy.57

The decade 1870-1880 was one of great population increase for the state, which then proceeded slowly to gain population through each decade until that of 1940-1950. This growth was in response to available land, the utilization of mineral and forest resources, development of manufacturing, and improvement of transportation facilities.

The last two censuses, 1950 and 1960, mark a decline in population. They cover the period of World War II and its aftermath. The population loss has resulted from the state's failure to offer economic opportunities which could compete with those elsewhere.

Figure 18 shows the population density of Arkansas counties in 1910 and 1960. Figure 19 emphasizes the loss in population which

57 For a full treatment of this topic, see Frank Cunningham, General Stand Watie's Confederate Indians (San Antonio, Texas: The Naylor Co., 1957),
some counties experienced in that fifty-year period. It is apparent that those counties with the largest population densities (and usually the largest cities) in 1910 have continued to grow. They have had the most productive soils, minerals, or other specific advantages to enable them to get ahead and continue to prosper. The counties which showed the poorest carrying capacity by 1910 obviously have not been able to raise that carrying capacity appreciably and make sizeable gains. In fact, greater opportunities in other counties or in other states have caused many of the counties with lower densities to decline in the fifty-year interval. This is true especially in the highlands. Within the Ozarks, for example, there have been large population decreases except for Washington County. The presence of the University of Arkansas and the manufacturing in the Fayetteville-Springdale area have enabled it to grow.

It would appear that the present pattern of population density will change only to the extent that areas of already high density will continue to increase and areas of low density, especially the mountains, will remain static or decline still more. Efforts to attract manufacturing to the state have resulted in the more highly developed areas improving their position because they are the ones which have had and still have the greatest attractions for industry. The hill and mountain lands have probably reached their potential carrying capacity
until the nation as a whole is forced to make a more intensive use of its space.

The Boston Mountains

The American pioneer in the first half of the nineteenth century probably viewed the Boston Mountains from a different perspective than a settler would today. Many people now look upon living conditions in the mountains as being "pioneer" or even "primitive" and the isolation as prohibitive. In many ways it may seem that little change has taken place during the past century. Yet, at the time of settlement the mountains possessed certain definite attractions and there were few cultural differences between those people living in the mountains and those who lived in surrounding areas.

An abundance of game and a plentiful supply of wood furnished many of the most basic necessities. Livestock could graze on open range and hogs, especially, could live off of the land with almost no farm care. The agricultural equipment and methods of the time made small fields both efficient and sufficient cropping units. Isolation was a less important factor in the life of the pioneer than it is to his descendants. Many pioneers, in fact, sought freedom from political and social restraints. Except that the mountain streams were not navigable, transportation facilities were about the same in the mountains as elsewhere. The well-drained highlands were certainly a more pleasant
place to live than the swampy river lowlands to the east and south.
Flint says of the latter areas that "The shores of Arkansas as far up
as Little Rock are decidedly unhealthy. Great tracts, on all sides,
are covered with sleeping lakes and stagnant bayous." 58

The time of settlement in the Boston Mountains coincided closely
with the westward movement of the American frontier. The moun-
tains were no obstacle to westward migration because of their very
narrow north-south extent. However this orientation may very well
have deterred settlement because the mountains could be easily by-
passed. This was, of course, quite opposite to the situation which
occurred in much of the Appalachian country. Also, the mountains
were less amenable to penetration than were the lowlands. No passes
or river valleys led entirely across them and the rugged terrain made
passage difficult. It is understandable, therefore, that they would be
entered somewhat later and by fewer people than would be the lowlands.

The best compiled source of early settlers in the Boston Moun-
tains is a History of Newton County, Arkansas. 59 This is used here
as an example of white settlement in the mountains with the

58 Timothy Flint, Flint's Geography (Boston: E. H. Flint,
1833), p. 284.

59 Walter F. Lackey, History of Newton County, Arkansas
(Independence, Missouri: Zion's Printing and Publishing Co.,
1950).
realization that the picture might differ slightly from place to place. As previously noted, no one county lies entirely within the mountains but Newton County is most representative when compiling any statistics on a county basis and is the most completely "mountain county" in northern Arkansas.

The initial settlement of Newton County was fairly complete by 1860, having been made in the previous three decades following the Cherokee Treaty of 1828. Most of the land was purchased in tracts of forty acres for one dollar and twenty-five cents per acre. Very little land was homesteaded or claimed under military warrant.

An account of the populace of Newton County in 1850 indicates the state of birth of the settlers. The home states of the two hundred and sixty-six heads of families residing in the county in 1850 are given in Table 9.

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60 The discussion and statistics of early settlement of Newton County are based upon information in Lackey's study, previously cited.
TABLE 9

HOME STATES OF NEWTON COUNTY
HEADS OF FAMILIES, 1850

<table>
<thead>
<tr>
<th>State</th>
<th>Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tennessee</td>
<td>126</td>
</tr>
<tr>
<td>North Carolina</td>
<td>48</td>
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<tr>
<td>Kentucky</td>
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<td>South Carolina</td>
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<td>Alabama</td>
<td>9</td>
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<tr>
<td>Virginia</td>
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<tr>
<td>Indiana</td>
<td>6</td>
</tr>
<tr>
<td>Illinois</td>
<td>5</td>
</tr>
<tr>
<td>Pennsylvania</td>
<td>4</td>
</tr>
<tr>
<td>Maryland</td>
<td>1</td>
</tr>
<tr>
<td>Maine</td>
<td>1</td>
</tr>
<tr>
<td>Mississippi</td>
<td>1</td>
</tr>
<tr>
<td>Ohio</td>
<td>1</td>
</tr>
</tbody>
</table>

(Compiled from information in Walter F. Lackey, *op. cit.*)

Obviously, Newton County received settlers primarily from the states directly to the east. It was probably an instance of exchanging one familiar environment for another: hills, in this instance. Sometimes, as in the case of the families from Illinois which were grouped closely together in the county, the people must have come as a colony or were closely associated in the former state.

The population of Newton County at each census since its organization is given in Table 10. Growth was fairly rapid in the early years. Although the 1870 count is lower than it might have been had there been
no war, the county certainly was not affected proportionately as much as was the state. For the decade 1860-1870, Newton County increased 28.6 per cent while the state increased only 11.2 per cent (see Table 8).

<table>
<thead>
<tr>
<th>Year</th>
<th>Population</th>
</tr>
</thead>
<tbody>
<tr>
<td>1850</td>
<td>1,758</td>
</tr>
<tr>
<td>1860</td>
<td>3,393</td>
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<td>1870</td>
<td>4,374</td>
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<td>1880</td>
<td>6,120</td>
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<td>1890</td>
<td>9,950</td>
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<td>1920</td>
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<td>1930</td>
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<td>1940</td>
<td>10,881</td>
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<tr>
<td>1950</td>
<td>8,685</td>
</tr>
<tr>
<td>1960</td>
<td>5,963</td>
</tr>
</tbody>
</table>

(These data have been taken from the published reports of the U. S. Census Bureau.)

The population decrease from 1900 to 1910 can be attributed in part to the creation of the Ozark National Forest in 1907 and 1908, which includes all of southern Newton County and involved some privately owned land. Another factor undoubtedly was zinc mining in adjacent counties, and outside of the mountains, which certainly was a much more remunerative opportunity than most of those offered by Newton County. No statistics available indicate how many people may have moved from Newton County as a result of the establishment of
the Ozark National Forest or to mine zinc. It is difficult to account for the fluctuations which appear in the 1920, 1930, and 1940 census tabulations. Probably the greater prosperity in other areas, made possible by better economic opportunities, drew people from the area during the 1920's. On the other hand, hard times in the cities and the greater ease of obtaining a subsistence living in the hills brought people back to the county in the 1930's.

Since 1940, population has drastically declined. This is in line with the trend in other rural farm areas in the state and across the nation. The effects of World War II and the continuing armament race and business activity make the economic opportunities in Newton County and the mountains in general appear negligible by comparison with those elsewhere. Nor is this situation going to change unless some economic reversal makes the rural mountain areas once more attractive. At present, no such reversal is in sight.

The Boston Mountains: 1960

Population Characteristics

It has been pointed out that the Boston Mountains exhibit one of the lowest arithmetic population densities in Arkansas and this is also true in Oklahoma. The density is greater everywhere adjacent to the mountains. The natural resources of the mountains are not sufficient
in either quantity or quality to support a large number of people or
even suggest that one might be possible under the present system of
extensive land use. Lack of minerals, the preponderance of land in
slope that is difficult to cultivate, accessibility, and the large acre-
age of government-owned land, combine to discourage sizeable settle-
ment. Yet, it is obvious to even the casual observer that there are
more people living on the land than it can adequately support.

It is impossible to give an absolutely accurate total population
figure for the area. Newton County, with approximately eighty per
cent of its area and seventy-one per cent of its population in the
mountains, is the only truly mountain county. Jasper, its principal
town and county seat, is situated at the foot of the Boston Mountain
Front and has a population of only 273.61

A total population of 45,118 has been compiled for the Boston
Mountains by using the townships that are entirely within the moun-
tains and those which have at least half of their area within the moun-
tains. (See Table 11) Relatively little area has been omitted by this
method. The excluded area is undoubtedly more than compensated
for by the higher population density of non-mountain areas which are
a part of some townships included.

