

CHAPTER II.

THE NATURAL DIVISIONS OF THE STATE.

THE UNAKA CHAIN—THE VALLEY OF EAST TENNESSEE—THE CUMBERLAND
TABLE-LAND.

40. The great physical features, or natural divisions of the State, that form the subject of this chapter, belong, with the exception of the western part of the Table-land, to the Appalachian Region. (§ 18.) With the same exception, they constitute that one of *the three political divisions* into which Tennessee is divided, known as *East Tennessee*. The remaining natural divisions will be considered in the succeeding chapters.

I.—THE UNAKA CHAIN.

41. *General Character.* —This is a long range of mountains, and the most massive of all the Alleghany, or Appalachian Ranges. Its high crest, as already stated, is, for the most part, the line dividing Tennessee and North Carolina. As here to be understood, this chain is not a single great ridge, but rather, especially on the Tennessee side, a long belt of parallel ridges, which vary at different points, counted across the chain, from two to four in number. One of these is the main axis; the others are subordinate and more or less broken, but all, in general, trending in the same direction. The range, or its main axis, is continuous lengthwise, excepting, principally, that it is intersected by the deep and rocky cuts of the tributaries of the Holston and Tennessee Rivers that flow out of North Carolina and the northeastern corner of Georgia.*

* The names of these tributaries have been already given. (See § 6.) In the cuts or *narrows*, as they are sometimes called, the steep mountain-slopes, or high rocky cliffs, frequently come down on both sides to the water's edge. The rivers in passing, form long and roaring rapids. A few years ago the cuts were impassable for travelers. But now good roads run through several of them. The most remarkable is the road up the Ocoee to the Ducktown Copper Mines. This passes through tortuous narrows for twelve or thirteen miles. It is but little above the water's edge and has been, nearly all the way, either cut out of solid cliffs, or dug out of the precipitous mountain side.

Formerly, most, or all of the travel between the Valley of East Tennessee and the

These divide it into sections; but the sections, abutting end to end, are merely links of the great chain.*

42. The Unaka Chain presents, in one of its longest sections—that between the deep cuts of the Big Pigeon and the Little Tennessee—numerous peaks but it few feet lower than the highest of the Black Mountains in North Carolina, and, without exception, the boldest and greatest mountain-mass east of the Mississippi. As a whole, it is the wildest feature in the physical geography of Tennessee; its geological formations are not found elsewhere in the State, and are important repositories of minerals; its botanical and agricultural characteristics are peculiar and well worthy of notice. For amateurs, its "bald" summits, its semi-arctic plants and balsam peaks, the magnificent scenery it affords; its roaring rapids and wild cascades; its game, and the "trout" of its cold streams, altogether, make it an elysium.

What I propose to say here, refers to the surface features of the chain. Its formations, minerals, and soils, will be discussed in the parts of the Report to which these subjects are respectively assigned.

43. *Extent and Relations; the Blue Ridge.*—Coming out of Virginia, the chain pursues a somewhat serpentine, though, in general, direct southwesterly course, along the Tennessee and North Carolina line, into Georgia. Its length, within the northern and southern limits of Tennessee is about 200 miles; it extends, however, a considerable distance each way beyond these limits. Its relations to the Blue Ridge, to the rivers of the western part of North Carolina, and, in general, to the

valleys of North Carolina passed over the mountains. But the cuts are now assuming much importance as the great, but narrow gate-ways between the former valleys and the southeast. Four have been surveyed with reference to the location of railroad lines through them. The Knoxville & Charleston Railroad, now under construction, runs through the cut of the little Tennessee.

*Several prominent portions of the chain, lying in different and distant counties, have the name *Unaka* applied locally to them. As it is desirable for greater convenience and for other reasons, that the entire range should, like the *Blue Ridge*, have a general and distinctive name, I have in this Report, borrowing the one above, denominated it the *Unaka Chain*.

Haywood, in his "Natural and Aboriginal History of Tennessee," (Nashville, 1823,) appears to use *Unaka* in the same general sense. He spells it *Unaca*, and says: "East Tennessee is divided from North Carolina by the Unaca or White Mountains—Unica, in the Cherokee language, signifying white."

Why they were called *White Mountains*, I cannot say. It may have been for the reason that, in winter, they are frequently capped with snow, and, in summer, with white clouds.

Tennessee and New River Slope, have already been noticed.* In Virginia, according to the best maps within my reach, the Unaka Chain and the Blue Ridge converge and finally unite; the former thus becomes a great branch of the latter,

44. The portion of the Unaka Chain within the limits of Tennessee—and to this portion our attention will be mostly confined—presents a strip; which, in breadth, will average about twelve or fourteen miles, varying, however, from two or three to twenty miles. Excluding the *coves*, confined within its ridges, it covers an area of not far from 2000 square miles.

45. Large parts, and generally the southeastern parts, of all the counties adjacent to the North Carolina line, are made up of the Unaka Ridges. These counties are Johnson, Carter, Washington, Greene, Cocke, Sevier, Blount, Monroe, and Polk. In Johnson the ridges lie in such a manner as to completely enclose the valleys, or rather *the great cove*, of this county. In Carter, too, they nearly enclose the valleys. Greene has less of its surface covered by the Unaka Ridges than any of the other counties mentioned.†

46. *Ridges and Outliers.*—It has been stated that the chain under consideration is a belt of parallel ridges. In general, it might be said, that the Tennessee portion is divided longitudinally into two ranges—one the high main axis, including its great spurs, the other a subordinate series or chain of outliers, mostly detached and lying along the base of the former, though generally separated by long coves. This typical character, however, does not always hold good, the greatest departure from it being northeast of the French Broad, or of the Big Pigeon. Some of the local features and principal ridges of the chain are pointed out below.

47. In the northeastern corner of the State, north of the Watauga River, in Johnson and Carter counties, the Unaka Chain is divided lengthwise into *three*, leading ridges or mountains separated by wide and beautiful valleys. These ridges, seen from some points, appear to be parallel, but in reality they converge towards the northeast, the two most westerly

*See §§ 6, 7, 11, and 15.

†These counties may be named the *Unaka Counties*. Sullivan and McMinn have their eastern boundaries along the crests, respectively, of two western outliers of the chain, and have, therefore, but little of their surfaces with the Unaka area. For this reason they are not included in the above group.

coming together and blending in a common ridge, as they enter Virginia, which also, further to the northeast, unites with the most easterly and remaining one. (See Map.)

48. The most easterly, is the *Stone Mountain Range*, called also *Iron Mountain*.* This is a long bed of a few crowded ridges, along the highest of which the State line runs. It extends southward to the Watauga. *Forge Mountain*, a sandstone mountain, the southern end of which is a short distance east of Taylorsville, is one of its ridges. To the northeast, just within Virginia, the Stone Mountain culminates in the grand and conspicuous summit—the "*White Top*." Other peaks, southwest of the White Top, are *Beech Summit*, *Cat Face*, *Slate Face*, &c.

49. The second, or middle ridge, is *Iron Mountain*. This is a long, heavy, straight ridge running through Johnson and Carter—a portion forming, for some distance, the boundary between the two counties. It is separated from Stone Mountain by the valley-lands of Johnson. It is cut through both by the Watauga and Big Doe Rivers, but nevertheless, continues as a well defined range to the southern part of Carter, where it gradually sinks away. South of the Watauga, it is separated from mountains on the east by a long, very narrow valley, the most important and widest part of which is *Doe River Cove*, in Carter.

50. The last and most westerly, is *Holston Mountain*. This is separated from Iron Mountain by a curious, very elevated basin of limited extent, called *Shady*, and by the large *Valley of Stony Creek*. It runs out boldly from its brother ridges into the "open country," and terminates abruptly a few miles north of Elizabethtown.

51. I may add here, too, as pertaining to this group, an isolated sandstone ridge called *Doe Mountain*. It rises up in the lower part of the Johnson County Valley, and divides the latter longitudinally into two portions, which, however, unite again around the southern end of the mountain. It commences near

*As on Mr. Rhea's Map. There is much confusion resulting from the indiscriminate use of local names by those living among, or in the vicinity of, the Unaka Ridges. Sometimes a well defined ridge has two or three different names. In many cases, the same name is applied to two or more distinct ridges, and sometimes when they are but a few miles apart. There are, for example, more than half a dozen "Iron Mountains" in the Unaka Chain, three of which, at least, are in Johnson and Carter, and which too, from some points, may all be seen at the same time. In selecting names, I have taken those most used, except in cases where the use of such would lead to confusion.

Taylorsville and extends nearly to the Watauga. Towards its southern end, it is cut into by Doe Creek.

52. The eastern part of Carter, south of the Watauga Valley and east of the Iron Mountain Range, forms a region—a portion of the Unaka area—from 12 to 14 miles across, nearly square, or rhombic, in shape, and drained mostly by the tributaries of Doe River. This region is very rough, and is remarkable for the great mountains which bound it on the southeast and south, and for the *transverse direction* (more or less northwest and southeast) of several of its included ridges. Within it, on the upper waters of the Big Doe, lies an isolated group of mountain-hemmed valleys, called collectively *Crab Orchard*. This name I extend to the whole region specified. The following are some of its principal ranges and its limits:

53. On the north and west, this region is limited by a sandstone border, which may be called the *Flint Range*. This range is broken and not well defined. Starting from the State line below the Watauga, it may be regarded as running westward until near Iron Mountain, where, bending around to the southwest, it runs to the southern part of Carter parallel with the Iron Mountain, and separated from it by the narrow valley and Doe River Cove, mentioned above. (§49.) The range is intersected at several points, near to one another, by the main tributaries of Doe River just before they unite in Doe River Cove; the parts thus cut off from bold *knobs*, against which the ridges dividing, the tributaries—the *transverse ridges*, by the way, referred to above—abut, and with which they unite.

54. Upon the east and south, the Crab Orchard region is bounded by the State line which here projects, in a great bend Dr angle, to the southeast. Leaving the Watauga the line pursues, at first, a straight course, passing over an interval of several miles in which the Unaka Chain is broken and loses, to some extent, its continuity. Towards the southern part of the region, however, it passes near and along the crests of several noble mountains—the *Humpbacks*, the *Big Yellows*, and the *Roan*—bending, at the same time, to the west, with the latter range. These mountains thus form a portion of the southeastern and southern border of Crab Orchard, overlooking the group of valleys—the local Crab Orchard—which lie at their northwestern base. (See Map.)

55. The *Roan*, though not having the highest peaks, is, in some respects, the grandest mountain of the Unaka Chain. It is high and massive, and has a chain or succession of beautiful *bald* places or "*balds*,"* which extends for several miles along its summit.

The greater part of the Big Yellow Mountain lies in North Carolina. Prof. Guyot, in speaking of the region between the Unaka Chain and the Blue Ridge, and of the clusters of high mountains within it, calls the Roan and the Grand Father, (the latter the highest part of the Blue Ridge and facing the Roan,) "the two great pillars on both sides of the Northgate to the high mountain region of North Carolina. * * * * That gate is almost closed by the Big Yellow Mountain."†

The State line, after running southwestward along the ridge of the Roan, for nearly, or quite, half a dozen miles, and when not far from its southwestern "bluff" end, (the mountain in this direction terminating very abruptly,) leaves it suddenly and runs north and west, over a connecting ridge, across to a *second Iron Mountain*. This leaves the Crab Orchard region, for the most part, to the northeast.

56. The Unaka Chain, in the extreme southern part of Carter County—in the region of *Limestone Cove*—is reduced to narrow limits. On account of the abrupt ending of the Roan, the Iron Mountain, just mentioned, lying several miles to the northwest, becomes the main range of the Unaka. The State line runs along its crest.