61 The source for this and all succeeding population data in the
remainder of this chapter is the U. S. Bureau of the Census, Eighteenth
Census of the United States: 1960, Population, Number of Inhabitants,
### TABLE 11

**POPULATION OF THE BOSTON MOUNTAINS, 1960**

<table>
<thead>
<tr>
<th>County</th>
<th>Population</th>
<th>Population Within Boston Mountains</th>
</tr>
</thead>
<tbody>
<tr>
<td>Arkansas</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Boone</td>
<td>16,116</td>
<td>736</td>
</tr>
<tr>
<td>Carroll</td>
<td>11,284</td>
<td>1,138</td>
</tr>
<tr>
<td>Cleburne</td>
<td>9,059</td>
<td>2,636</td>
</tr>
<tr>
<td>Crawford</td>
<td>21,318</td>
<td>3,921</td>
</tr>
<tr>
<td>Franklin</td>
<td>10,213</td>
<td>1,036</td>
</tr>
<tr>
<td>Independence</td>
<td>20,048</td>
<td>2,756</td>
</tr>
<tr>
<td>Johnson</td>
<td>12,421</td>
<td>1,020</td>
</tr>
<tr>
<td>Madison</td>
<td>9,068</td>
<td>4,722</td>
</tr>
<tr>
<td>Newton</td>
<td>5,963</td>
<td>4,214</td>
</tr>
<tr>
<td>Pope</td>
<td>21,177</td>
<td>579</td>
</tr>
<tr>
<td>Searcy</td>
<td>8,124</td>
<td>2,519</td>
</tr>
<tr>
<td>Stone</td>
<td>6,294</td>
<td>2,026</td>
</tr>
<tr>
<td>Van Buren</td>
<td>7,228</td>
<td>3,522</td>
</tr>
<tr>
<td>Washington</td>
<td>55,797</td>
<td>5,269</td>
</tr>
<tr>
<td>Oklahoma</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Adair</td>
<td>13,122</td>
<td>2,865</td>
</tr>
<tr>
<td>Cherokee</td>
<td>17,762</td>
<td>1,664</td>
</tr>
<tr>
<td>Sequoyah</td>
<td>18,001</td>
<td>4,505</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>262,995</strong></td>
<td><strong>45,118</strong></td>
</tr>
</tbody>
</table>

In the more rugged areas of the mountains population density is two to five persons per square mile. This is due in large measure to the low carrying capacity of the land but in some areas it is due also to the presence of the Ozark National Forest. Independence Township in northeastern Pope County has only fifty persons in thirty-two square miles; Wheeler Township in northwestern Van Buren County has two hundred and seventy-three persons in fifty-nine square miles. In some localities, however, significant bottomland area raises the density in the more rugged regions, as typified by Japton Township. This unit, located in southwestern Madison County, has three hundred and nine persons in twenty-six square miles. There is available crop land along Drakes Creek and Lollars Creek and the village of Japton serves the locally greater population concentration.

The population is unevenly distributed even within a small area (Fig. 20). Two types of location attract settlement: valley bottoms and ridge tops. Both of these afford ample space for farmstead buildings with the major crop fields and pastures adjacent. Few farmsteads are located on the hillsides except where a farm is entirely in slope or where a bench or terrace provides a building site.

There is no trade center of over five hundred population within the mountains except Leslie, Searcy County, which has five hundred and six people. Other population centers are: Mountainburg,
Fig. 20 - Portion of St. Paul Quadrangle Showing Settlement
Crawford County, 402; Shirley, Cleburn County, 197; Winslow, Washington County, 183; St. Paul, Madison County, 118; Chester, Crawford County, 99. Leslie is on U. S. Highway 65 at the junction of Arkansas Highway 66. Mountainburg is on U. S. Highway 71 in an agricultural valley just within the mountains. The other settlements mentioned, and others even smaller, are situated in important valleys. Their agricultural economy is usually supplemented by forest industries.

Living generally is on a simpler scale here than outside of the mountains but it is not necessarily substandard. Hunting and fishing still can compete with the juke-box and movie for the attention of the younger generation. The church and community dances are major outlets for the social drive. If the people lack the many social and cultural opportunities of the city, so are they without many of its problems. Actually, most people live close enough to towns to take advantage of anything they offer. Memphis, Tennessee, Little Rock, Arkansas, Tulsa, Oklahoma, and Springfield, Missouri, are each within one or two hours drive of some section of the mountains and these cities fulfill the urge or need one might have to visit a city of major proportions. Remoteness is most manifest when emergency medical attention is needed. Yet, this has helped engender the high degree of self-sufficiency which the people exhibit and which is an important element in their adjustment to the situation.
Much, both of fact and fancy, has been written about the Southern Highlander in general and the Ozark Mountaineer in particular. The usual description entails indolence and ignorance. It is true that a person can "subsist" with a minimum of work more easily in this area than in many others and some are encouraged to live a hand-to-mouth existence. But ignorance is no greater in the younger generation here than elsewhere. The school-age population attends consolidated schools, generally, in the towns adjacent to the mountains. If they are short on interest in the fine arts and classical music, they display an interest in science and have a curiosity about the natural world around them. What the people may lack in scholarly education and social graces they compensate for, to some extent, in forthrightness, honesty, and a general interest in the world outside commonly lacking in the person living in a more complex and attention-demanding society.

The people have made their basic adjustments to the natural setting in keeping with the American political and economic heritage. Their independence, religious fervor, and little use for organized law are in the tradition of the American pioneer. If they change more slowly than the rest of the nation, it is due to isolation and conservatism rather than to an indifference to progress. When the people migrate elsewhere, usually in search of greater economic opportunity,
they adopt new attitudes and ways very readily. Most profess a reluctance to return to the mountain way of life, except as they may come back to retire and are able to provide for themselves the standard of living of the regions beyond the mountains.

Linguistic curiosities, such as the use of "heathen" to mean an outsider and folk tales and songs, may intrigue the stranger. These peculiarities are disappearing as the mountains become less isolated and as the younger generation profess less interest in them. The Department of English at the University of Arkansas is actively engaged in folk-lore research. This involves not only the collection of stories and personal anecdotes but the tape-recording of ballads and other songs as played and sung by the mountaineers.

The rural church and cemetery are often the scene of a major social event. Once a year, each community observes a "Memorial Day." This is a Sunday - different dates are observed by different communities but a community keeps the same Sunday each year - set aside for homecoming, an all-day religious service, and decoration of the graves. Relatives may come from as far away as California. "All-day preaching with dinner under the trees" is the order of the day. Various local elders may take their turn at preaching the fundamentalist doctrine to which most of the people adhere. Singing is frequently without accompaniment by musical instrument. At noon
everyone goes out under the trees and shares the food they have all brought. Later, paper flowers made at home are placed at the graves, often covering them completely.

Most peculiarities of the population are not necessarily restricted to the Boston Mountains alone. That the mountains exhibit a certain provincialism is more easily felt and casually observed than scientifically recorded and analyzed.

Characteristics of Settlement

The farmstead is the basic unit of settlement in the mountains. It consists of the house, one or more major farm buildings, some livestock pens, and a garden plot. The house is usually situated very close to the road and a lawn is either lacking or uncared for. Fences around the farmstead are generally of wood or stone, with wire used occasionally. A garage is generally regarded as unnecessary and the vehicles stand in the yard or by the roadside. The general impression is not one of prosperity or of an industrious populace.

The older homes in the mountains are simple structures of utilitarian design. They are small, square or rectangular in shape, containing four to six rooms. They are, as a rule, unpainted and covered with a composition or metal roof. Both features to some extent may indicate carelessness on the part of the owner. Yet, both
are practical. The weathered wood fits unobtrusively into the landscape. To keep it painted would strain the meager finances. The composition or metal roof is more durable than shingles and since wood is a major fuel, the non-shingle roof offers less risk from fire.

Many homes were originally dog trot houses, an architectural form by no means unique to the mountains. Today the "dog-trot" itself is often enclosed to form a large central living room. Characteristically, the houses were built with a front porch across the side facing the road. With the introduction of the washing machine this was where it was housed since the house lacked space inside and there was no back porch. Also, the machine could be filled and emptied more easily on the porch than in the house if the dwelling lacked a water system, as was true of most. A deep-freeze or even a large refrigerator may also be placed on the porch if conditions are too crowded inside.

Newer homes are of more modern design and construction and are painted or covered with composition siding. These are usually built by young people who often have worked away from the mountains or by retired persons with outside income.

There are few other farm buildings and generally these are not well-built. Mild winters make large barns unnecessary for the protection of livestock and storage of food. The few agricultural machines
do not require much shed space and often they are not sheltered at all. The broiler house, two hundred feet or more in length, is often the largest structure on the farm.

Electricity is available everywhere throughout the mountains, supplied by REA cooperatives. Thus, most of the modern household conveniences are available to the mountain family. Bottled gas is commonly used for cooking but wood remains the primary fuel for heating and the wood-pile is a prominent feature. Commercial telephone service is absent throughout large areas because population density does not warrant the upkeep of a system. The Forest Service line may be used in extreme emergency. Wells on ridge tops and hillsides are usually drilled; those in the valleys may be dug. However, the cistern and rain-barrel are commonly relied upon. Springs occur but often are located at some distance from the house.

Throughout the mountains there are unnumerable general stores which serve basic needs. Some may have a few homes clustered about them but others do not have. The general store may be post office, store, filling station, livestock feed center, and owner's home, all in one structure. Often these represent the location of larger settlements in former times. Consolidation of schools, decline of local lumbering activities, and greater ease of access to other areas have decreased their importance.
Community centers, once serving as both school and church building, and perhaps with a cemetery nearby, may stand alone. They are still focal points although their importance has diminished. The impact of improved roads, television, and other factors has either enabled people to seek their entertainment farther afield or to be satisfied with that in their own homes.
CHAPTER 6

THE ECONOMY

The natural setting of the Boston Mountains described in Part I provides the framework for the economic development of the area. The people are limited largely to what they can do with the soil and the forest. Mining is non-existent since there are no mineral deposits. The support for cities is lacking; therefore, industrial opportunities and other urban-associated activities which the mountain people engage in are located mainly in areas adjacent to the mountains.

The overall development has emphasized the grazing of livestock and forest industries; both are extensive uses of the land. The small population of the region reflects the extensive nature of resource use. Yet, as stated in the introductory section of this study, there are too many people on the land to be adequately supported by present methods. Observations on the standard of living substantiate this.

There is no indication that the basic pattern of economic development in the Boston Mountains has changed appreciably over the past several decades. Locally, differences do occur. Technology has enabled men to make a more intensive use of the resources than he
once did as, for example, the use of aluminum pipes for irrigation. But at the same time, changes in the cultural complex make some adjustments no longer profitable as in the case of cotton production which has ceased in the more rugged mountain areas.

In economic development, as in many other respects, the Boston Mountains stand as an island amid the surrounding land. In all directions away from the mountains, the land is generally more productive as the result of factors such as mineral wealth, low relief, and longer growing season. The mountains are in very sharp contrast to the Mississippi Alluvial Plain to the east. A few similarities, however, occur between the mountains and the rest of the Ozarks to the north and the Arkansas Valley to the south. In the state as a whole, the Ouachita Mountains are most nearly like the Boston Mountains, although the larger valleys, warmer temperatures, and coniferous forest of the former do combine to produce a somewhat different resource base.

In the discussion which follows, an analysis will be made of the economic development which is characteristic of the mountains. In order to emphasize the regional identity of the area, comparisons will be made with adjacent areas.
The Ozark National Forest

The presence of the Ozark National Forest in the heart of the mountains is a major factor in the economic development of the mountains as a region although it does not affect directly the entire area. (See Figure 17 for the location of the Forest.) The entire Ozark National Forest contains 1,489,070 acres\(^1\) and extends beyond the mountains. However, the Boston Mountain Division and Ozark Main Division are in the mountains and these two comprise 1,186,954 acres\(^2\) or 79.7 per cent of the gross Ozark National Forest area.

The forest was set aside by President Theodore Roosevelt in two proclamations in 1907 and 1908, respectively.\(^3\) The size of the Forest has varied from time to time. In 1910, 1916, and 1919 land believed valuable for farming was eliminated from government ownership.\(^4\) However, the early trend was reversed and the present size was attained in 1941.\(^5\) Approximately one-third of this came from the

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\(1\) This information is from a copy of a memorandum to District Rangers, August 10, 1961, from Harold Johnson, Acting Forest Supervisor, supplied by J. B. Dahl, present Forest Supervisor.

\(2\) Ibid.

\(3\) Paul H. Gerrard, *Ozark National Forest, Arkansas* (Russellville, Arkansas: 1948), p. 5. This is a brochure issued on the 40th Anniversary of the National Forest.

\(4\) Ibid., p. 13.

\(5\) Ibid., p. 14.
public domain and the remainder was purchased from individuals who volunteered to sell it.\textsuperscript{6}

Of the gross area lying within the mountains, 71.4 per cent \((847,757\text{ acres})\textsuperscript{7}\) is net National Forest. The remaining 28.6 per cent is privately-owned land within the bounds of the Forest. Isolation in the midst of government-owned land and great ruggedness of much of the area make it undesirable land for private ownership in most instances. These small private tracts also increase the fire hazard for the Forest.

The National Forest itself has direct economic value. Grazing is possible under permits from the Forest Service and is widely practiced. This is a definite advantage for farmers living in and near the area. Watershed protection is provided for a region of steep slopes where run-off damage might otherwise be great. The results of this protection reach far beyond the Forest itself, of course.

There is an annual harvest of timber which provides employment in the forest and in the wood industries of adjacent areas. The timber is sold on the stump to the highest bidder but lumbering operations are carefully supervised by the Forest Service. One-fourth of the

\textsuperscript{6}\textit{Ibid.}, p. 13.

\textsuperscript{7}\textit{See footnote 1.}
total receipts which the government gets from the timber is given to the State for use by counties in which the Forest is located for road and school purposes. 8

Three game refuges are in this part of the Forest and are important wildlife habitats. In addition, the Forest in general is an excellent home for many types of wildlife, especially deer, elk, and bear. The Forest, except for the refuges, is open to hunting and many of the streams are used for fishing.

The recreational value of the Forest cannot be calculated exactly. Some of the most spectacular scenery of the mountains is here and nature lovers find much of interest. The Forest Service has provided a number of recreation areas at major points of interest and a fairly complete network of roads is maintained through the Forest. The reluctance of most people to venture far from a paved highway is a major factor in limiting the recreational usefulness of the Forest.

Agriculture

The characteristics of agriculture in the Boston Mountains are largely in response to relief and slope, which limit cultivation, and to inaccessibility, which limits the market. The best agricultural

8Gerrard, op. cit., p. 8.
analysis of the area is in Type-of-Farming Areas in Arkansas.\textsuperscript{9} This study recognizes agricultural regions rather than describes agricultural characteristics on a county or other political unit basis (See Fig. 21).

"Type-of-farming Area 6, principally the Boston Mountains,\textsuperscript{10} includes the heart of the mountains and a very small area situated beyond. There is little mountain land which has been excluded from Area 6. Where this has occurred the agricultural development is more nearly like that of an adjacent area and has been included with it; for example, most of the extreme southern margin of the mountains is included with the Arkansas Valley.

The description of Area 6\textsuperscript{11} develops a relatively complete picture of the agricultural characteristics (see, also, Table 12). Only a little over a third (35.8 per cent) of the region was in farms.\textsuperscript{12} Of this farm area, although over one-fourth (27.2 per cent) was classified as cropland, only one-eighth (12.7 per cent) was harvested

\textsuperscript{9}Virgil B. Fielder, Type-of-Farming Areas in Arkansas, Agricultural Experiment Station Bulletin 555 (Fayetteville: University of Arkansas, 1955). This study is based on 1949 statistics.

\textsuperscript{10}Ibid., p. 80.

\textsuperscript{11}The description of Area 6 and other regions to be noted is based upon the reference in footnote 9.

\textsuperscript{12}As previously noted, these statistics are for 1949.
Figure 21
ARKANSAS TYPE-OF-FARMING AREAS

1. Poultry, Dairy, Livestock
2. Livestock, Dairy, General, Poultry
3. General
4. Cotton, Cash Grain
5. Cash Grain, Cotton
6. North: Livestock, General
7. Dairy, Livestock, Fruit, Vegetables
8. Vegetables, Cash Grain, Cotton
9. Dairy, General, Cotton, Livestock, Poultry
10. South: Livestock, General
11. Cotton, Livestock, General, Poultry, Fruit
12. Cotton, Livestock, Cash Grain
13. Livestock, Cotton, General
X Non-Agricultural
cropland. Nearly two-thirds (60.9 per cent) was woodland. Much of this woodland also served as pasture. These broad divisions of land uses are indicative of the relative importance of crop and livestock agriculture in the region.

Evidently, the farmland was not a good investment for the absentee landlord. Of all farms, 76.8 per cent were operated by the full owners, 10.0 per cent were operated by part owners, and only 13.1 per cent were operated by tenants. This last group of farms would include much rented pasture. The average size of farms in Area 6 was 131 acres. On such a small tract, small considering its productivity, the farmer operated a marginal or submarginal enterprise.

Indicative of the low income provided by the land are the facts that 25.3 per cent of the farm operators worked 100 or more days off of their farms and 53 per cent of the farms reported that other family income exceeded the value of agricultural products sold. There was a relatively high degree of production for home use. Cash income per farm averaged $587.

Cattle, hogs, and chickens were the major livestock of the area and these were also the major sources of cash income. Cattle and calves accounted for 32.1 per cent of the total cash income. Hogs were the most wide-spread product sold, but accounted for only 20
per cent of the total. The most wide-spread crop was corn but the
average acreage per farm was only eight acres. Oats were the chief
small grain. Vegetables and berries harvested for sale were grown
largely in the western portion of the mountains and a small amount
of cotton was planted in the very low eastern section.

Certain border areas were more highly developed agricultur-
ally, largely because of low local relief and gentle slope and/or
greater accessibility, than the heart of the mountains. Along the
southern margin adjoining the Arkansas Valley there was more mixed
farming with greater emphasis upon dairying and poultry, particu-
larly to the east. The Batesville-Floral broiler-producing region
lies partly within the low eastern end of the mountains. Also, cot-
ton was relatively important. In the northwestern part of the moun-
tains, mainly in Washington County, commercial livestock farming
with emphasis upon broilers was important.

Area 6 contrasts with most of the other agricultural regions of
the state. Table 12 compares certain characteristics of Area 6, the
heart of the Boston Mountains, with Area 10, the heart of the Ouachita
Mountains, with Area 1, the Springfield Upland, and with Area 4A,
the Mississippi Alluvial Plain. The Ouachita Mountains are developed
much like the Boston Mountains. The Springfield Upland is similar,
agriculturally, in several respects but obviously is much more
<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Area 6</th>
<th>Area 10</th>
<th>Area 1</th>
<th>Area 4A</th>
</tr>
</thead>
<tbody>
<tr>
<td>Proportion of total area in farms (per cent)</td>
<td>35.8</td>
<td>23.9</td>
<td>80.5</td>
<td>70.3</td>
</tr>
<tr>
<td>Average size of farms (acres)</td>
<td>131.0</td>
<td>110.0</td>
<td>88.0</td>
<td>73.0</td>
</tr>
<tr>
<td>Proportion of land in farms in cropland harvested</td>
<td>12.7</td>
<td>16.4</td>
<td>19.9</td>
<td>60.8</td>
</tr>
<tr>
<td>cropland used only for pasture</td>
<td>11.8</td>
<td>15.3</td>
<td>20.3</td>
<td>4.6</td>
</tr>
<tr>
<td>cropland not harvested or pastured</td>
<td>2.7</td>
<td>4.6</td>
<td>5.0</td>
<td>6.7</td>
</tr>
<tr>
<td>woodland</td>
<td>60.9</td>
<td>45.5</td>
<td>36.7</td>
<td>20.8</td>
</tr>
<tr>
<td>other pasture</td>
<td>6.9</td>
<td>14.2</td>
<td>12.8</td>
<td>2.5</td>
</tr>
<tr>
<td>other land</td>
<td>5.0</td>
<td>4.0</td>
<td>5.3</td>
<td>4.6</td>
</tr>
<tr>
<td>Proportion of farms operated by full owners</td>
<td>76.8</td>
<td>77.0</td>
<td>77.1</td>
<td>17.9</td>
</tr>
<tr>
<td>part owners</td>
<td>10.0</td>
<td>9.4</td>
<td>9.7</td>
<td>7.4</td>
</tr>
<tr>
<td>tenants</td>
<td>13.1</td>
<td>13.5</td>
<td>12.7</td>
<td>74.1</td>
</tr>
<tr>
<td>Proportion of operators working 100 or more days off their farm</td>
<td>25.3</td>
<td>34.4</td>
<td>26.2</td>
<td>9.4</td>
</tr>
<tr>
<td>farms reporting other income of family exceeded value of agricultural products sold</td>
<td>53.0</td>
<td>54.7</td>
<td>40.5</td>
<td>10.7</td>
</tr>
<tr>
<td>Cash income per family ($)</td>
<td>587.00</td>
<td>682.00</td>
<td>2,910.00</td>
<td>3,438.00</td>
</tr>
</tbody>
</table>