57. This *Iron Mountain* is a heavy ridge coming out of the Crab Orchard region. It runs in a southwesterly course, and is continuous with the eastern range of Washington County. It is but a few miles east of the disappearing and crowded ends of the Flint Range and of the first mentioned Iron Mountain, being separated from them by Limestone Cove, before referred to, which is a small, narrow valley on the head waters of Indian Creek.

58. In Washington County, the Unaka Mountains consist, in general, of two parallel subordinate beds, (§ 46,) which are separated by a long, straight valley, called *Greasy Cove*.

*So called by those living in the region of the Unaka and the Blue Ridge. The *balds*, in general, will be spoken of specially further on.

†Am. Jour. Sci., Nov., 1860.

59. The eastern bed may be designated the *Bald Mountain Range*. It runs to the southwest, continuing the State line, and has many great spurs and several prominent bald peaks. The Iron Mountam, of the southern part of Carter, may be regarded as forming a part of it. As it enters Washington County, the range rises up in a high, bold mountain, locally known as the *Unaka*. In the southern part of the county it swells up again and forms the *Great Bald*, well known in this section of the State for its elevation and the *bald* which crowns it.

60. The western bed may be called the *Buffalo and Rich Mountain Range*. Its northern end rises up right in the midst of the lowlands, at a point nearly opposite the bluff terminus of the Holston Mountain. (§ 50.) From this point it pursues a southwesterly course, parallel with the Bald Mountain Range, until it strikes the Greene County line. It passes entirely through Washington County, but is intersected by the Nolichucky, the northern part constituting *Buffalo and Cherokee Mountains*, and the southern, *Rich Mountain*, &c. It is really a double range, inclosing two small coves, the most important of which is *Bompass Cove*, extending southwestward from the Nolichucky.

61. Entering Greene County, we find the Unaka, within Tennessee, reduced suddenly to a single massive ridge. This is due to the large S-shaped bend that the State line makes along the southern boundary of Washington County. Soon after passing the Great Bald, the line, leaving the Bald Mountain Range, crosses over northward and westward, until it reaches the massive ridge mentioned. (See Map.) This is the conspicuous mountain lying to the southeast of Greeneville, and is in a line with the Buffalo and Rich Mountain Range of Washington.

In the Southern part of Greene two other well marked ranges occur.

62. The ridge, or mountain, lying to the southeast of Greeneville, belongs to what may be called the *Big Butt Range*, the northern end being well known as the "Big Butt." It starts up just within Washington, in a bold, high summit, presenting a bald, and partially separated by a gap from the Buffalo and Rich Mountain Range. It runs for more than half a dozen miles to the southwest, forming a straight, high mountain, pre-

senting, in its course, several bald places, and sending off short, but heavy, spurs. Further southward it sinks to a lower and less direct ridge, which, however, may be regarded as a portion of the same range. This portion continuing the State line, forms an elbow to the southeast, in which course it bends around near the Warm Springs, on the French Broad River, in North Carolina.

63. Before reaching the point where the last range loses its greater elevation, *Paint Mountain* rises up close upon, or forming, its western flank. This mountain soon becomes a distinct range running more directly southwestward to the French Broad, which it strikes at the "*Painted Rock*," forming with its rocks and its bluff end, the narrows, and the great mural escarpment and amphitheatre of solid sandstone, so well known to travelers on the French Broad.

Paint Creek, draining a very rough and rapidly descending valley, flows out from between this mountain and the southern part of the former range.

64. Northwest of Paint Mountain, and separated from it by a cove and a long valley, (*Peck's Trough*,) is an outlier, a long, straight ridge, called *Meadow Creek Mountain*. It first appears in the southern part of Greene, gradually swelling up from the lowlands, and runs in a southwesterly direction to the French Broad, in Cocke County.

65. After crossing the French Broad, there are in Cocke County, several subordinate ranges, continuations, to some extent, of those in Greene. The range which marks out the State line, is at first, for several miles, poorly defined, being very low and broken. Within six or seven miles, however, it rises rapidly, and soon becomes one of the greatest mountains of the Unakas.

66. Southwest of the Big Pigeon, the Unaka Chain throughout, may be divided generally, in accordance with the typical character, (§ 46,) into two parallel but unequal ranges. The *first*, which I will call the *Great Smoky*, is, in much of its extent, the State boundary. It is the greatest bed of mountains in Tennessee, having the highest peaks, and occupying with its high ridges, a large area. The *second* is a range, or chain, of prominent, isolated, and long mountains, all arranged lengthwise, nearly in the same line, and composed of the same

sandstones and conglomerates. They are all *outliers* skirting, at intervals, the northwestern base of the Smoky Range. They appear, in most cases, to rise up massively and independently, just within the southeastern edge of the East Tennessee Valley. The whole chain may be named, from one of its principal mountains, the Chilhowee Range.

The interval between the ranges is occupied by narrow valleys or coves, and numerous ridges and spurs. The ridges and spurs have) generally, a much lower elevation than the principal ranges; in a few cases) however, they become high, and conspicuous mountains.

67. The first range—the *Great Smoky*—has several local names. That of *Great Smoky*, as well as that of *Unaka*, is very generally applied to the more northeastern portions. In the southern part of Blount County, a portion is called the *Bald Mountain*, on account of the balds upon it. The section between the Little Tennessee and Hiwassee Rivers is often locally denominated *Unaka*. In Polk, south of the Ocoee, another portion is known as the *Frog Mountain*.

Along the State line, in Sevier and the eastern part of Blount, this range attains its greatest development. (§ 42.)

68. The general course of the Smoky Range is southwest. It makes, however, as may be seen by reference to the map, a great elbow, or angle, to the southeast in passing around the head waters of the Tellico River.

Within a few miles of the Hiwassee River, the State line leaves the course of the highest ridges and runs in a straight direction, nearly due south, to the Georgia boundary, a distance of about sixteen miles. This throws the range within Tennessee, and gives to the State, as it were, accidentally, a most interesting triangular area—the *Ducktown Region*. This region is, physically, a portion of one of the mountain valleys, or basins of North Carolina and Georgia.

69. The second, the *Chilhowee Range*—that of the outliers—being a chain of detached mountains, has its parts more definitely named.

English's Mountain, lying lengthwise between Newport and Sevierville, is the first. It breaks up from the lowlands, three or four miles southwest of the former place, and is nearly a dozen miles in length.

70. *Chilhowee Mountain*, whose *bluff* end first appears five or six miles west of Sevierville, is the second. This mountain, coming out of Sevier County, runs through Blount and terminates at the Tennessee River. It is the longest and most important of the series. Little River, in Blount, cuts through it. The Montvale Springs are at a point of its northwestern base south of Maryville.

71. In Monroe County there are two short mountains in the Chilhowee line, lying between Play-Ball Creek and Tellico River. Taken together, they may be designated as the *Guide Mountain*.

72. Leaving the last mountain, and passing over an interval of eight or ten miles, the last of the chain rises up boldly from the valley, and runs on into Polk County, terminating at the Ocoee River. This outlier is called *Star's Mountain*; next to Chilhowee, it is the greatest of the range. It is cut in two by the Hiwassee River.

73. *Elevation above the Sea*.—The general elevation of the Unaka Chain, along the Tennessee boundary, is doubtless greater than that of the part of the Blue Ridge, within the limits of North Carolina. It cannot be much, if any less than 5000 feet. One long section of the chain, that between the French Broad and the little Tennessee, has indeed, an average elevation much greater. Prof. Guyot, in speaking of this section, says:

"Though its highest summits are a few feet below the highest peaks of the Black Mountain, it presents on that extent of 65 miles, a continuous series of high peaks and an average elevation not to be found in any other district, and which give to it a greater importance in the geographical structure of that vast system of mountains. The gaps or depressions, never fall below 5000 feet, except towards the southwest and beyond Forney Ridge; and the number of peaks, the altitude of which exceeds 6000 feet, is indeed very large."*

* For the last ten years, Prof. Arnold Guyot, of Princeton, N. J., has devoted the greater parts of the summers to the study of the geography of the Alleghany, or Appalachian system, and to the measurement of its mountains. During four of these summers—those of 1856, '58, '59, and '60—he has, attended by assistants, given his attention to the mountains of North Carolina and to those of the Unaka Chain. It is to his able researches, in connection with the levels of the surveyed railroad lines, that pass through the valleys, or water gaps, of the chain, and to his kindness personally, that I am almost wholly indebted for the very satisfactory series of elevations presented in the following tables. (Am. Jour. Sci., Sept., 1857, and Nov., 1860.)

Mr. S. B. Buckley has given us valuable and interesting contributions bearing upon

The measurements hitherto made in the Unaka Chain have been almost entirely confined to its main axis. The general elevation, therefore, of the outliers upon the northwestern side, cannot be given with any accuracy. It may be estimated at about 2500 feet.

74. The following tables embrace the peaks and gaps that have been measured, with their heights in feet above tide-water. The heights of a number of points in the valleys and watergaps immediately around the mountains, or in their vicinity, are also given for comparison.

(1.) The first table includes several high points of the Stone Mountain Range, (§ 48,) and of the neighboring valleys. Balsam Mountain is several miles northeast of White Top; both are in Virginia.

Balsam Mountain, Va.,.....	5,700 (about).....	Guyot.
White Top.	5,530.	"
Cat Face Mountain, Tenn.,.....	4,913.....	Guyot.
State Gap, (Tenn. & N. C. line.)...	3,400 (about).....	"
Shull's Mill-pond, Main Watauga, N. C.,.....	2,917.....	R. R. Survey.
Taylorville, Tenn.,.....	2,395.....	Guyot.
State Line, (Tenn. & N. C.,) in Watauga Valley,.....	2,131.....	R. R. Survey.

(2.) The following are prominent points upon the Yellow and Roan Range. (§ 55.)

Yellow, (above Brigg's house,).....	5,158.....	Guyot.
Little Yellow, (highest,).....	5,196.....	"
Roan, Cold Spring,.....	6,132.....	"
" Grassy Ridge Bald.....	6,230.....	"
" High Knob.....	6,306.....	"
" High Bluff.....	6,296.....	"
Toe River Ford, in N. C....	2,132.....	"
Brigg's house, foot of Roan, N. C.,.....	2,757.....	"

(3.) The following is the height of Bald Mountain, the only measured peak of the Bald Mountain Range, (§ 59,) so far as I know. The heights of Burnsville and Jonesborough, are added for comparison.

the elevation of the Great Smoky Range. He measured many points, along and near the State line in Cocke and Sevier Counties, which were afterwards measured by Prof. Guyot. Mr. B.'s heights are greater than Prof. Guyot's by quantities varying from 60 to 130 feet and more, mostly for the reason that the altitudes of the bases he started from were too great. (Jour. Sci., Mar., 1859.)

The lamented Dr. E. Mitchell, of Chapel Hill, N. C., and Prof. W. C. Kerr, of Davidson College, have likewise made measurements in the Unaka Chain. The former many years ago. (Jour. Sci., April, 1839.)

Bald Mountain.....5,550.....Kerr & Guyot.

Burnsville Court-House, N. C.....2,840.....R. R. Survey.

Jonesborough, Tenn.....1,734.....E. T. & Va. R. R.

(4.) I cannot give the exact height of the Big Butt Range. (§ 62.) The higher portion, however, is not much, if any, less than 5000 feet above the sea. Col. T. Johnson, of Greene County, who is interested in property upon this range, in a letter of March, 1859, says: "There are two high peaks near the *Cold Spring*" [a noted spring and summer retreat near the north end of the range] "which have the same height, and are from 5000 to 5500 feet above tide-water. There have been two measurements made, but neither, I think, is very reliable."

Adding, for comparison, the elevation of the depot at Greeneville, we have then:

Big Butt Range (highest point)....5,000 (?).....