(Data from Virgil B. Fielder, op. cit. Area 6 is the Boston Mountains, Area 10, the Ouachita Mountains, Area 1, the Springfield Upland, and Area 4A, the Mississippi Alluvial Plain.)
productive. The Mississippi Alluvial Plain, in the heart of the Cotton Belt, differs radically. Relief and slopes have had a direct influence upon these different type-of-farming areas although they are not the only controlling factors.

The most striking differences between the mountain areas (Area 6 and Area 10) and the plains areas (Area 1 and Area 4A) are in the proportion of total area in farms, average size of farms, proportion of farm land in woods, the dependence upon non-farm income, and the average cash income per family. Area 4A, the Mississippi Alluvial Plain, differs in many respects from Area 1, the Springfield Upland, although both are plains. The cotton economy in Area 4A contrasts rather strongly with the livestock economy in Area 1 to account for the differences. The dissimilarities between the two mountain areas stem largely from the greater amount of valley land in the Ouachitas.

The Boston Mountains and the Ouachita Mountains have a relatively small proportion of their total area in farms, 35.8 per cent and 23.9 per cent, respectively. This is due in large measure to the presence of the Ozark and Ouachita national forests. The Springfield Upland and Mississippi Alluvial Plain have a larger proportion of their total area in farms, 80.5 per cent and 70.3 per cent, respectively. The presence of much wet land makes the Mississippi Alluvial
Plain less arable than one might think it would be. However, absence of government-owned land, low relief, and gentle slopes contribute to the large percentage of farm land in the plains' counties. Farms are larger in the mountains, 131 acres in the Boston Mountains and 110 acres in the Ouachitas, as compared with 88 acres in the Springfield Upland and 73 acres in the Mississippi Alluvial Plain. Greater emphasis upon self-sufficiency in the mountains requires larger farms whereas cotton in the Mississippi Alluvial Plain and livestock, especially broilers and dairy cattle, in the Springfield Upland provide greater income on fewer acres.

The mountains have a much greater proportion of farm woodland than have the plains, 60.9 per cent in the Boston Mountains and 45.5 per cent in the Ouachitas, as compared with 36.7 per cent and 20.8 per cent in the Springfield Upland and Mississippi Alluvial Plain, respectively. Greater cultivability creates greater demand for cropland in the plains. Over half of the farms in the mountains reported that other income exceeded the value of agricultural products sold. In the Mississippi Alluvial Plain, only 10.7 per cent of the farms so reported and in the Springfield Upland 40.5 per cent did so. This relatively great difference between the two plains is due to the labor demands of cotton and livestock.
The difference in agriculture between mountains and plains is most clearly made evident in the cash income per farm family. The Boston Mountains' family averages only 587 dollars and the Ouachita Mountains' family averages 682 dollars per family. However, the average farm family in the Springfield Upland averages 2,910 dollars and that in the Mississippi Alluvial Plain, 3,438 dollars.

There is no study comparable to Fielder's using the 1959 statistics. However, since Fielder's study included all of Newton County in Area 6, a survey of the agricultural situation there is illustrative of much of the Boston Mountains. Also, Polk County can be used as typical of the Ouachita Mountains, Benton County, as typical of the Springfield Upland, and Mississippi County is typical of the Mississippi Alluvial Plain. Table 13 contains several points of comparison among these four counties.

In general, the same differences prevail between the mountains and plains in 1959 as were noted for 1954. Most of the major factors which are critical in determining land use are natural factors and relatively unchanging. The proportion of total area in farms, value of land and buildings per farm and per acres, farm operators working off of the farms, type of farm, and value of forest products sold are of especial note.
TABLE 13
Agricultural Characteristics of Newton (N), Polk (P), Benton (B), and Mississippi (M) Counties

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>N</th>
<th>P</th>
<th>B</th>
<th>M</th>
</tr>
</thead>
<tbody>
<tr>
<td>Proportion of total area</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>area in farms (per cent)</td>
<td>27.5</td>
<td>25.9</td>
<td>68.6</td>
<td>90.5</td>
</tr>
<tr>
<td>Average size of farms (acres)</td>
<td>150.9</td>
<td>152.4</td>
<td>107.5</td>
<td>183.7</td>
</tr>
<tr>
<td>Value of land and bldgs</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>per farm ($)</td>
<td>5,037</td>
<td>9,782</td>
<td>13,722</td>
<td>53,588</td>
</tr>
<tr>
<td>per acre ($)</td>
<td>31.60</td>
<td>64.10</td>
<td>128.95</td>
<td>305.90</td>
</tr>
<tr>
<td>Number of all farms</td>
<td>958</td>
<td>933</td>
<td>3,619</td>
<td>2,904</td>
</tr>
<tr>
<td>Number of commercial farms</td>
<td>358</td>
<td>168</td>
<td>1,951</td>
<td>2,593</td>
</tr>
<tr>
<td>Farm operators</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>working off farms</td>
<td>599</td>
<td>592</td>
<td>1,913</td>
<td>1,045</td>
</tr>
<tr>
<td>100 or more days</td>
<td>396</td>
<td>440</td>
<td>1,402</td>
<td>483</td>
</tr>
<tr>
<td>with outside income exceeding income from agricultural products sold</td>
<td>622</td>
<td>741</td>
<td>1,865</td>
<td>307</td>
</tr>
<tr>
<td>Type of farm (numbers)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>field crop</td>
<td>5</td>
<td>-</td>
<td>20</td>
<td>2,563</td>
</tr>
<tr>
<td>cash-grain</td>
<td>-</td>
<td>-</td>
<td>10</td>
<td>60</td>
</tr>
<tr>
<td>cotton</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>2,503</td>
</tr>
<tr>
<td>vegetable</td>
<td>-</td>
<td>-</td>
<td>30</td>
<td>5</td>
</tr>
<tr>
<td>fruit and nut</td>
<td>-</td>
<td>-</td>
<td>25</td>
<td>-</td>
</tr>
<tr>
<td>poultry</td>
<td>10</td>
<td>25</td>
<td>974</td>
<td>-</td>
</tr>
<tr>
<td>dairy</td>
<td>50</td>
<td>15</td>
<td>507</td>
<td>-</td>
</tr>
<tr>
<td>livestock other than poultry and dairy</td>
<td>272</td>
<td>122</td>
<td>319</td>
<td>16</td>
</tr>
<tr>
<td>general farming</td>
<td>15</td>
<td>-</td>
<td>65</td>
<td>9</td>
</tr>
<tr>
<td>Miscellaneous/ unclassified</td>
<td>642</td>
<td>737</td>
<td>1,693</td>
<td>270</td>
</tr>
<tr>
<td>Farms reporting any forest products cut or sold</td>
<td>723</td>
<td>482</td>
<td>1,109</td>
<td>85</td>
</tr>
<tr>
<td>Sale of any forest products farms (Number)</td>
<td>123</td>
<td>140</td>
<td>165</td>
<td>7</td>
</tr>
<tr>
<td>value ($)</td>
<td>80,514</td>
<td>63,352</td>
<td>50,065</td>
<td>33,561</td>
</tr>
</tbody>
</table>

Again, within the plains differences occur, largely related to the cotton economy of Mississippi County and the livestock economy of Benton County. Newton and Polk counties also show differences between mountain areas which are largely attributable to available farm land and market accessibility.

Newton County is of special significance since it does represent the Boston Mountains. In 1959, Newton County had 27.5 per cent of its area in farms which averaged 150.9 acres in size. The average value in land and buildings per farm was 5,037 dollars and per acre, 31.60 dollars. Most of the farms were owner or part-owner operated, the proportion of tenancy being only 8.2 per cent. Of the total number of farms reporting (958), almost 65 per cent reported that other family income exceeded the value of farm products sold.

The relative isolation of the farms is indicated by the roads which serve them. Only 55 farms were reported to be on hard-surfaced roads; 181 were on gravel or shale roads; 753 were on dirt or unimproved roads. Within the last category, 25 were located less than a mile from a hard-surfaced road, 226 were one to four miles away, and 502 were more than five miles distant. However, since

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the dirt roads are primarily of sand and drain readily, this is not as restrictive a factor as it might seem at first. Only 76 farms reported having a telephone. Thus, the roads were the main avenue of communication.

There can be no question but that agriculture will continue to be the major land use in the Boston Mountains. Virtually no other choices are possible. It is probable, however, that more and more families will supplement their farm income from outside sources. Most of the towns which are situated adjacent to the mountains are adding new industries and expanding old ones so that the labor market continues to grow and will attract more and more people from the mountains. As roads are improved within the mountains, the economic opportunities nearby will be more accessible.