Greeneville (Depot).....1,581.....E. T. & Va. R. R.

(5.) The following table includes points of the Great Smoky Range between the French Broad and Little Tennessee. (§§ 67 & 73.) Most of them are on the State line. The elevation of a few points in the valleys and water-gaps are given as before:

Warm Springs, N. C.....1,326.3....Bench-mark R. R.

" " Piazza of Hotel...1,335.....Guyot.

Tennessee Line on the French

Broad,.....1,264.....R. R. Survey.

W. H. Campbell's house, head of

Big Creek, tributary of the

French Broad.....3,287.....Guyot.

Indian Grave Gap, (between Fr.

Broad and Big Pigeon).....4,288..... "

Man Patch Gap, (do).....4,392..... "

Bear-wallow Mt., (do).....4,659..... "

Bear-wallow Mt. Gap to Fine's

Creek, (do).....4,116..... "

Luftee Knob, (on Tenn. Line at

the corner of Haywood and

Jackson, Counties, of N. C.

The points below are between

this and the gap of the Lit-

tle Tennessee.).....6,238*..... "

Thermometer Knob.....6,157..... "

Ravens Knob....6,230..... "

*This elevation may not be correct within a few feet. Prof. G. states that he was interrupted when at this point by a storm.

Tricorner Knob.....	6,188.....	Guyot.
Mt. Guyot, (so named by Mr. Buckley, in Tenn.,).....	6,636.....	"
Mt. Henry.....	6,373.....	"
Mt. Alexander.....	6,447.....	"
South Peak.....	6,299.....	"
The Three Brothers,—highest or central Peak.....	5,907.....	"
Thunder Knob.....	5,682.....	"
Laurel Peak.....	5,922.....	"
Reinhardt Gap.....	5,220.....	"
Top of Richland Ridge.....	5,492.....	"
Indian Gap.....	5,317.....	"
Peck's Peak.....	6,282.....	"
Mt. Ocona.....	6,135.....	"
Right-hand, or New Gap.	5,096.....	"
Mt. Mingus.....	5,694.....	"
Group of Bullhead in Tennessee:		
Central Peak, or Mt. LeConte.....	6,612.....	"
West Peak, or Mt. Curtis.....	6,568.....	"
North Peak, or Mt. Safford.....	6,585.....	"
Cross Knob.....	5,981.....	"
Neighbor.....	5,771.....	"
Master Knob.....	6,013.....	"
Tomahawk Gap.....	5,450.....	"
Alum Cave.....	4,971.....	"
Alum Cave Creek, junction with Little Pigeon River	8,848.....	"
Road Gap.....	5,271.....	"
Mt. Collins.....	6,188.....	"
Collin's Gap.....	5,720.....	"
Mount Love	6,443.....	"
Clingman's Dome.....	6,660.....	"
Mt. Buckley.....	6,599.....	"
Chimzey Knob.....	5,588.....	"
Big Stone Mountain.....	5,614.....	"
Big Cherry Gap.....	4,838.....	"
Corner Knob	5,246.....	"
Forney Ridge Peak.....	5,087.....	"
Snaky Mt.....	5,195.....	"
Thunderhead Mt.....	5,520.....	"
Eagletop... ..	5,433.....	"
Spence Cabin	4,910.....	"
Turkey Knob.....	4,740.....	"
Opossum Gap.....	3,840.....	"
North Bald.....	4,711.....	"
The Great Bald's Central Peak	4,922.....	"

South Peak.....	4,708.....	Guyot.
Tennessee River at Hardin's....	899.....	"
Chilhowee Mt., summit road to Montvale Springs	2,452.....	"
Montvale Springs, Tenn.....	1,298.....	"

(6.) Between the Little Tennessee and the Hiwassee, we have the following elevations:

Hangover Knob, over.....	5,300.....	Guyot.
Haw Knob, over.....	5,300.....	"
Beaverdam, or Tellico Bald.....	4,266.....	"

(7.) South of the Hiwassee the average elevation of the chain is reduced to about 3400 or 3000 feet. Frog Mountain, south of the Ocoee, is a high portion of the chain. Prof. Guyot makes the elevation of its highest peak 4226 feet. The elevation of the Ducktown Copper Region, which lies to the east of Frog Mountain, is said to be about 2000 feet.

75. *The "Balds," Views, Balsam Peaks, &c.*—I have had occasion several times, to refer, incidentally, to the "balds" of the Unaka Range. Some further notice of them is required.

As a general thing, the Unaka Ridges are clothed with forests, the high, exposed summits, however, running up from 4000 to more than 6000 feet above tide-water, are frequently destitute of trees, owing to the cold climate of these heights. Such places are said to be *bald*, or are called the *balds*, and sometimes *balls*. They are treeless domes capping the great mountains.

These domes are, in some cases, nearly, or quite, a mile in diameter; sometimes a chain or succession of them, occurs along the summit of a ridge, giving, in fact, a more or less continuous bald for several miles. Such is the case upon the Roan.

(§ 55.)

76. Although treeless, the balds are not wanting in verdure; supplied often with a good, though not deep, soil, they abound in grasses, ferns, and small shrubs,* several of which belong to a far more northern climate than is found in the valleys below. During the summer, the clouds, in which they are often buried, keep them moist, and supply with water the ice-cold springs which are frequently found around their edges, much to the comfort and relief of the mountain-climbers who visit them. In winter they are, much of the time, covered with snow.

*"Wild gooseberries," several species of huckleberries, and even strawberries, abound upon some of them, and are much esteemed for their rich flavor.

77. In ascending a mountain crowned with a bald, the changes which successively occur in the aspect of the trees and general growth, as we approach the bald, are curious and most interesting. Leaving the heavy forests on the slopes below, the oaks, beeches, and other trees, begin to diminish in size, and diminish more and more, as the bald is approached, until we find ourselves passing through strange, low groves of old looking dwarfs, often not much higher than one's head. Groves of stunted beeches, buckeyes, maples, oaks, with sometimes birches and patches of balsams, are found more or less, around all of them. On reaching the edge of the bald, the groves disappear, and the treeless summit is boldly spread out before the visitor; often, with the exception of occasional rocky masses here and there, as a great gently rolling meadow, and often, too, in the summer season, alive with "stock" of all kinds, feeding and fattening upon the rich herbage.

78. The balds, in themselves, are interesting, but when the great and magnificent views of the world below and around them are associated, they become in truth, sublime. They must be visited, to be appreciated. There is a fascination about them which cannot be told.

79. In general, the views on the one hand, to the east or southeast, in North Carolina, are made up in the distance of the broken heavy ranges and arms of the Blue Ridge. Nearby, from nearly all the points, the spurs of the Unakas are seen running out from beneath one's feet, sometimes apparently interlocking, in much confusion, with those from the North Carolina ranges; often, however, the different sets are seen to be more or less parallel, and separated by beautiful valleys which look like garden spots deeply seated, and sometimes seemingly almost buried among the mountains.

80. On the other hand, to the west and north, in Tennessee, the view is different. There is not the same apparently unbounded ocean of mountain billows. In place of the rough ranges of the Blue Ridge, we have, in the distance, far below us, (combining the views from the different points along the Unakas,) the great Valley of East Tennessee, spreading out like a rich and checkered carpet, its inequalities, excepting a few heavy ridges to the north, being almost lost—its surface sinking down to a great plain, dotted all over with cultivated spots. In the extreme distance, especially from the central and more southern summits, the Cumberland Table-land is seen to the northwest, rising up dimly beyond the Great Valley, and bounding the view. From the more northern summits, the

Bay's Mountain group of ridges, and the Virginia ranges, the Clinch especially, which run their abrupt ends into Tennessee, appear in demi-relief, set in the midst of the Valley, and interpolated, as it were, between the Unaka and the Cumberland.

(§ 95.)

At our feet the Tennessee Unakas are well seen. Great spurs run out from the main axis, at the base of which lie, very generally, long, narrow coves; just beyond which, again rise up long, straight mountain ridges—the outline of the chain (§ 46) trending with the main axis itself, to the northeast and southwest.

81. Many balds occur along the Unaka Chain. White Top, of the Stone Mountain Range, (§ 48,) has a conspicuous one, which can be seen from many and distant points. Other summits of the same range, have them. Those of the Roan, the Bald Mountain, and Big Butt ranges, have been referred to. (§§ 55, 59 and 62.) Others occur along, or in the vicinity of the line in Cocke, Sevier, Blount, and Monroe.

Of all the balds, those of the Roan are doubtless the most extensive and beautiful. They are three or four in number, and lie in a chain six miles in length along the summit of the mountain. They are partially separated from each other by shallow depressions, or gaps, which abound more or less with groves of dwarfed trees such as generally surround the balds. (§77.) The largest lies at the southwestern end of the Roan. Dr. Mitchell appears to have had this one in mind when he wrote the following graphic notice of this mountain: "It is the most beautiful and will best repay the labor of ascending it, of all our high mountains. With the exception of a body of rocks, looking like the ruins of an old castle, near its southwestern extremity, the top of the Roan may be described as a vast meadow without a tree to obstruct the prospect; where a person may gallop his horse for a mile or two, with Carolina at his feet on one side, and Tennessee on the other, and a green ocean of mountains raised in tremendous billows immediately around him. It is the Elysium of the Southern botanist, as a number of plants are found growing in this cold and humid atmosphere, which are not seen again until we have gone some hundreds of miles further north. It is the pasture ground for the young horses of the whole country about it during the summer. We found the strawberry here in the greatest abundance and of the finest quality, in regard to both size and flavor, on the 30th of July."*

The bald of the Big Butt, in the neighborhood of the "Cold Spring," is easy of access, affords a magnificent view, (all the mountains and coves of

*Amer. Jour. Sci., 1839, Vol. XXXV. See also same Journal, 1842, Vol. XLII, for an interesting notice of the botany of this and other neighboring mountains, by Dr. Asa Gray.

Washington, to the northeast and east, among them the Great Bald, the towns of Jonesborough and Greeneville to the north and west, far down in the Valley, Bay's Mountain, &c., being in sight,) and will well compensate for the labor incident to a visit.

82. Those summits, or crests of considerable elevation, but not high nor exposed enough to be bald, are generally covered with a stunted open growth.

Some of the very highest points, in place of being bald, are dark with a heavy balsam and evergreen growth, through which it is sometimes impossible to pass. Such a dark, thick, sombre vegetation has given name to the Black Mountains of North Carolina; and some of the Tennessee peaks might well be denominated *Black* for the same reason. The following remarks refer, in part, to the "balsams" of the mountains of Cocke and Sevier counties:

"Most of the highest mountain tops are covered with the *Abies nigra* and *Abies Fraseri*; the former is the black spruce, and is erroneously called the balsam; the latter is the true balsam with blisters in its bark, from which balsam is collected. It attains a greater size than Pursh or Nuttall has given it. •••• The black spruce appears to grow at a lower elevation than the balsam, but neither of them is often met with beneath a height of 4000 feet."*

83. Dr. Mitchell, who many years ago measured the peaks of the Black Mountain, and who, too, in after years, unfortunately lost his life while alone among their dark, cold summits, has left us the following notice of the laurel thickets and bear trails of this mountain. Similar thickets and trails occur upon some of the rough ridges of Tennessee.

"The ascent of the Black Mountain is very difficult, on account of the thick laurels which are so closely set, and their strong branches so interwoven, that a path cannot be forced by pushing them aside. The hunters have no method of advancing, when they happen to fall in with the worst of them, but that of crawling along their tops. The bear, in passing up and down the mountain, finds it wisest to keep the ridges; and, trampling down the young laurels as they spring up, breaking the limbs of the old ones, and pushing them aside, he forms, at last, a sort of burrow above ground through this bed of vegetation, along which he passes without difficulty."

84. *Climate*.—The cool, grassy balds, the high crests with open, stunted growth, the balsam summits and northern aspect

*S. B. Buckley, Amer. Journ. Sci., Vol. XXVII, 2d Series, p. 286.

of vegetation, which have been referred to, indicate the character of the climate on the tops of the higher Unaka ridges. In ascending these ridges no important changes are seen until near their tops. The same forests extend from the valleys a long way up the sides of the mountains. In the vicinity, however, of the higher crests and summits, and upon them, the aspect is very different. The changes in vegetation are especially striking. Many of the plants are sub-alpine in character, the equivalents of which must be sought for on the plains of Canada, several hundred miles to the north.

For the want of systematic observations upon the meteorology of the Unakas, no satisfactory statistics can be presented. All I propose to do is to estimate their mean temperature and other climatic features, using as data the averages obtained at Knoxville, the nearest point at which observations have been made. Knoxville occupies a position near the centre of the great valley of East Tennessee, but is within sight of some of the Unaka ridges.

85. It is well known that the greater the altitude of a place, the colder is its climate. The rate of decrease in temperature is one degree for about every 300 or 350 feet of elevation.

Prof. Guyot, in his excellent work on comparative Physical Geography, says:*

"An elevation of level of 350 feet, which is only that of many of our public edifices, is sufficient to diminish the mean temperature of a place by one degree of Fahrenheit; that is to say, the effect is the same as if the place were situated sixty miles further north. A few thousand feet of height, which are nothing to the mass of the globe, change entirely the aspect and character of a country. The excellent vineyards, bordering the banks of the Swiss lakes, become impossible at 1000 feet, at 500 even, above their present level; and the tillage, the occupations of the inhabitants, take here quite a different character. A thousand feet higher still, and the rigor of the climate no longer permits the fruit trees to flourish; the pastures are the only wealth of the mountaineer, for whom industry ceases to be a resource. Higher still, vegetation disappears, with it the animals, and soon, instead of the smiling pictures of the plain and the lower valleys, succeeds the spectacle of the majestic, but desolated regions of eternal ice and snow, where the sound and animation of life give place to the silence of death."

* The Earth and Man: Lectures on Comparative Physical Geography in its Relations to the History of Man, by Arnold Guyot. Boston, 1850.

I quote this passage for a double purpose; it contains practical illustrations for which we will have use hereafter.

86. Prof. Henry, in constructing the isothermal chart of the territory of the United States, which accompanies one of his instructive articles on Meteorology in the Patent Office Reports, has made an allowance for decreasing temperature of *one degree for every 333 feet of elevation, or three degrees for every 1000 feet*. This rate of decrease afforded him satisfactory and consistent results. It will be adopted in estimating the temperature of the high lands of Tennessee.

87. The mean annual temperature at Knoxville, so far as we can at present, determine it, is fifty-seven degrees, (§ 30.) and the height of the city, or rather of the points where the observations were made, is 1000 feet above the sea, or so near it, that this, for present purposes, may be taken as the height.

Many of the more elevated Unaka summits are from 4000 to 5000 feet higher than Knoxville, and some 5500, and a few even 5600 higher. The difference in temperature, must, therefore, be considerable. At the rate adopted, it is fifteen degrees for those points 5000 feet above Knoxville, or 6000 above the sea. This gives them a yearly mean of forty-two degrees, which is about that of the southern shore of Lake Superior, and of Quebec and Montreal.

88. The yearly mean of forty-two degrees belongs strictly to those points which have the same latitude of Knoxville, and are 6000 feet above the sea. A difference of latitude, in this region, of about forty-five miles, makes a difference in temperature of one degree. The elevation therefore, being the same, the mean, forty-five miles further north, will be forty-one degrees, and at the same distance south, forty-three degrees. It follows, also, that an elevation of 5666 feet above the sea, in the northern part of the Unaka Chain, will be equivalent, so far as it regards temperature; to one of 6000 feet on the parallel of Knoxville, and to one of 6333 forty-five miles further south.

Thus, finally, it is seen that, in *mean temperature* at least, these high local regions have a climate that is truly Canadian. But while the annual mean is that of Quebec, or of Montreal, the extremes of heat and cold are less than they are there; the winters being milder and the summers cooler.

89. As to *rain and moisture*, but little that is definite can be given. It is well known, however, that there is, in general, no lack of either. In the summer season, showers of rain frequently dash over these mountain tops, when scarcely a cloud is to be seen floating above the great Valley, to the west. The annual quantity of rain and melted snow at Knoxville, may, for the present, be taken at 44.5 inches, (§ 38.) That which falls upon the Unakas is greater than this. The moist westerly and southwesterly winds, when they strike, and flow up the mountain sides, lose a part of their sensible temperature, and, in consequence, may precipitate moisture, for the first time in their passage across the State, either simply as clouds enveloping and bedewing the summits, or as rain. During the winter, the highest crests and summits are, much of the time, white with snow.

The foregoing features of climate give the Unakas, for the most part, their agricultural characteristics; of these it is proposed to speak hereafter.

II.—THE VALLEY OF EAST TENNESSEE.

90. Leaving the mountains, we now descend to a great area, or Valley, fluted with scores of smaller valleys and ridges. Such are the relations of this area to the mountains on both sides, that it is well called, collectively, the Valley. It is one of the most beautiful and populous portions of the State. Within it is embraced nearly all the agricultural wealth which is usually accredited to the civil division we call *East Tennessee*.

(§ 40.)

91. *Geographical Limits and Relations.*—The limits of this valley have been already briefly given in the table of the natural divisions. (§ 25.) As there said, it is bounded on the southeast by the Unaka Chain, and on the northwest, by the steep escarpments of the great Table-land next to be described.*

* The panoramic view, facing this page, presents the general appearance of the Valley of East Tennessee as seen from the point of Lookout Mountain near Chattanooga. In the extreme distance, upon the right, are seen some of the high ridges of the Unaka Chain, and nearby, upon the left, the eastern escarpment of Walden's Ridge, (an arm of the Cumberland Table-land,) the wide valley lying between these mountain ranges. Some of the ridges included within the valley, are also seen. The conspicuous ridge east of Chattanooga, is Mission, or Missionary, Ridge. Further off, White Oak Mountain, parallel to the ridge, just mentioned, may be traced out.

To the northeast it is continuous with the Valley of Virginia; to the southwest it extends into Georgia and Alabama. It is, in reality, but a part of a long, great and complex trough that extends, at least from the Susquehanna, in Pennsylvania to the Coosa and Black Warrior rivers, in Alabama; and it is thus, too, I may add here, a portion of a great natural highway,—for such is this trough,—that Providence has opened between the North and the South, and which now is rapidly becoming available by iron tracks throughout its entire length. This trough, in its southwestern course, enters Tennessee obliquely with reference to its northern boundary, but, in crossing the State, turns with a graceful curve more southward, and passes the southern boundary at a much less acute angle. The Tennessee portion—the Valley under consideration—has, in the northern part of the State, (measured, for example, directly across from Meadow Creek Mountain, in Cocke county, to the Cumberland Gap on the State line, in Claiborne,) a width of about fifty-five miles. Towards the southern part of the State, however, its mountain walls converge and reduce its breadth. Measured across from Star's Mountain, in McMinn, to the foot of the Cumberland, in Rhea, it is only about thirty-four miles wide, and thus narrowed, it strikes the Georgia line.*

92. Altogether, with its outlying subordinate valleys and coves, the Valley of East Tennessee embraces the following counties and parts of counties: the whole of Hancock, Hawkins, Grainger, Union, Jefferson, Knox, Roane, Meigs, and Bradley, nearly all of Sullivan and McMinn; the parts, and in most cases, much the greater parts, of Carter, Johnson, Washington, Greene, Cocke, Sevier, Blount, Monroe, and Polk, not occupied by the Unaka Ridges; and finally, the parts of Claiborne, Anderson, Rhea, Hamilton, Bledsoe, Sequatchee, and Marion, not upon the Cumberland Table-land. The entire Valley, including its outlying valleys and coves, has an area of about 9200 square miles, considerably more than one-fifth of the area of the State.

93. *Component parts, the Ridges.*—The Valley of East Tennessee constitutes the largest and most interesting portion of

* I do not include here a remarkable and beautiful outlier—Sequatchee Valley—to be considered hereafter, which would increase the aggregate breadth.

that part of the Appalachian Region, (§ 18,) which lies within Tennessee. It has the Appalachian characteristics well developed. It is closely furrowed with parallel valleys and ridges, all trending to the northeast and southwest. Owing to this character, the surface in a transverse direction, that is to say, from the southeast to the northwest, is remarkably rolling. "Across the country" is here significant. The luckless traveler, whose route lies "across," unless happily favored with breaks and gaps in the ridges, prepares for "wave on wave succeeding." On the other hand, "up," or "down the country,"—to the northeast or southwest—is as equally significant of good level roads.

94. The ridges are very numerous, and differ more or less in height, sharpness of outline, agricultural and other features; while, at the same time, each one is remarkable for the uniformity of character it preserves from one end to the other—a distance, in some cases, of a hundred miles or more. The differences among them depend, for the most part, as will be seen hereafter, upon the differences in geological character. The most important are mentioned below.

95. In the first place, several, in the northern part of the Valley, are called *mountains*. Most of these are prominent ridges, which, coming out of Virginia, terminate abruptly, within the borders of Tennessee. They are arranged in three groups, one of which—the last noticed—belongs exclusively to Tennessee.

96. First, *the Powell's Mountain Group*.—This is a series of three great parallel ridges, which, coming from the northeast, and entering Tennessee, run through a corner of Hancock County, and terminate in the northeastern part of Claiborne. The remarks below refer to them as they occur in Tennessee, where they are, in fact, but little more than the ends of ridges. The first, on the northwest, is *Wallin's Ridge*; then, at the distance of about two miles, follows *Powell's Mountain*, the intermediate space being occupied by a lower ridge and a limestone valley. Powell's Mountain is succeeded by *Newman's Ridge*, the two being crowded closely together, with but a very narrow trough, or valley, between. These are high conspicuous ridges, but can hardly be designated as mountains.

97. Second, *the Clinch Mountain Group*.—*Clinch Mountain* is the most prominent of all the ranges included in the Valley. After pursuing a long course in Virginia, it crosses the Tennessee boundary and runs continuously for more than fifty-six miles, in a nearly straight line, to within sight of Knoxville, when it breaks off abruptly in a bold end. It has a sharp crest, and well defined outlines. In height, it will average not much, if any, less than 1000 feet above the level of the Holston. It is the boundary, in part, between the counties of Hancock and Hawkins, and between Union and Grainger.

98. Close along the southeastern base of Clinch Mountain, but separated from it by a narrow trough, or valley, (Poor Valley,) is, generally, a low sharp ridge. In Hawkins, however, on its southeastern side, there are several heavy ridges, the *Pine Mountain*, the *Stone Mountain*, and a curious outlier, the *Devil's Nose*, all of which, including Clinch Mountain, are crowded together, side by side, and constitute the group. *House Mountain*, an isolated, short, roof-like ridge, in Knox County, and a mile or two below the end of the Clinch, might also be included. This is a conspicuous object, and is seen from Knoxville, and from many other distant points.