**Other Economic Developments**

There are few opportunities for employment within the mountains themselves besides those afforded by agriculture. But it is obvious from the number of mountain families deriving a large proportion of their income from non-farm sources, as explained in the previous chapter, that non-agricultural opportunities must exist. Some people work in various public service categories: road maintenance, school bus operator, teacher, minister, mail carrier, etc. A few own general stores, referred to previously.
There are no means of computing accurately how much of the non-farm income is earned within the mountains and how much is earned in adjacent areas. However, it is reasonable to assume that areas adjacent to the mountains supply most of it.

In Newton County two-thirds of the total number of workers, 971 out of 1,442, are employed at non-agricultural jobs.\(^\text{14}\) Of the total rural-farm population employed, only half is engaged in agriculture (340 out of 686).\(^\text{15}\) Undoubtedly, many of these people travel outside of the mountains and even outside of the county to their work. Some, of course, draw retirement income, old-age benefits, etc. which have no connection with the productivity of the area at all.

A recent study of Madison County,\(^\text{16}\) which ranks next to Newton County as most typically a Boston Mountain county, interviewed open-country households on economic matters. Of the 134 such households reporting income in 1959, 52 received nonwork income. Thirty-three households received nonwork income from social security, 21 from state welfare, 18 from rent or royalty, 16 from retire-


\(^{15}\)Ibid.

ment funds, 7 from unemployment and workman's compensations, and 3 received aid from relatives.\textsuperscript{17}

Of the 93 persons reporting nonfarm work in 1959,\textsuperscript{17} 24 were in sawmilling, 18 were in business, 18 were in service work, 16 worked at poultry processing and other manufacturing, 10 were in construction, 5 were in government, and 2 were in transportation. It was not reported where these jobs were located. People in Madison County have poorer access to industrial jobs than has most of the population.

Manufacturing

Manufacturing in the mountains is unimportant in all but a very few localities. It consists mainly of small plants which draw upon local raw materials and produces for a very local market. Using Newton County again as the example, the 1958 Census of Manufactures\textsuperscript{19} lists only seven manufacturing establishments: five lumber and wood products, one printing and publishing, one miscellaneous. These had a total of thirty employees with a $43,000 annual payroll and produced

\textsuperscript{17}Ibid., p. 13.

\textsuperscript{18}Ibid., p. 24.

$76,000 in value added. The 1961 Directory of Arkansas Industries\textsuperscript{20} does not report any new plants.

Throughout the mountains, saw-mill operations are the most widely distributed and numerous processing activity. Many of these are in operation only part of the year, are migratory, and are very low in value. Therefore, they are not usually counted in an inventory of manufacturing establishments. Most of them hire only three or four men who are supplementing a farm income and the rough lumber or poles are marketed in near-by towns. Figures 22 and 23 show typical saw mills.

Canneries, once widely scattered, are almost gone from the mountains. These were small operations using the seasonal supply of local vegetables, chiefly tomatoes and beans, and making use of the female labor pool. The products were marketed through larger corporations. Better access to facilities outside of the mountains and the greater economy of larger plants serving a greater area have put most of the local canneries out of business.

The towns situated adjacent to the mountains all represent some degree of industrialization and offer job opportunities to the mountain people. Most of the largest manufacturing plants are subsidiaries of

plants elsewhere, especially in the north, which have been established to take advantage of some local factor such as female labor, cheaper labor, lower taxes, community-financed physical plants, etc.

Table 14 lists some of the larger industries which are located in towns adjacent to the mountains. Many times this number of smaller establishments exist. It is readily observed that many plants are engaged in processing local raw materials, such as poultry. Others are located with reference to a variety of factors. The Obermann and International Shoe operations, for example, capitalize on the supply of female labor.

**TABLE 14**

<table>
<thead>
<tr>
<th>Town and Industry</th>
<th>Employees</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Male</td>
</tr>
<tr>
<td>Alma</td>
<td></td>
</tr>
<tr>
<td>Alma Canning Co.</td>
<td>160</td>
</tr>
<tr>
<td>Atkins</td>
<td></td>
</tr>
<tr>
<td>Atkins Pickle Co.</td>
<td>60</td>
</tr>
<tr>
<td>Bald Knob</td>
<td></td>
</tr>
<tr>
<td>Arkansas General Industries</td>
<td>22</td>
</tr>
<tr>
<td>Whiteco, Inc.</td>
<td>75</td>
</tr>
<tr>
<td>Batesville</td>
<td></td>
</tr>
<tr>
<td>Arkansas Poultry Co.</td>
<td>35</td>
</tr>
<tr>
<td>Batesville Rubber Co.</td>
<td>na</td>
</tr>
<tr>
<td>Batesville White Lime Co.</td>
<td>96</td>
</tr>
<tr>
<td>Configured Tube Products Co.</td>
<td>na</td>
</tr>
<tr>
<td>International Shoe Co.</td>
<td>224</td>
</tr>
<tr>
<td>J. K. Sutherland, Inc.</td>
<td>65</td>
</tr>
<tr>
<td>Berryville</td>
<td></td>
</tr>
<tr>
<td>Ocoma Foods</td>
<td>140</td>
</tr>
<tr>
<td>Location</td>
<td>Company Name</td>
</tr>
<tr>
<td>-----------------</td>
<td>-------------------------------------</td>
</tr>
<tr>
<td>Clarksville</td>
<td>Johnson County Frozen Foods, Inc.</td>
</tr>
<tr>
<td></td>
<td>Priebe &amp; Sons, Inc.</td>
</tr>
<tr>
<td>Clinton</td>
<td>Clinton Poultry &amp; Egg Co.</td>
</tr>
<tr>
<td>Fayetteville</td>
<td>Baldwin Piano Co.</td>
</tr>
<tr>
<td></td>
<td>Bear Brand Hosiery</td>
</tr>
<tr>
<td></td>
<td>Campbell Soup</td>
</tr>
<tr>
<td></td>
<td>Fulbright Wood Products Co.</td>
</tr>
<tr>
<td></td>
<td>Obermann Manufacturing Co.</td>
</tr>
<tr>
<td></td>
<td>Standard Register Co.</td>
</tr>
<tr>
<td>Fort Smith</td>
<td>Borg-Warner Corp., Norge Division</td>
</tr>
<tr>
<td></td>
<td>Dixie Cup Division</td>
</tr>
<tr>
<td></td>
<td>Harding Glass Co.</td>
</tr>
<tr>
<td></td>
<td>Landers Products Division</td>
</tr>
<tr>
<td></td>
<td>Ward Furniture Manufacturing Co.</td>
</tr>
<tr>
<td>Harrison</td>
<td>Obermann Manufacturing Co.</td>
</tr>
<tr>
<td></td>
<td>Turney Wood Products, Inc.</td>
</tr>
<tr>
<td>Huntsville</td>
<td>Claymore, Inc.</td>
</tr>
<tr>
<td>Morrilton</td>
<td>Arkansas Cotton Mill, Inc.</td>
</tr>
<tr>
<td></td>
<td>Morilton Cotton Seed Oil Mill</td>
</tr>
<tr>
<td></td>
<td>Obermann Manufacturing Co.</td>
</tr>
<tr>
<td>Newport</td>
<td>Kickerinos, Inc.</td>
</tr>
<tr>
<td></td>
<td>Revere Copper &amp; Brass, Inc.</td>
</tr>
<tr>
<td></td>
<td>Victor Metal Products Corp.</td>
</tr>
<tr>
<td>Ozark</td>
<td>Harold Dodgen, Inc.</td>
</tr>
<tr>
<td>Russellville</td>
<td>International Shoe Co.</td>
</tr>
<tr>
<td></td>
<td>Valley Poultry Co.</td>
</tr>
<tr>
<td></td>
<td>Meter Division of Arkansas-Louisiana</td>
</tr>
<tr>
<td></td>
<td>Air Conditioning Corp.</td>
</tr>
<tr>
<td>Van Buren</td>
<td>H and B Canning Co.</td>
</tr>
<tr>
<td></td>
<td>Kay Chair Co.</td>
</tr>
</tbody>
</table>

It is probable that additional industries will develop in these towns within the next few years, thus increasing the market for labor. Roads within and to the mountains are constantly being improved, thereby increasing accessibility. The bulk of the mountain population already is within an hour's drive of some major town. Within the mountains themselves the outlook for additional industrial opportunities is extremely dim. Expansion of the lumbering industry to some small degree will undoubtedly take place. But sawmilling is generally a part-time job. There simply is not the resource base nor the market need for major industries in the mountains themselves.

Tourism

It is not possible to make an accurate quantitative evaluation of the role which tourism plays in the economy of the Boston Mountains. Unquestionably, the mountains are a tourist attraction. To the "flatlander," the mountains provide breath-taking vistas even though they are small compared with many other mountain groups. To people throughout the nation, the Ozarks generally are assumed to harbor a quaint cultural group which must be seen to be believed.

For whatever reason they come, the income from the tourists is earned mainly in the areas adjacent to the mountains rather than in the mountains themselves. The very narrow north-south extent of the mountains can easily be crossed in one or two hours, even allow-
ing time to view the scenery from look-out points. Thus, it is actually not necessary for the tourists to stop in the mountains for food and lodgings.

Most of the over-night lodgings are located in the towns adjacent to the mountains. Only along Highway 71 between Fayetteville and Alma are there several motels in the mountains. Eating establishments are curio shops are similarly located.

Tourism is one segment of the economy which perhaps should be more highly developed, particularly with the aid of better roads and road markings in the areas away from the federal highways. Most tourists today do not care to drive several miles on dusty, rough roads asking for directions along the way. They like to see Nature, but not necessarily experience it first-hand. Over-night camping grounds, currently nonexistent, would doubtless attract many people who would spend an inexpensive vacation of several days.

The Ozark Playgrounds Association is concerned with the development of this area as part of the entire Ozarks. This organization's tendency, however, is to emphasize further development of the better known areas in order to increase the income of businesses already established, an intensification of a pattern already set.

It is doubtful that a large number of people could earn their livelihood in the mountains solely from tourism. The business is
seasonal, concentrated largely between April and November. The greater attraction of the towns as over-night stopping places cannot easily be competed with except for the few people who would rather spend their time looking at the stars and listening to whip-poor-wills instead of the local movie.

Land for Retirement

One other segment of the economy deserves consideration. A number of people, also for whom there are no statistics, have retired to the Ozarks in general and to the Boston Mountains in particular. Natives who have worked outside of the area frequently return. People from cities, especially in the north, are often attracted to the area either because they have visited it or have heard about its advantages as a retirement area.

Retired persons usually have fixed incomes and are of moderate means. They find that for a nominal investment they can purchase a comfortable home, and acreage if desired, with attractive scenery. Taxes are low and there is not the social pressure to live in an elaborate style which often characterizes more sophisticated areas. They frequently supplement their incomes with self-sufficient livestock and vegetable production and occasionally produce quantities for sale.

Usually these people seek homes which have ready accessibility to the nearby towns. They rarely live in the more remote mountain
areas. As this segment of the national population increases, it is to be expected that it will constitute a more important element of the population in areas such as the Boston Mountains. Certainly, the mountains can be the home of far more people if they are not concerned with deriving a major portion of their livelihood from the land. This is also a portion of the population which is no longer reproducing itself and does not give rise to population increases except by immigration.

There are drawbacks to the mountains as the home for retired persons. Chief among them would be the limited social activities and general cultural climate. Also, the area lacks specialized medical service which might be needed by such people.

**Trade Centers and Transportation**

The small population of the mountains does not warrant the development of a closely-spaced transportation network. Neither does it provide the support for major cities. Both the number and distribution of trade centers and transportation lines indicate the low population density in the mountains.

The general store is the most widespread form of trade center, supplying the immediate and emergency needs in groceries, clothing, and livestock feed. As previously noted, the store may stand alone or be the nucleus of a small cluster of houses.
There have never been towns of a few thousand or so people within the mountains. In pioneer days, mountain villages were sometimes ambitiously planned and the land platted for settlements of considerable size. But development failed to materialize as projected because there simply was not the basis for support of a concentrated population.

The establishment of trade centers both within and adjacent to the mountains coincided with the advance of general settlement discussed previously. In the beginning, few trade centers had any particular advantage in location. Nor were disadvantages apparent. But in time circumstances made it possible for some settlements to prosper and grow while others became static and died.

Many trade centers of earlier days have drastically declined as local agriculture and lumbering industries have declined. The uppermost White River Valley, for example, is situated in the Boston Mountains and was once served by a branch of the Frisco Railroad. A flourishing lumber industry supported the railroad and gave rise to a number of small station settlements which were local shipping points for the forest products. Today, the lumber industry has dwindled and the railroad is gone. Most of the settlements consist of only a few houses clustered around a store with no apparent reason for continued existence.
For major purchases and social activities outside of the local area, people travel to the towns adjacent to the mountains. Their locations are given in Figure 24. These are all relatively small, as indicated in Table 15.

### TABLE 15

Population of Adjacent Trade Centers

<table>
<thead>
<tr>
<th>Location</th>
<th>Population</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fort Smith</td>
<td>52,991</td>
</tr>
<tr>
<td>Muskogee</td>
<td>38,059</td>
</tr>
<tr>
<td>Fayetteville</td>
<td>20,274</td>
</tr>
<tr>
<td>Newport</td>
<td>7,007</td>
</tr>
<tr>
<td>Van Buren</td>
<td>6,787</td>
</tr>
<tr>
<td>Harrison</td>
<td>6,580</td>
</tr>
<tr>
<td>Batesville</td>
<td>6,207</td>
</tr>
<tr>
<td>Tahlequah</td>
<td>5,840</td>
</tr>
<tr>
<td>Clarksville</td>
<td>3,919</td>
</tr>
<tr>
<td>Sallisaw</td>
<td>3,351</td>
</tr>
<tr>
<td>Heber Springs</td>
<td>2,265</td>
</tr>
<tr>
<td>Berryville</td>
<td>1,999</td>
</tr>
<tr>
<td>Ozark</td>
<td>1,965</td>
</tr>
<tr>
<td>Stilwell</td>
<td>1,916</td>
</tr>
<tr>
<td>Marshall</td>
<td>1,095</td>
</tr>
<tr>
<td>Prairie Grove</td>
<td>1,056</td>
</tr>
<tr>
<td>Huntsville</td>
<td>1,050</td>
</tr>
<tr>
<td>Green Forest</td>
<td>1,038</td>
</tr>
<tr>
<td>Mountain View</td>
<td>938</td>
</tr>
<tr>
<td>Clinton</td>
<td>744</td>
</tr>
<tr>
<td>Jasper</td>
<td>273</td>
</tr>
</tbody>
</table>

The most diversified opportunities are in Fayetteville, which has the University of Arkansas as well as a business district and industrial jobs which equal or surpass those in any other town listed except Fort Smith and Muskogee. The Veteran's Hospital there is also a feature attracting many retired service men to settle in the area.

Only two railroads cross the Boston Mountains and neither is really of much significance to the development of the region (Fig. 24). The Kansas City Southern makes no stops within the mountain area. The Frisco (St. Louis-San Francisco) does have a number of "whistle-stops" between Van Buren and Fayetteville but there is little demand for its services except to transport relatively small amounts of forest products at infrequent intervals.

No commercial air lines have terminals within the mountains. However, both schedule and chartered air service are available at a number of the towns adjacent.

U. S. Highways 71 (International Falls, Minnesota, to southern Louisiana) and 65 (Minneapolis, Minnesota, to Natchez, Mississippi) are the only major trans-nation routes which cross the area. U. S. Highway 67 (Rock Island, Illinois, to Texarkana, Arkansas) is at the eastern end of the mountains. U. S. Highways 62 and 64 are east-west highways to the north and south, respectively, of the mountains.
National Interstate Highway 40 will roughly parallel Highway 64. A number of state highways, both paved and unpaved, provide service to immediate outside areas, supplemented by county and township roads. Arkansas Highway 7 is accounted one of the most scenic routes in the State where it crosses the Boston Mountains.

Many homes in the rougher mountain area are served by roads which utilize the creek beds. Innumerable trails, passable by jeep, tractor, and truck, cross the countryside. The advent of the bulldozer has made country road building a relatively easy operation. It is often only necessary to remove trees, boulders and debris and there is enough rock lying in place to give a serviceable surface.

The road pattern has changed little through the years except for major highways. The older United States Geological Survey Quadrangles, surveyed and printed in the 1890's and early 1900's, can be used with few changes in driving and locating features in the mountains. The early settlers, without benefit of modern construction equipment and surveys, found the easiest routes along valleys, ridges, and up the mountain slopes.

Greater accessibility is probably the greatest change needed to improve the carrying capacity of the mountains. Yet, it is doubtful that any great economic improvement would occur even if it were provided. Tourist travel would be made more comfortable and,
therefore, perhaps would augment the local economy. The size and
nature of the mountains are such, however, that out-of-state tourists
are attracted to cross them but not to stop in them. The in-state
tourists probably would not make much greater use of the mountains
than they currently do. Because of other factors affecting agriculture
and manufacturing, better roads would not necessarily result in ex-
pansion of those parts of the economy.
CHAPTER 7

TYPE-LOCALITIES OF LAND USE

General Relationships

The previous chapters have described and to a degree analyzed the natural and cultural settings of the Boston Mountains. The natural setting consists largely of characteristics which would appear whether man were there or not. Actually, he has done little to alter the natural phenomena, except to clear small areas of the forest. His buildings, fields, and roads mark the landscape but they seldom, if ever, dominate it.

Another people, of a different time and/or a different culture, might have made other adjustments to the natural setting. The Oriental might have terraced the steeper slopes for crop agriculture; the Central European might have developed intensive silviculture. But the American pioneer, often with previous experience in the Appalachian highlands, usually made the simplest adjustments possible. He hunted, trapped, and fished; he cleared and maintained fields for limited crop production; he let his livestock roam the forests, so little cared for that his hogs became wild.
Although the way of life of the mountain inhabitant has undergone change since pioneer days, the change is largely the result of outside influences, such as employment in towns and electrification, rather than a difference in approach to the opportunities which occur in the mountains themselves. Rather than alter the natural setting in order to increase productivity, man often has contented himself with an almost self-sufficient existence. If he was not contented with this, he sought to supplement his income from sources outside of the mountains. Many have found this solution difficult to manage and have migrated from the mountains, as previously noted.

Relief and slope are two prominent characteristics which not only distinguish the mountains as a landform but also give the region itself identity and a degree of unity. These elements have exerted strong influence upon human evaluation and use of the region. Because the mountains are still largely forested and livestock agriculture is the major economic activity, many of the physiographic-land-use relationships are extremely simple and obvious.

Overall, the agricultural pattern is what the casual observer would expect to find. Three situations are suitable for cultivation without previous terracing or without severe erosion afterward: valley bottoms, bench lands, and ridge tops. The valley bottoms and ridge tops are flat to gently sloping; the bench lands vary between
gentle and moderate slopes. Areas of steep slope along the valley walls are almost without exception uncultivated. Population pressure does not require intensive production, at least from the point of view of the inhabitants, and only the most readily cleared and most easily cultivated land is cropped. Much of the land suitable for cropping is, in fact, devoted to grazing because livestock are more profitable.

Livestock graze both the forests and the planted pastures. Some of the pastures may be fenced in order to produce hay but they are grazed for much of the year. Cattle, because of their size and the relative difficulty of walking the steeper hill sides, are usually pastured on the gentler slopes. But hogs, sheep, and goats may be grazed everywhere except on the sheerest bluffs.