99. Last, *the Bay's Mountain Group*.—This group lies wholly within Tennessee. It is a curious bed of half a dozen sharp, straight ridges, which, like those of the group just mentioned, are crowded laterally together, being separated only by very narrow trough-like valleys. The group itself is called, collectively, Bay's Mountain, and extends from the Holston, near Kingsport, to a point several miles below Bull's Gap, a distance of about forty miles.* Across its middle part, it is several miles through, and here the greatest number of ridges occur. Towards either end, the ridges one after another drop away, until, at the Holston and below Bull's Gap, the group terminates in single ranges. *Chimney Top* and *Fodder Stack*, are high, prominent points, capped with masses of sandstone, which belong to the most eastern ridge. The former affords, from its

*In Jefferson County, and even south of the French Broad, between Knox and Sevier counties, are ridges which are considered as continuations of Bay's Mountain, and take its name. They are, however, no part of Bay's Mountain proper. They are comparatively low, have a different geological structure, and no physical connection with it.

great sandstone "chimneys," a most beautiful and extended landscape view.

Bay's Mountain has points which are as high as the mean elevation of Clinch Mountain, or higher, yet its average height is considerably less.

100. Such are the "mountains" of the northeastern portion of the Valley. Owing to the presence of the first two groups, and of many intermediate ridges of less elevation, some of which will be mentioned, the region between Rogersville and Tazewell, by the way of Sneedville, is exceedingly rough or rolling. It is relieved, however, to some extent, by several fine limestone valleys lying imbedded between the parallel ridges.

101. The northern groups running out, the Valley far southward is without mountains. Its surface, it is true, is closely furrowed with ridges and valleys, but the former are comparatively low, and almost sink down into a common plain with the latter when seen in the great views obtained from the high summits of the Unakas. (§ 80.)

102. In the southern part of the Valley, however, is a single range which deserves to be mentioned here. This is the so-called *White Oak Mountain*. *

This mountain first appears five or six miles below the Hiwassee River, near Georgetown. It runs in a direct course southwesterly to the Georgia line, and separates, in part, the counties of Bradley and Hamilton. It is a prominent range and a leading feature in this part of the Valley. Taylor's Ridge, in Georgia, is a continuation of White Oak Mountain.

103. In regard to the scores of ridges of less elevation, my remarks must be general. There are several different classes, or types, of these ridges—so far as their forms and outlines are concerned—features, by the way, depending in reality upon their geological characters.

104. In the first place, a large class is composed of those which are depressed, or rounded, along the summits or crests. These are generally limestone ridges, and often of great length. Most of them have a comparatively unbroken outline, others are more or less cut into a succession of dome-like knobs.

**Lookout Mountain*, which looms up abruptly and grandly just within the Valley, and near the Georgia line, is properly an outlier of the Cumberland Table-land, and is referred to that division.

Many of them are covered, to a greater or less extent, with sharp flinty gravel.

105. A second and large class, includes numerous ridges which are steep and sharp-crested. These owe their characteristic forms to the sandstone, and sometimes to the slaty layers which they contain. Though often occurring in groups, yet they more frequently, perhaps, alternate in position with those of the first class, and like them extend in length a great number of miles. Sometimes their sharp crests are notched by gaps, at short intervals, affording curious lines of pointed peaks. In such cases, they are frequently denominated *comby* "ridges."

106. Another class, and the last I shall mention here, includes a number of long and remarkable ranges of "*Red Knobs*" or "*Red Hills*," traversing the southeastern part of the Valley. The knobs are separated from each other by deep gaps. They have generally a conical shape, sending up their peaks from 200 to 400 feet, and sometimes to a greater altitude, above the general level of the Valley. The soil upon them has a deep brownish red color, derived from the sandy ferruginous and calcareous rocks, of which, for the most part, they are composed. These curious hills dot out straight or gently curving ranges, remarkable for their length, and for their uniform appearance throughout.

107. For the purpose of presenting examples of the different classes, and, at the same time, of illustrating the surface-features of the Valley, which, indeed, is the main object desired, some of the most prominent ridges will be noticed. It will be best to speak of them in connection with the different sections of the Valley in which they occur.

108. The region west and north of Knoxville, is distinguished for its numerous parallel ridges, several of which are remarkable for their size, their directness, and length. The principal ones, in the order in which they successively occur, in going from Knoxville, are the *Black Oak*, *Copper*, and *Chestnut Ridges*. Copper Ridge runs from the Virginia line far down into Tennessee, and may be traced out for at least seventy-five miles. This, as well as the Black Oak and Chestnut Ridges, have a limestone basis, and, belong, with others, to the first class mentioned.

In addition to these, and in some cases, alternating with them, there are in this region many of the sharp crested ridges. Such are *Bull Run* and *Pine Ridges*. The ridge three miles west, or northwest of Knoxville, is also an example. In Hancock County several ridges of this kind occur; among them *Comby Ridge* is prominent.

109. The section of the Valley east of Bay's Mountain, and northeast of the French Broad River, including the counties of Sullivan, Washington, Greene, and part of Cocke, is in strong contrast, so far as *long* uniform ridges are concerned, with the one just mentioned. Here are no very long ranges like the Copper and Black Oak Ridges. The surface is furrowed, in common with all parts of the Valley, with ridges and valleys, running northeasterly or southwesterly; but the ridges are comparatively short, seldom running more than eight or ten miles, and their axes not always arranged consecutively in lines. The region may be said to be interruptedly furrowed or fluted.

110. Constituting one of the peculiarities of this section, are short and narrow *slate ridges*, which thrust their backs up here and there over its area.

Another feature is the occurrence, especially in Sullivan County, of *regions, or belts, of slaty knobs*. These knobs are crowded together without order, and, where most numerous, form wild labyrinths of conical hills, from which a stranger, once off the beaten track, might not easily extricate himself. The East Tennessee & Virginia Railroad, just north of the Watauga River, runs for about four miles through one of these "knobby regions."

111. Southwest of the last section, and east and south of Knoxville, as far down as the Little Tennessee River, there is another portion of the Valley, including the counties of Jefferson, Sevier, Blount, and parts of Cocke and Knox, in which the ridges are better defined than in the last, but not so well as in the adjacent section to the northwest. Many of the ridges belong to the first class. (§ 104.) Such is the so-called "*Bay's Mountain*," north of the French Broad. A few have the sharply crested character, as the "*Bay's Mountain*," which lies south of the French Broad, and separates Knox County from Sevier.

112. It is here that the curious ranges of "Red Knobs," (§ 106,) are first seen. These constitute one of the most prominent topographical features of this region. They originate in Jefferson County and in the northern part of Blount, and extend to the southwest, for the most part, along the margins of two slaty belts traversing this part of the State. One of these ranges, which I mention as an example, originates in the vicinity of Strawberry Plains, and passes near Knoxville, its red prominent hills being just beyond the Holston; from this point it continues to the southwest, runs close by Athens, and reaches a point a few miles east of Cleveland. Here the Knobs cease to be prominent, but yet they can be seen, and the range they form traced on into Georgia.

113. The slaty belts just referred to, are often "knobby," forming, in fact, "knobby belts" like those of Sullivan. (§ 110.) One of these, several miles wide, traverses Sevier County. It originates in fact, in Greene, and traverses Cocke County before entering Sevier. It lies just to the west of Sevierville, strikes the end of Chilhowee Mountain, and then continues on down along the western side of this mountain, into Blount. This belt is noted for its conical hills, or "*knobs*," especially that portion of it in Sevier County.

114. The southern part of the Valley, the section south or southwest of the Little Tennessee, and of the Big Tennessee as far down as the mouth of Clinch River, is, in general, very uniformly fluted with ridges and valleys.

115. In the first place, the portion of this section west of the East Tennessee and Georgia Railroad, contains numerous long ridges, both sharp-crested and rounded, many of which, are continuations of those traversing the section west and north of Knoxville. White Oak Mountain, already mentioned, (§ 102,) occurs here. Missionary Ridge, east of Chattanooga, and prominent in the plate facing page 39, is one of the first class. (§ 104.)

116. North of Chattanooga and west of the Tennessee River, as far up, at least, as the mouth of the Hiwassee, is a strip, from four to six miles wide, which is broken and hilly. It is a *knobby region*, but of a different character from those before mentioned. Its knobs are more dome-like, and are covered

with flinty gravel. The rocks which compose them are not slate, but a magnesian limestone.

117. To the east of the railroad, in the second place, there is much uniformity in the direction and arrangement of subordinate parts. Here the ridges are principally rounded and flinty with a few conspicuous lines of red hills, all being continuations of the ranges from the northeast. The red hills of the Knoxville and Athens Range are very prominent in the northern part of this section. In addition to these, there are some narrow, knobby belts.

118. *Valleys and Coves*. —Such are the relations existing between the ridges and valleys of this great division, that much of what might be said here has been anticipated. The ridges mark out the valleys. Where the former are long and straight, and occur side by side, at short intervals, the latter will necessarily be long and narrow.

119. In the western half of the Valley,—that next to the Cumberland Table-land and reaching from Virginia to Georgia,—the subordinate valleys, as might be inferred from the character of the ridges, have the greatest longitudinal extent, and the greatest regularity in their arrangement. In fact they are remarkable for these features. There are several valleys or ranges of valleys here, which, although, perhaps not averaging more than one mile in width, run continuously through the State, a distance of more than 150 miles. They extend, moreover, each way beyond the limits of Tennessee.

120. These valleys may be easily traced out upon the Map.

In one long range, which may be presented as an example, are found the towns of Tazewell, Clinton, Decatur and Georgetown; and I might add also, Ringgold, in Georgia.

121. Another range of valleys lying at the base of the Cumberland Table-land, or of Walden's Ridge, (as the eastern border of the Table-land is called,) may be here noticed. This range, with the exception of two or three short breaks in Roane and Campbell counties, is also continuous through the State. *Powell's Valley*, in Claiborne and Campbell counties, *Tennessee Valley*,* in Rhea and Hamilton, and *Lookout Valley*, in the southern part of the latter county, are among its well known

* Not of the Tennessee River

portions. This valley-range, however, does not come in direct contact with the base of the Table-land, being usually separated from it by a low, sharp ridge, and a very narrow and curious trough, often called the "*Back Valley*," the latter lying immediately at the base, and back of, the sharp ridge.

122. In the northeastern portion of the Valley, especially in Washington, Greene, and Cocke counties, the valleys partake of the nature of the ridges, and are comparatively short and broken. (§ 109.)

Southwest of this section, and especially south of the Hiwassee, there are again, long ridges and valleys succeeding each other laterally, with considerable regularity.

123. The valleys, in general, vary in width from a few hundred yards to several miles. Most of them are fertile and beautiful. Some of the narrow ones are not inviting, being cold and unproductive.

They are best classified in accordance with their geological characters. So far as may be necessary, they will be enumerated in connection with the descriptions of the formations with which they are associated.

124. My remarks, hitherto, have been confined to the subordinate valleys lying wholly and properly within the body of the great Valley. In addition to these, the *outlying valleys*, or *coves*, which are more or less interlocked with the ranges and arms of the Unaka and Cumberland, or are entirely surrounded by them, are to be noticed.

125. Beginning in the northeastern corner of the State, there is, at the first, one of the largest and most interesting coves in Tennessee, for such a cove, indeed, the valley-lands of Johnson County, taken together, form. The general outline and extent of this cove may be seen by reference to the map. Below Taylorsville, it is divided lengthwise by Doe Mountain; the parts, however, unite again around the mountain in the valley of the Watauga. (§ 51.) *Johnson County Cove*, as it may be called, is a more elevated body of valley-land than any other of equal extent in the State. Its average elevation is considerably more than 2000 feet above the sea, which is, at least, as high, if not higher, than the top of the Cumberland Table-land. It is well watered by the Watauga, and by Roane's Creek and its crystal

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tributaries. Northward, it runs to a point not far above the Virginia line. It is entirely inclosed by mountains. On the east and south lies the Stone Mountain Range; (§ 48,) on the northwest, the Iron Mountain Range. (§ 49.) To enter or leave the cove, it is necessary, either to climb over the mountains, or to pass through the very narrow rocky gaps cut out by the water courses. The gaps most used are those formed respectively, by Doe River and the south fork of the Laurel; the former furnishing a pass to the southwest, and the latter to the northwest into Virginia.