Forest industries are affected by slope and relief in the harvesting of timber, both from the standpoint of moving machinery and the hauling of cut logs. However, few slopes are too steep for lumbering if the return promises to be high enough.

The trade centers are small enough to fit into valleys or on the ridge tops. In addition to occupying those situations, farm houses may be built on benches. Occasionally, as at Winslow which developed partly as a resort settlement, the steeper slopes may be sought as home sites because of their aesthetic value.
As previously mentioned, roads have changed little since they were made to accommodate wagons. Obviously, since the early road builders lacked modern engineering methods they followed the lines of least slope. Only where paved highways have replaced the old country roads has there been grading of the roadbed to decrease the grade appreciably. Some of the roads are almost unbelievably steep.

The characteristics of the mountains are not the only criteria to be considered in evaluating land use. Accessibility, which influences the availability of markets, professional services, consumer supplies, and other cultural elements is a significant factor in land use. The degree to which a family can rely upon employment outside of the mountains may rest heavily upon the nearness of and/or available transportation to trade centers.

**Type-Localities**

In order to explore the nature of land use further, certain type-localities are recognized and analyzed. These are based upon the natural situation of land within the mountains. A more thorough understanding of the problems of land use and the adjustments which have been made thus far is gained by this method.
Flat Ridge Tops

As discussed previously, the uppermost surface area of the mountains is not extensive. Few mountain crests have more than four or five hundred acres of flat land and most have far less. The flat crest usually ends abruptly, almost without any warning except the tree tops rising from the sloping land beyond. The valley wall (the mountain side) slopes sharply downward, usually as almost sheer bluffs for many feet where the Atoka formation is at the surface. The crest, therefore, is accessible only after an ascent usually of several hundred feet of relief and over a varying degree of slope which nearly always includes some cliffs.

These flat crests are usually cleared and fenced (Fig. 25). The dominant land use is pasture but small fields of crops, chiefly corn, are cultivated. Agriculture is mechanized but there is little need for more than a tractor and a few attachments for cultivation. At one time the cropped land was more extensive but low yields per acre, an overall low income from crops, and the inability to be self-sufficient at a satisfactory standard of living, all combined to encourage production of livestock which would bring a higher cash income. The farmer who raises beef cattle relies to a large extent upon pasturage throughout the year with little feeding except for supplemental hay in winter. If he has chickens, as he usually does, the "scientific" feeds purchased
are more suitable than those which he could raise. Hogs and sheep may require much feeding if closely penned, but usually they must forage for most of their food.

Few ridge tops are large enough to contain several farms or even a single farm. In addition to the acreage devoted to the farmstead, productive land is diminished further by roads, churches and other community centers, and cemeteries. Only rarely is a village, or cross-roads store, located on the ridge top. Farmsteads are scattered along the sinuous ridges and population density is sparse. Not uncommonly houses are two or three miles apart.

Valley Walls

Throughout the mountains, slopes tend to be rather steep, even in areas of low relief. Most streams have at least one steep bank, often cut in bedrock and rising many feet above the channel; differential weathering and erosion have produced bands of cliffs. However, many mountain sides contain bench lands of gentle slope. These are smaller in extent but similar in many respects to the flat ridge tops.

The valley walls remain forested except where the slope is gentle. The occasional erosional bench is often cleared and where this feature occurs for some distance bands of fields may extend its entire length (Fig. 26). When these occur at different elevations, the forest
alternating with fields, an impression of land use similar to that of strip-cropping is created.

Relatively few farms are situated entirely on a valley wall. Most are elongated to include land either at the valley bottom or on the mountain top. If a tract possesses neither of those, nor a bench, it is considered to be practically worthless. Lacking even a flat area for a farmstead, it has little value except as a part of a farm which includes more favorably situated land. Water on the slopes is often a critical factor because its chief source is springs which usually flow only in wet weather.

Because of the problem of erosion and the difficulty of using agricultural machinery, it is advisable to leave these valley walls forested and, either from wisdom or lack of initiative, man has done so. The fact that man has not attempted to clear the slopes extensively is the major factor accounting for the absence of severe erosion in the mountains. The forest cover itself has many values including watershed protection, wildlife habitats, forage for livestock, and timber products.

Most of the lumbering is done along the mountain sides, since the great majority of the forested acreage is there. Lumbering roads, often accessible only to jeeps and trucks are provided temporarily. Few saw mills are put up in these areas, however.
Valley Bottoms

Many stream valleys are still in a youthful stage and even those which have advanced to early or middle maturity are less than a mile in width (Fig. 27). However, valley bottoms have most of the gently sloping land in the mountain region. They not only are greater in scope than the mountain crests but also they generally occupy more accessible situations, leading directly to the land beyond the mountains.

Most of the bottom land was originally cleared for both crops and pasture. Today, crops are less emphasized than formerly but the main crop land remains here. Hay occupies the largest acreage; corn is the main grain crop. The necessity to rely upon agriculture is lessened somewhat by the access which people have to outside opportunities which are more remunerative. Some of the land is reverting to forest because of neglect.

The most densely settled areas of the mountains are the valley bottoms. Not only are farmsteads more numerous but the majority of the villages are located here, also. The major roads traverse the valleys as far as possible. Even the forest industries concentrate here because most lumber mills are located where the cut timber can be brought together most easily from several locations.
Relative Isolation

Certainly, the over-all evaluation of the mountain region is influenced by the apparent isolation even though the degree of isolation is less than that imagined by most outsiders. To travel through the area, observe the rugged terrain and the forest, the impression is that of an unconquered wilderness beyond man's reach. Land use proves otherwise. No part of the area totally lacks settlement because of isolation. The limited economic opportunities are less the effect of isolation than of relief and slope and other physical traits of the mountains.

No attempt is made here to categorize the individual types of isolation or to map accurately the degree of isolation resulting from any one or a combination of factors. However, a general discussion of isolation and accessibility is pertinent to the consideration of land use.

The element of isolation can be measured by several criteria. Distance to such services as elementary and secondary schools, medical attention, general stores and villages, the distribution and density of population, availability of rural mail delivery, and telephone service are some of the factors which can be taken into account. Distance, though important, is sometimes less significant than the time required to travel within or beyond the mountains. The condition of the road,
its gradient, and the necessity to ford streams, are all factors which can create isolation. Even the attitude of the individual can be a factor. Some persons might not feel isolated in a situation that others might find almost unbearable.

To a degree, the suitability of the ridge tops, valley walls, and valley bottoms for settlement and productive use is influenced by accessibility and isolation. Several large valleys open directly onto the lower and less rugged areas to the north and south of the mountains. Both settlement and land use in these valleys usually are an extension of that characteristic of an adjacent area. These valleys usually are traversed by major roads, though seldom paved, and are the most accessible mountain areas as well as being the least isolated. Occasionally, however, this is not true. The valley of Richland Creek, in the central northern part of the mountains, can be reached from the Salem Upland only by fording the Buffalo River and access from other directions is by very steep roads through areas of almost no settlement. The road which extends the length of the valley crosses Richland Creek several times without even low water bridges. Isolation in the Richland Creek valley is perhaps as great as that found anywhere in the mountains. The area of available farmland comprises several hundred acres but few families attempt to live there.
Small valleys, well within the mountains, often are accessible by little more than trails and are sparsely settled. In order to reach a main road, several fordings may be necessary and the trail usually is narrow, winding, and poorly graded. In emergencies, especially when prompt medical attention is needed, the time element can be a very critical factor.

Valley bottoms, of course, must be traversed in most instances before the mountain sides or crests can be reached. There is very little settlement on the valley walls. A farmstead there is usually reached from a trail which deadends at the house, having branched from a road in the valley or from one which leads on to the mountain crest. People who live on these side roads may have to go a mile or so to a mail box or to take children to meet a school bus. They usually have no immediate neighbors along the road.

The crests might appear quite isolated because they are reached only after an ascent of the mountains. Yet, many good roads have been built leading to the mountain tops and, once there, the relatively level nature of the crests makes possible an adequate road network. Mail carriers and school buses run regularly. Of course, since the ridges are sinuous and narrow, the roads are winding and with few branches. Population on the ridge tops is sparse but more the result of limited economic opportunity than a feeling of being isolated.
The Ozark National Forest is a major factor in isolating certain areas. As mentioned previously, there is much privately owned land situated within the general boundary of the forest. A farm may be entirely surrounded by federal land or at best adjoin only two or three other privately owned tracts. Roads are maintained but social contacts within the mountains are quite limited because the population is so widely scattered.

A rather unique situation affects an area of approximately 150 square miles in southern Madison County. The White River and War Eagle Creek almost completely surround the region on three sides. On the fourth side, the tributary branches which lace the area almost create a water barrier. Only low water bridges span these streams, and frequently there is no bridge at all. During heavy rains this relatively large area, containing several hundred people, is nearly completely isolated. One-room schools flourished here long after other districts were consolidated. Swinging foot bridges, including the longest one the author has ever seen in the Ozarks, are still a vital link.

The effect of isolation upon the economy is especially important. If many people are to supplement their farm incomes by working in the towns adjacent to the mountains, they must be assured of getting to work regularly and on time. This necessitates roads which are kept
be enjoyed, most people prefer certain comforts along with nature. Few care to jostle over the roads; few like the thought of being unable to leave should creeks rise; and few can be persuaded to forsake the daily newspaper or daily trip to the corner drug and grocery stores.