126. Lying between, or rather, almost on the Holston and Iron Mountains, just before they unite near the Virginia line, is the curious basin called *Shady*. (§ 50.) This is also included in Johnson County. It is much higher than Johnson Cove, but is of limited extent. It is noted chiefly for its excellent iron. This little basin is so elevated that its flora partakes of a Canadian character. Within it flourish cranberries and northern coniferæ.

127. The two mountains which enclose *Shady*, diverge, as they pass to the southwest, and finally give between them a long, wide, and interesting area—the *Stony Creek Valley* of Carter County. (§ 50.)

128. In Washington County, between its two principal mountain ranges, is another long valley called *Greasy Cove*. (§ 58.) This has, perhaps, across its middle part, a width of about two miles. To the southwest it gradually becomes narrower and finally ends in a low gap upon the State line; to the northeast, however, it widens, and finally opens out boldly, opposite to the lower and larger end of the *Stony Creek Valley*. This valley and *Greasy Cove*, taken together, may indeed be regarded as one long fusiform cove nearly cut off from the Main Valley by the intervening Holston Mountain and the Buffalo and Rich Mountain Range which approach each other on the northwest. (§ 60.) These features, as well as the extent of the valleys, may be seen by reference to the Map.

129. *Limestone Cove*, in Carter, and *Bompass Cove*, in Washington County, have been already mentioned. (§§ 57 and 60)

130. In Greene County, a cove of some importance lies between Paint and Meadow Creek Mountains. It runs down southwesterly, into a narrow valley, called *Peck's Trough*. (§ 64.)

131. South of the Big Pigeon, in Cocke County, several bands of limestone run to the southwest, back of English's Mountain, and taper off in long slender fingers which reach into Sevier. One of these fingers constitutes *Jones's Cove*, a narrow valley four or five miles south-east of English's Mountain.

In Sevier County, north-east of the Little Pigeon River, are other small coves, of which, however, it is not necessary to speak here.

132. In the southern part of Sevier, and in Blount County, there is a group of three large and very interesting coves. They lie completely imbedded among the mountains. The first two are surrounded by those ridges which occur in the space between the main Unaka Range and the outlier—Chilhowee Mountain; (§ 66;) the third lies immediately at the base of the main range. They all have nearly the same dimensions, ranging from five to six miles in length, and from one and-a-half to two miles in breadth. Their forms and relative positions may be seen upon the Map.

133. The first, *Wear's Cove*, is situated in the southern part of Sevier County. It is a beautiful and elevated region, walled in all around by high, rough ridges. Its bounding ridge on the southeast swells up to a conspicuous mountain, which is well seen from Sevierville, and from many other distant points. This cove has been settled very nearly sixty years, and now furnishes homes for about seventy families.

134. The second is *Tuckaleechee Cove*. This lies just within Blount County, and is separated from Wear's Cove by a narrow neck, or ridge, the two being about a mile apart. In leaving the latter we pass through a low gap, and then descend perhaps about 300 feet, into Tuckaleechee. This is the largest of the group. Little River flows through it, and in leaving it, cuts out a narrow pass through the mountain walls upon the west, thus forming the gateway of this imprisoned basin. Tuckaleechee has been settled about as long as Wear's cove, and now contains nearly one hundred families.

135. The last of the group is *Cade's Cove*. This is cut off from Tuckaleechee by a heavy ridge, which bifurcates towards the west, including between its branches, a little valley called "*El-dorado*."

Cade's Cove is highly elevated, being more than 700 feet above Tuckaleechee.* It lies, as I have said, at the base of the main Unaka Range, and only a few miles from the State line. Several fine "balds" occur upon this part of the range, (§ 81,) from which can be seen, not only the Cove below, but the mountains, lying west of the Cove, (Chilhowee being especially conspicuous,) and the great valley beyond the mountains, bounded by its western wall—the dim edge of the Cumberland Table-land.

Cade's Cove is remarkable for its rich bottoms and its meadow-like features. It is well watered by the tributaries of Abram's Creek. It contains at present about fifty families. It was partially settled about sixty years ago, but for many years it remained Indian territory.

136. *Miller's Cove* is a long narrow trough, immediately along the southeastern base of Chilhowee Mountain. It is situated partly in Sevier County, and partly in Blount. This cove has been settled about as long as those just mentioned, and contains, perhaps, thirty families.

137. In Blount and Monroe Counties, are several other small coves, several of which occur along the Little Tennessee River.

138. I have now noticed the principal valleys and coves associated with the Unaka ranges.† They have several characters in common, one of the most important of which is, that they all contain, or are based upon, limestone. After the general elevation of the whole Unaka region, it is doubtless, in part, to the removal of limestone, through the agency of water, (the hard slates, sandstones, and conglomerates, now forming the ridges being left,) that the existence of these troughs and basins, as such, among the mountains, is to be attributed. The discussion of this subject, however, belongs to another part of the Report.

139. We now pass across the Valley to the Cumberland Table-land. Here the aspect of things is very different. Instead

*In July, 1858, John Caldwell, Esq., of Jefferson County, was kind enough to accompany me through this group of coves. His knowledge of the country, and the researches he himself had made in this region, enabled him to render valuable assistance. With his help, and by means of a pocket level, the difference in the elevation of the two coves was approximately determined. We found it to be about 765 feet.

†The *Ducktown Region*, already spoken of, (§ 68,) is not included among the coves. It differs from them in its general relations, and especially in its geological character.

of a great bed of parallel ridges, including naturally, as it were, valleys and coves, we have an extended plateau, or table-land, the eastern border of which is nearly unbroken and continuous through the State. There are, however, two valleys, confined within the general limits of this table-land, which, although cut off from the main part of the Valley to the east, are, nevertheless, connected with it by their geological and physical features.

140. The first, and by far the largest, is the long and symmetrical *Sequatchee Valley*. The head of this valley is in the bosom of the Table-land, and nearly midway between the northern and southern boundaries of the State. From its head, it pursues a nearly straight, southwesterly course, for about sixty miles, through the counties of Bledsoe, Sequatchee, and Marion, to the Alabama line. It is, in fact, a great trough sunk lengthwise in the body of the Table-land, dividing, or splitting, the latter from its middle part, southwestward, into two parallel but unequal portions or arms. All along, on both sides, it is bordered and overlooked by the high, steep, inner edges of these portions. These edges are from three to five miles apart, and, like great walls, mark out the limits of the long valley with singular definiteness.*

141. The arm of the Table-land that lies along the southeastern side of Sequatchee Valley, is a long and quite uniform belt, or table, from six to eight miles wide, running down into Georgia and Alabama. Near the Georgia line, however, it is much broken. In the first place, the Tennessee River, a few miles above the line, cuts completely through it, forming a deep, narrow and serpentine gorge.† Then again, partly upon the line, it is cut by Running Water Creek, not so deeply as before, but yet down to a low gap through which the Nashville and Chattanooga Railroad finds a passage. The belt, as a whole, separates Sequatchee from the main Valley to the east,

* The geographical features of Sequatchee Valley may be seen upon the Map of the State, accompanying this Report. To this the reader is referred.

†The point where the Tennessee cuts into this belt is well seen in the panoramic view facing page 40. Passing Chattanooga, the river makes a large bend—from its form called the *Moccasin Bend*—and then soon begins its passage through the mountain. It is in passing this that the river encounters those serious obstructions so well known to boatmen as the *Boiling Pot*, the *Skillet*, and the *Pan*.

and the narrow cuts, made by the Tennessee and by Running Water, are natural lines of communication between the two.

142. North of the Tennessee River, the above belt forms a part of *Walden's Ridge*; south of the river its broken portions constitute the *Raccoon Mountains*.

143. In a line with Sequatchee Valley, and a few miles northeast of its upper end, there is, I may add here, a curious little basin, sunk in the Table-land, called *Grassy Cove*. Still further to the northeast, in the same line, lies *Crab Orchard Gap*. Sequatchee Valley and Grassy Cove, likewise the latter and Crab Orchard Gap, are separated by high ridges.

144. The second valley, referred to above, is that of the *Elk Fork*.* It lies in the northwestern part of Campbell County, in the northern part of the State. It is narrow, rough, and nearly straight. Originating near a point called *Elk Gap*, right in the midst of high ridges, it runs northeastward into Kentucky. Its southeastern side is well defined, all along, by a high, bold ridge, or crest, of the Cumberland Table-land, called *Pine Mountain*, which runs with the valley to the northeast. Its northwestern side, on the other hand, is irregular, being cut, or notched, by the ends of spurs from *Tellico Mountain*, another range of the Table-land. The valley may be regarded as lying between Pine and Tellico mountains. The bed of the Elk Fork has an average elevation of about 1200 feet above the sea.

145. *Elk Gap*, referred to, is a low pass, dividing the waters of the Cumberland River from those of the Tennessee, and connecting Elk Fork Valley with the valley of *Cove Creek*. These valleys originating at the same point, run off nearly at right angles to each other. The latter, however, is narrow and but little more than a straight, deep cut. It opens below into the southwestern end of Powell's Valley. (§ 121.)

146. The valleys of Cove Creek and of Elk Fork, are so situated with reference to each other, and to the local ridges of this part of the Cumberland Plateau, that they furnish a comparatively good route through the mountains for the Knoxville and Kentucky Railroad. They also completely detach within

* The Elk Fork is a tributary of the Clear Fork of Cumberland River.

the limits of Tennessee, a considerable part—a quadrilateral area or *block*—of the Cumberland *Table-land*.

147. *River System*.—The Valley of East Tennessee has an admirable system of rivers and water courses. Its rivers are, for the most part, wide and shallow, and consequently but moderately navigable; yet their waters are clear and beautiful, their smaller tributaries exceedingly numerous, and arranged with remarkable regularity. Crystal rills, flowing from thousands of bold springs, irrigate the land everywhere, and, with the larger mill-streams and the rivers, form a net-work of water courses, which, for completeness and elegance is, perhaps, not excelled.

148. The "*Big Tennessee*" and its proper prolongation, the Holston, (which, by the way, ought to be included whenever we speak of *The Tennessee*,) constitute the great stream into which all the other rivers pour their contents. The "Forks" of the Holston rise in Virginia. The *Clinch*, also, and its tributary, *Powell's River*, take their origin in the same State. All of these have, in general, a southwesterly course, and descend with a considerable fall.

149. At a point about half way through the Valley, the Holston becomes the Big Tennessee, which, after flowing a few miles to the northwest, and receiving the waters of the Clinch, takes a southwesterly course until near the Georgia line, in the vicinity of Chattanooga. At this point it makes its first attempt to break through the Cumberland Table-land and succeeds so far as to pass Walden's Ridge, (§ 141,) and to gain Sequatchee Valley. Here it is again sent off to the southwest, down the Sequatchee trough and its southwestern continuation, many miles into Alabama, where finally it escapes to the northwest through the southern broken portion of the Table-land.

150. The Tennessee and its Virginia tributaries thus follow, in general, the trend of the valley. Yet there is, at the same time, a well marked tendency westward, and even northwestward, for all the important offsets of the main stream, (the Tennessee and Holston,) of which there are three in the State, beside the great one in Alabama, are to the west and northwest. These throw the river into the extreme southwestern

corner of the Valley, and even into its most western outlier, the Sequatchee trough.

151. The tributary rivers which flow out of North Carolina, unlike those from Virginia, all pursue a westerly, and mostly a northwesterly, direction, until they unite with the Holston, or with the Big Tennessee.