Many of the people who live in the mountains prefer a degree of isolation. This appears especially true of the older generations born and reared there. Radio, television, and mail service maintain contact with the world. There is "elbow room" in the tradition of the pioneer. Electricity is available to virtually every home and they can have all of the appliances of the city-dweller. Frozen and canned foods, and trucks to haul large quantities of livestock feed, make frequent trips to town unnecessary. The scarcity of neighbors makes those few available all the more dear. People who move into the mountains but find the relative isolation frustrating usually remain only a brief time.
CHAPTER 8

SUMMARY AND PROSPECT

Summary

The nature of the Boston Mountains as a geographic region is the result of many factors. However, the Boston Mountains can be delineated most accurately as a physiographic region, using the criteria of general geology, morphology, and physiographic history. Although they are a part of the larger Ozark uplift, of which they are the southern edge, they differ sufficiently in certain respects to be recognized as a distinct section. Other landform regions to the east, west, and south are markedly different.

The mountains are not high, the most extensive high surface being about two thousand feet elevation, but they rise above the surrounding land on all sides, the northern boundary being the most distinct. Relief, and to a lesser extent the slope, has given the area its distinctly mountainous and hill characteristics. The surface bedrock, which is sandstone, is similar to that in the Ouachitas to the south but the surface molding forces and the physiographic history of the Boston Mountains are shared with the other sections of the Ozark highland.
The general nature of the mountains themselves has affected other natural elements of the region to some degree. The absence of commercially important minerals is related to the type of bedrock and the geologic forces which have been operative within the area. The climate is the same as that throughout southeastern United States; yet, elevation produces micro-climatic effects. Soils, also, are those common to the South but the degree of slope in the mountains has influenced soil formation and development. The natural vegetation is basically no different from that which occurs in adjacent areas but relief has made it impractical to remove any large percentage of the natural forest for agricultural purposes. Because of the effects which relief has had upon settlement and land use, there is considerable wilderness area which serves as wildlife refuge.

The people also contribute to the regionality of the Boston Mountains. Population is relatively sparse and scattered. There are no towns of size and the transportation network creates a degree of isolation both by the nature of the roads and by the distance from major highways and settlements. Yet, the land is over-populated in terms of its ability to support the population at a standard of living commensurate with the desires of most of the people.

In common with other highland areas, especially in the South, the Boston Mountains are considered a backward area because of the
failure of the people to make the best use of the resources which are present and/or because the resources are so limited in terms of the needs of modern society. The average cash income is low and there is a relatively high degree of self-sufficiency. Many of the inhabitants are dissatisfied with the opportunities in the Boston Mountains and the area is losing population. The pioneer appraisal of the mountains as an area which had most of the elements necessary for settlement has given way to the modern-day view of the mountains as somewhat isolated and lacking in opportunities which appear desirable for development.

Land use has changed little since the time of early settlement. Agriculture and forest industries provide most of the income which is earned within the mountains. The problems of farming the hill and mountain land and the current agricultural situation in the United States make livestock agriculture more profitable than crop farming. Lumbering activities, though locally important, are largely to supplement agricultural income. Many families find it necessary to earn additional income by working outside the mountains. The towns which are situated adjacent to the mountains provide a number of industrial opportunities.

The general picture of the mountains as a rugged, forested, sparsely inhabited, largely untamed wilderness area is supported by
close analysis. However, regional character is subject to change and it may be that in the future the Boston Mountains will be identified by other characteristics, although retaining distinct regional identity.

Prospect

Two sets of factors determine the present characteristics of the Boston Mountain region. These are the elements of the natural setting and those of the cultural setting. To a degree, the natural and cultural settings are independent of each other: the natural setting would exist whether man were there or not; the cultural setting is influenced by some factors, such as government, which are not related to the natural setting. Yet, it is the combination of these two groups of elements which creates the total regional character of the area.

The natural setting provides the natural resources of the mountains. However, not all of the natural elements are necessarily natural resources because they may not be of use to the inhabitants. The topography, climate, soils, etc., provide man with the natural basis for his livelihood. They make certain opportunities possible and at the same time withhold others. As elements of the natural setting, these resources change slowly, often imperceptibly, if they change at all. Within the lifetime of a man it is unlikely that natural
processes will change them, barring some cataclysmic event. Man, of course, can and does work change upon some of them, such as natural vegetation, wildlife, and soil, to improve or diminish their quantity and/or quality. Assuming that a fairly complete and accurate survey has been made of the natural setting, it is possible to note not only what elements are currently available for man to work with but also to indicate what he will have for the future.

The cultural setting is much less stable and much less predictable than the natural setting. The center of the cultural setting is man. He is the creature of his inheritance and the victim of his society. His desires, his inventiveness, his attitudes, and other characteristics which center in his ability to think and reason cannot be predicted except within a very broad range. He is influenced strongly by his local environment, by both the natural and cultural elements of that environment, but influences on a larger scale, such as within the state or nation, or even at the international level, may exert force upon him.

Man’s creations, his towns, fields, mines, factories, and other evidence of his handiwork, are the result of the interaction between man and society with the natural setting. Beginning within the larger framework of the opportunities which the natural setting offers and the technology which man has at his disposal, choices are made which
may be the reflection of many factors in his culture. Not uncommonly, economic factors appear paramount. His choices, moreover, may not be the wisest ones.

The major portion of this investigation has been devoted to an analysis of the Boston Mountain region as it exists at the time of this research and writing. It is appropriate, also, to indicate what the future development of the area may be.

The natural setting will not change for centuries as the result of its own processes. Man, however, constantly is subject to change and he can alter his evaluation and use of the mountains. It is impossible to predict what changes will occur but certain trends are already evident and other possibilities can be suggested.

Trends

One of the most evident trends in the geography of the Boston Mountains is the continued loss of population. This results from the limited economic opportunities within the region and its inability to compete with better-endowed areas. Neither of those situations will change appreciably. Population may well continue to decrease until the number of inhabitants equals the carrying power of the land at a level of living which is acceptable to the majority. Population numbers then might stabilize.
Several trends are apparent in agriculture. Crop farming is decreasing in importance and will probably continue to decline for as long as a greater return is possible from livestock. The position of meat and livestock products in the national diet does not appear to be lessening in importance and livestock will continue to be profitable as long as the market exists. The region's emphasis upon livestock agriculture is related to the decreasing population. As the population declines, more land is then available to those who remain and the size of farms increases, making the farm operation, especially the raising of beef cattle, more profitable. Perhaps, too, with larger farms more emphasis will be given to forest products.

There has been a marked improvement in the road network within the past twenty years. This improves accessibility, enlarges the possibilities for commercial agriculture, and encourages tourism. Continued improvement of the roads can be anticipated.

It is apparent that many people within the mountain region supplement their incomes with outside sources. This will no doubt continue either by means of employment in the towns adjacent to the region or through retirement benefits from government and/or private sources. Of course, if the population within the mountains declines to that which can be supported by the region itself, this situation might alter.
There is no indication that the percentage of land in trees is decreasing. Indeed, as the private lands within the Ozark National Forest are taken into public ownership, the total forested area will increase. Although the forest is not a major source of income, it will continue to provide the services currently associated with it. Perhaps as the nation's need for timber products increases, the forest will play a larger role in the region's economy.

It appears extremely improbable that any major towns will arise in the mountains in the future. Improved accessibility will make it easier for the trade centers adjacent to the mountains to serve the region. There will be no more bases for the support of trade centers within the region than now exists. This indicates, too, that industry will not be situated within the mountains in the future.

It is difficult to visualize that the regional complex of the Boston Mountains will change materially in the next several decades. The greatest change may well be the rise in income and living standards as the population more nearly approaches the number which the mountains can support adequately. If the state of Arkansas continues to lose population, or even if it gains, there will be little pressure upon the mountain region to support more people than currently are there. If the state continues to industrialize, this will draw more people out of the mountainous areas, thereby depopulating them still more.
Future Possibilities

Yet, other factors, not apparent within the region or state in 1963, must not be overlooked. It may be that more change will occur as the result of national factors than of local ones. Certain possibilities are suggested here but it must be emphasized that there is little or no indication that they will enter the picture.

Perhaps in view of the nation's growing urban population, the best use of such an area as the Boston Mountains would be for recreation. Much of the region is today in a relatively natural wilderness state. By removing more of the population and the works of man, this image could be enlarged. The recreational value of the natural setting could be enlarged through the erection of dams and the creation of reservoirs, stocking with wildlife, and forestation of denuded areas. Then such facilities as would be necessary for the accommodation of tourists could be installed. The mountains are already accessible to large urban populations beyond the borders of Arkansas and it is desirable to have greater recreational opportunities available as those urban centers grow.

Associated with the use of the area for recreation, the Ozark National Forest might be enlarged. The uses for forest and as a recreational area need not conflict. A program of scientific forestry would improve the value of the area for recreation and provide timber products for a growing market.
It is possible that some of the mountain region might be developed as settlement projects for retired persons. As yet, this has not been considered although such projects are located in northern Arkansas. A new one is currently being planned in Benton County, only thirty miles from the mountains. Retired persons would find the scenery attractive, could reach trade centers for their needs, and could supplement their incomes with home gardens and perhaps some livestock. A few persons, as previously mentioned, have settled in the Boston Mountains for these reasons.

Whatever their place in the regional balance of the United States may be, the Boston Mountains are certain to retain their regional identity. As the Boston Mountain region undergoes change, so will other regions. It is evident that whatever the specific changes may be, the Boston Mountain area will probably stand out more distinctly than before.
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AUTOBIOGRAPHY

I, Ollie Orland Maxfield, was born February 4, 1925, the son of Rev. Ollie O. and Jeane Taylor Maxfield. I am a native of Crawford County, Illinois, and received my secondary school education there. My undergraduate training, with majors in Geography and English, was at George Peabody College for Teachers, Nashville, Tennessee, which granted me the Bachelor of Arts degree in 1945. I received the Master of Arts degree in Geography from The Ohio State University in 1946. I accepted a position as Instructor in Geography at the University of Arkansas in 1946. I returned to The Ohio State University for the academic year 1950-1951 and taught as a Graduate Assistant during the year. I have remained at the University of Arkansas since 1951 and have taught during the summers of 1960 and 1962 at Texas College of Arts and Industries, Kinsgville, Texas.