152. There are thus two general directions in which the rivers of the Valley flow; one, to the northwest, corresponding to the direction of the general drainage pertaining to the great slope of which the State, as a whole, is a part; (§§ 9, 10 ;) the other, to the southwest, corresponding to the deflection of drainage caused by the intervention of the Cumberland Table-land, and by the Appalachian features of the Valley itself. (§§ 12, 13 and 11.)

153. The smaller tributaries—the " creeks"—have, generally, great uniformity in direction. Nearly every valley has its creek, flowing either to the northeast, or to the southwest, in conformity to the direction of the ridges. If they escape from one valley to another, they do so through narrow gaps in the ridges, and then only to be sent off again in a direction parallel to their former course. Some exceptions, however, there are, among which those that flow into the Tennessee from Walden's Ridge are the most important. Ooltawa, of Bradley and Hamilton, and Citico, of Monroe, might also be mentioned as important exceptions.

154. *Elevation above the Sea.*—The great Trough, extending from Pennsylvania to Alabama, including the Valley of East Tennessee, (§ 91,) is divided transversely, by the river systems, into natural sections or subordinate slopes. (§ 14.) Of these, none is better defined than that drained by the Tennessee River and its Virginia tributaries. The East Tennessee Valley constitutes the greater part of this, and it may give a better idea of the elevation and position of the Valley to consider it, at first, in connection with this entire slope.

155. The slope, or trough, has its many channeled head, in Virginia, from forty to sixty miles northeast of the Tennessee boundary, along a curved line running through the county of Tazewell, and through Mount Airy, between Smith and Wythe counties. This line is the crest of a water-shed dividing the

waters of the Tennessee on the southwest from those of New River on the northeast. The Virginia and Tennessee Railroad crosses "Mount Airy Ridge" at an elevation of 2594 feet above the sea. From this high region the slope extends in a south-westerly direction to the northern parts of Georgia and Alabama, a distance of about 300 miles.

156. The following tables give the heights, in feet, above tide-water, of many points in this area, most of which, however, are in the East Tennessee Valley. They have been derived mainly, from the railroad surveys.*

The points are arranged in lines, the first extending lengthwise through the Trough: the second is a limited line nearly parallel to a portion of the first, and connecting two of its points, Bristol, and a point near the railroad bridge over Lick Creek. The others are cross-sections. The places noted are in Tennessee, unless otherwise indicated.

(1.) The first series runs along the Virginia and Tennessee Railroad from Mount Airy Ridge to the Tennessee line; it is then continued along the East Tennessee and Virginia Railroad to Knoxville, and from this point, along the East Tennessee and Georgia Railroad to Dalton, Georgia. We thus have a complete longitudinal profile of the Valley of East Tennessee, and in fact of the entire subordinate slope to which it belongs.

Mount Airy Ridge, Va....	2594	(Level of rails).	Va. & Tenn. R. R.
Marion, Va.....	2129	"	"
Seven Mile Ford, Va.....	1976	"	"
Holston River at Seven Mile Ford.....	1954	(Surface of river)	"
Glade Spring, Va.....	2,078	(Level of rails)	Va & Ten. R. R.
Emory and Henry Col- lege, Va.....	2,103	"	"
Abingdon, Va.....	2,071	"	"
BRISTOL, Va, and Tenn. Line.....	1,678	"	"
Holston River at Union..	1,401	(Surface of River)	E. T. & Va. R. R.
Union.....	1,457	(Level of Rails)	"
Summit between Holston and Watauga Rivers.	1,606	"	"
Carter.....	1,474	"	"

*I am indebted for much valuable information, and for profiles, to Mr. Charles Williams, Chief Engineer of the Knoxville & Kentucky Railroad, and to Mr. R. C. Morris, Chief Engineer of the East Tennessee & Georgia Road, and its Cleveland and Chattanooga Branch. I am also indebted to the officers of the East Tennessee and Virginia Road for the altitudes along their line.

Watauga, at Carter.....	1,428	(Surface)	E. T. & Va. R. R.
Johnson's.....	1,643	(Level of rails)	" "
Summit between Watauga and Nolichucky...	1,841	"	" "
Jonesborough.....	1,734	"	" "
Limestone.....	1,419	"	" "
Fullen's.....	1,489	"	" "
Greeneville (Depot).....	1,581	"	" "
Blue Spring.....	1,279	"	" "
Blue Spring Summit.....	1,368	"	" "
Lick Creek.....	1,112	(Surface)	" "
Bull's Gap.....	1,214	(Level of rails)	" "
Russellville.....	1,260	"	" "
Morristown.....	1,283	"	" "
Summit west of Morristown.....	1,352	"	" "
Mossy Creek.....	1,111	"	" "
New Market.....	1,057	"	" "
Strawberry Plains.....	906	"	" "
Holston, at Strawberry Plains.....	849	(Surface)	" "
McMillan's.....	868	(Level of rails)	" "
KNOXVILLE, (Depot).....	898	(Grade)	E. Tenn. & Ga. R. R.
McClellan's Summit.....	992	"	" "
Knox County Line.....	882	"	" "
Lenoirs.....	786	"	" "
Loudon.....	814	"	" "
Tennessee River, at Loudon.....	737	(Low water)	" "
Sweet Water Summit.....	1023	(Grade)	" "
Athens.....	993	"	" "
Hiwassee River.....	723	"	" "
" ".....	684	(Low water)	" "
Cleveland.....	878	(Grade)	" "
Summit in Tenn. <i>Dividing ridge between Tennessee and those flowing into the Gulf of Mexico.</i>	892	(Grade)	" "
STATE LINE, Tenn. & Ga.	837	"	" "
Dalton, Ga.....	771	"	" "

(2.) The following table includes the heights of certain points along one of the experimental lines of the East Tennessee and Virginia Railroad. It extends from Bristol through Blountville, crosses the Holston at Long Island, runs up the valley of Horse Creek, and then down that of Lick Creek, until it strikes the adopted line near the mouth of Gap Creek.

Bristol, Tenn. and Va. Line 1678 (Rails) Va. and Tenn. R. R.

Steele's Creek.....	1626 (Surface).....	May's Survey.
Summit ($3\frac{3}{4}$ miles from Bristol).....	1727	" " "
Muddy Creek (near Blount- ville)	1560	" " "
Summit (13 miles from Bristol).....	1773	" " "
Holston River (upper end of Long Island).....	1218	" " "
Summit between Horse Cr. and Lick Cr.....	1413	" " "
Lick Cr. (13 miles from last Summit).....	1192	" " "
Summit ($8\frac{1}{2}$ miles further on).....	1222	" " "
Lick Cr. ($5\frac{3}{4}$ miles on).....	1118	" " "
Mouth of Gap Creek (near R. R. crossing of Lick Creek.	1113	" " "

(3.) The following points occur along a line extending *across*, (indirectly,) from the Watauga Valley in N. C., through Johnson County, Tenn., to Abingdon and to the Saltworks, or Saltville, Va.

Headwaters of Linnville and Watauga rivers, west foot of Grand- father Mt., N. C.....	4100	Guyot.
Shull's Mill-pond, Main Watauga, N. C.....	2917	R. R. Survey.
STATE LINE, <i>Tenn. & N. C.</i> (Watauga Valley).....	2131.....	R. R. Survey.
Taylorsville, Tenn.....	2395.....	Guyot.
Holston, South Fork, Va., on the road to Abing- don.....	1778.....	"
Holston, Middle Fork, Va., id.....	1772.....	"
Abingdon, Va. (Depot).....	2071.....	Va. & Tenn. R. R.
Saltworks, Va., Depot on the North Fork of Holston River.....	1712	" "

(4.) From the State line in the rocky gorge of the Little Tennessee River, through Knoxville to Kentucky, an interesting and entire cross-section is furnished. It is from the surveys of the Knoxville and Charleston, and the Knoxville and Kentucky railroads. It crosses nearly through the middle of the Valley.

STATE LINE, on the Little			
Tenn.*	1114 (Grade).....	K. & C. R. R. Survey.	
Tenn. River near Harden's	900	"	"
Abram's Creek	872	"	"
" "	855 (Surface)	"	"
End of Chilhowee Mt.....	870 (Grade)	"	"
Four-mile Creek†.....	825	"	"
" "	808 (Surface)	"	"
Dividing Ridge between			
Four-mile and Nine-			
mile Creeks.....	896 (Grade)	"	"
Dividing Ridge between			
Four-mile and Nine-			
mile Creeks.....	945 (Surface)	"	"
Nine-mile Creek, 30 miles			
from Knoxville.....	832	"	"
Nine-mile Creek, 26 miles			
from Knoxville.....	913 (Grade)	"	"
Nine-mile Creek, 26 miles			
from Knoxville.....	900 (Surface)	"	"
Dividing Ridge between			
the Tennessee and Lit-			
tle Rivers, 21 miles			
from Knoxville.....	1045 (Grade)	"	"
Dividing Ridge between			
the Tennessee and Lit-			
tle Rivers, 21 miles			
from Knoxville.....	1076 (Surface)	"	"
Pistol Cr., Mid. Fork (Ma-			
ryville).....	875	"	"
Pistol Cr. North Fork.....	835	"	"
Pistol Cr.....	810 (Grade)	"	"
" "	790 (Surface)	"	"
Summit.....	870	"	"
Little River.....	802 (Grade)	"	"
" "	768 (Surface)	"	"
Summit.....	890	"	"
French Meadow Cr.....	852 (Grade)	"	"
Summit, nearly 2 miles from			
Knoxville.....	936	"	"
Holston River.....	816 (Surface)	"	"

* For the elevation of the Tennessee line on the French Broad River, and the Warm Springs in North Carolina, see page 32.

†At a point, between Four-mile Creek and the "End of Chilhowee Mt.," the profile, from which these elevations were taken, suddenly drops, going toward Knoxville, fifty feet, the following note being attached: "Jostle of fifty feet from error in leveling." The profile is one deposited, according to law, in the office of the Secretary of State.

KNOXVILLE.....	900	"	K. & K. R. R. Survey.
Black Oak Ride (Gap).....	1106	(Grade)	" "
Beaver Creek.....	982	(Surface)	" "
Copper Ridge.....	1071	(Grade)	" "
Bull Run.....	823	(Surface)	" "
Chestnut Ridge.....	1038	(Grade)	" "
Clinton.....	847	"	" "
Clinch River, (Clinton)....	791	(Surface)	" "
Cane Creek.....	837	"	" "
Coal Creek.....	855	"	" "
Indian Grave Gap.....	1265	"	" "
" " ".....	1188	(Grade)	" "
Cove Creek.....	1041	(Surface)	" "
Elk Gap.....	1702	"	" "
" ".....	1620	(Grade)	" "
State Line, (Tenn. & Ky.)	990	"	" "

(5.) The following is another cross-section. It extends from Cleveland to Chattanooga, thence through the Running Water Gap of the Raccoon Mountains, across the Sequatchee Valley and by Stevenson, to the Tunnel of the Nashville and Chattanooga Railroad.

Cleveland.....	878	(Grade)...	C. & C. Br. of E. T. & Ga. R. R.
Candy's Creek.....	794	"	" " "
Lea's Summit.....	913	"	" " "
White Oak Mountain (Gap).....	813	"	" " "
Ooltawa Creek.....	790 ?	"	" " "
Summit.....	912	"	" " "
Chickamauga.....	682	"	" " "
".....	649	(Low Water)	" " "
Tunnel.....	752	(Grade)	" " "
Chattanooga*.....	675	"	" " "
" Tenn. River	642	(Surface)	W. & A. R. R. (Ga. Road.)
".....	688	(Grade)	" " "
".....	676	"N. & C. R. R.
Lookout Creek.....	676	"	" "
Point near 6 miles from Chat- tanooga.....	676	"	" "

* The elevations pertaining to Chattanooga are derived from the several roads terminating at that place. The difference between the elevations given by the Cleveland and Georgia roads respectively, may result, in part at least, from the profiles not meeting at the same point.

The elevation given by the Nashville & Chattanooga road has been derived from the profile of this road carried through from Nashville; it is the height above low tide of Mobile Bay. When the elevations of points in Middle Tennessee are given, I will speak more particularly of this profile.

The heights 642 and 688 are from a profile on Bonner's Map of Georgia.

Running Water	N. & C. R. R.		
Summit..... 977 (Grade)	"	"	
Running Water			
Summit... ..1017 (Surface)	"	"	
Whitesides..... 868 (Grade)	"	"	
Shell Mound..... 636	"	"	
A Summit..... 697 (Surface)	"	"	
Tennessee River... 629 (High water)	"	"	
A Summit..... 749 (Surface)	"	"	
A point at, or near			
Stevenson† 630	"	"	"
Crow Creek Val-			
ley..... 612	"	"	"
do do Low			
Water..... 598	"	"	"
Crow Creek Val-			
ley, 8 miles			
further on..... 634	"	"	"
Crow Creek Val-			
ley, 9 miles			
further on..... 674 (Surface)	"	"	"
TUNNEL*.....1153 (Grade)	"	"	"

(6.) The remaining table presents a cross-profile from "Cross Plains," (Dalton?) Ga., to Chattanooga, Tenn., along the Western & Atlantic Railroad. It is taken from Bonner's Map of Georgia.

Cross Plains, (Dalton) Ga.....	773.....	W. & A. R. R.	
Tunnel, Ga.....	859.....	"	"
SUMMIT OF RIDGE ABOVE TUNNEL.			
DIVIDING RIDGE between Tenn.			
River waters and those flowing			
into the Gulf of Mexico.....	1032	"	"
TENNESSEE AND GEORGIA LINE..		"	"
Tenn. River, at Chattanooga.....	642	"	"

†In a table of elevations of points along the Memphis and Charleston Railroad, published in one of the Reports of that road, the elevation of Stevenson is given at 602.80. On the N. & C. R. R. profile, from which the above heights were taken, it is not within my power to determine the exact point at which the two roads meet. The difference in the elevations may, in part, be due to this. I suspect, however, that 602.80 is below the true height of the Depot.

*At Montgomery's Gap, seven miles east of Winchester. In a report, made by John Edgar Thompson (1847) upon an experimental survey of the line of the N. & C. R. R., it is said: "The elevation of this Gap (Montgomery's) is 1365 feet above the Atlantic, and but 200 yards wide on top, with steep declivities on each side, admitting the passage of a railroad by means of a short tunnel 209 feet below its apex. . . . At this point the road will attain an elevation of 1156 feet above the ocean, and pass through the mountain by a tunnel 2100 feet long." According to the profiles of the road the tunnel was made 2200 feet long.

157. From the tables, it is seen that the fall of the Holston and Tennessee River, from Saltville, (Table 3,) on the North Fork of Holston, Va., to Chattanooga, is approximatively 1040 feet. Of this fall very nearly one-half occurs in Virginia, in the valley of the North Fork, above Kingsport.

158. Confining ourselves to Tennessee, the general elevation and the southwesterly descent of the Valley of East Tennessee are best represented by the profile of its longer and central axis. This may be considered as extending from the Virginia line, near Kingsport, along the northwestern base of Bay's Mountain to Russellville, and then as being coincident with the East Tenn. and Va. Railroad, and with the East Tenn. and Ga. road as far down as the southern boundary of the State. Referred to this line, the Valley has an elevation (as determined by the river-surfaces) ranging, and running down, from about 1220 feet to 684 above the sea.

159. The following table exhibits the rate of descent. The heights are those of river surfaces. The *direct* distances between the points, and the differences in elevation, are given on the right.

Holston, at Long Island, above Kingsport,.....	1218 ft.			
Holston, at Strawberry Plains,	849	}	Dist. 85 miles.	Fall 369 ft.
Holston, at Knoxville,.....	816?		Dist. 16 "	Fall 33 "
Tennessee, at Loudon,	737	}	Dist. 28 "	Fall 79 "
Hiwassee, at Calhoun,	684		Dist. 40 "	Fall 53 "

160. From this it appears that the greater part of the descent (more than two-thirds) occurs before reaching Strawberry Plains.

161. Including the surface, along the axis of the Valley, the general elevation near the Virginia line, is, perhaps, 1300 or 1400 feet; towards Strawberry Plains it is less, and, from this point to the Georgia line, it may be taken at about 900 feet, or as ranging from 1000 down to 800.*

162. In addition to the southwesterly descent, the general

* In Jefferson County, along the line of the railroad, there is a high body of land, forming an interesting local plateau, which has an elevation of from 300 to 400 feet above the Holston, on the northwest.

plane of the Valley has, consistently with the northwesterly tendency of the rivers, (§§ 150, 151 and 152,) a decided slope to the northwest.

163. The following tables will give approximately the degree of inclination in this direction.

The heights (above the sea) of the mouths of the Clinch and Hiwassee rivers, respectively, have been determined by the rate of the fall of the Tennessee River between Loudon and Chattanooga. This is 0.805 feet per mile. The *direct* distances from point to point, and the differences in elevation, are given as in the last table.

(1.) Tenn. & N. C. Line, Watauga		
Valley,.....	2181*	} Dist. 22 miles. Fall 703 ft.
Watauga, at Carter, E. T. & Va. R. R.,.....	1428	
Holston, at Long Island,	1218	} Dist. 17 " Fall 210 "
(2.) Tenn. & N. C. Line, French		
Broad,	1264*	} Dist. 58 miles. Fall 448 "
Holston, at Knoxville,.....	816?	
Clinch River, Clinton; K. & K. R. R.,.....	791	} Dist. 16 " Fall 25 "
(3.) Tenn. & N. C. Line, Little		
Tennessee,	1114*	} Dist. 30 miles. Fall 377 ft.
Tennessee River, Loudon,...	737	
Mouth of Clinch,	719	} Dist. 14 " Fall 18 "
(4.) Hiwassee, at Calhoun,.....		
Mouth of Hiwassee,.....	669	} Dist. 16 miles. Fall 27 ft.

Reference may also be made to the table of heights (page 60) along the Western & Atlantic Railroad. Dalton has an elevation considerably above Chattanooga, and the Tunnel is more than 200 feet above the Tennessee at the latter place.

164. *Climate*.—In speaking of the climate of the State, in general, that of this division was necessarily included. I add but little more.

165. Knoxville is very near the centre of the Valley. Its higher portions are nearly 1000 feet above the sea; this, at any

* These are not the elevations of the river surfaces; they are all, however, within, perhaps, fifteen or twenty feet of those surfaces.

rate, without causing material error, may be taken as the height of the particular points at which the observations were made. The *mean annual temperature* here is $57^{\circ}.03$, or simply 57° , at least, according to the limited data we possess. (§ 30.)

166. In the upper part of the Valley, near the Virginia line, the annual mean, on account of greater elevation above the sea, and higher latitude, will be at least two degrees less ; while, upon the other hand, near the Georgia line, it will be as much greater. It will, therefore, range throughout the Valley from about 55° to 59° .

167. The *summer mean*, at Knoxville, which has been placed at $73^{\circ}.6$, (§ 31,) is about that of Philadelphia, Pa., as well as that of several points in Central Virginia, of Cincinnati, Louisville, Ky., Southern Indiana, and Central Illinois. It is, too, I may add here, that of the central part of Spain, and the northern part of Italy. The summer of the East Tennessee Valley, is, therefore, considering its valley-like character, and its low latitude, a comparatively cool one. This is mostly due to the considerable elevation of the region above the sea.

This lower summer temperature has its influence in giving to East Tennessee agricultural features, to some extent, different from those found elsewhere in the State.

168. It might be thought that the mountain ranges which bound the Valley on both sides, would materially affect its climate. This, however, is not the case. These ranges are happily, so situated as not to obstruct, to any considerable extent, the southwesterly and westerly winds, which, of all others, in an agricultural point of view, are most important. (§ 35.)

The great trough, of which the Valley is a part, is open towards the southwest, so that these winds, coming from the Gulf of Mexico, and charged with warmth and moisture, flow freely through it, imparting, during the spring and summer, fertility to all its parts. The mountain ranges, doubtless, change the direction of the winds, to some extent, and thus, make southwesterly and northeasterly winds more frequent than they would be otherwise.

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III.—THE CUMBERLAND TABLE-LAND.

169. *General Character.*—Leaving the Valley of East Tennessee, and passing westward, we meet next, with the elevated and wide-spreading plateau well known as *Cumberland Mountain*. This, in order, is the third great natural division of the State. (§ 25.) I have already, many times, called it the *Table-land*.

170. As a natural division, it is well defined, and, as to many things, has no lack of interest. As we will see hereafter, it is the great depository of all the stone-coal in Tennessee. Fruit-growers and horticulturists, notwithstanding its general agricultural character is not in the best repute, look to it as a field of promise; stock-raisers hope to make it a land of meadows and pastures; its cool summer nights, render it attractive during the hot months; and it bids fair, in a few years, to be the favorite summer resort of Southern men.

171. As yet, this portion of the State is, for the most part, but thinly settled. Over its wooded plains the deer is still chased, and, in some of its wild coves, the wolf and the black bear find hiding places. Nevertheless, it has upon its flat and elevated surface, a number of small villages,* and, upon its northern half especially, many tracts well covered with farms.

172. *Geographical Relations, Limits, and Area.*—Confining ourselves to Tennessee, this division is, in the main, a great table, or mountain-block, resting upon the general plane, to which the general surface of the State has been referred. (3.)

Its top is elevated above this plane, and above the low-lands on each side, from nine hundred to twelve hundred feet.†

173. Looking beyond the State, we find the Cumberland Table-land to be part of a long belt or high land extending from the southern part of New York, through Pennsylvania, Western Virginia, Eastern Kentucky and Tennessee, into Alabama, in which State it finally sinks away. This belt, in its entire

*Among them, are six county-towns.

†In the panoramic view facing this page, the western escarpment facing the Tableland, as it appears from its distant outliers—the Short Mountains—is seen. The view extends from Alabama through Tennessee, to within twenty miles of the Kentucky line, and embraces much of the western side. (See § 191.)

In the view opposite page 40, a portion of the eastern escarpment—that of the subdivisions Walden's Ridge and Raccoon Mountain—is prominent to the left of Chattanooga.

length, is intersected completely by only two streams, New River in Virginia, and the Tennessee in Alabama.* Its eastern escarpment presents, generally, a bold, steep face, and is known, in Pennsylvania and Virginia as the Alleghany Mountain.

484. The belt just mentioned, crosses Tennessee obliquely.

The portion within the State—the Table-land we are considering—although much indented by valleys and coves, is nowhere completely cut in two by them. It could furnish a highway from Kentucky to Alabama, upon its flat top, along which a traveler might pass, without once descending, and even without discovering, at any time, his elevation. The engineers of the Nashville and Chattanooga Railroad, in their experimental surveys, could find within Tennessee, no low pass through one of the leading arms of the Table-land, and were therefore compelled either to ascend and go over, or else, by making a great deflection to the south in Alabama, go round it. The latter alternative they adopted.

The top of the Table-land, though comparatively flat, does not become monotonous to the traveler. Low ridges and shallow valleys, with crystal streams, are occasionally met with, and afford a pleasant variety, which relieves what would otherwise be the sameness of its "flat woods."

175. At almost all points, on both sides, the surface breaks off suddenly in sandstone cliffs and precipices, which are from 20 to 100, or even 200 feet high. These form all along the sides of the Table-land, a well defined margin or brow. From beneath this very frequently overhanging brow, the steep slopes of the sides commence, and run down to the low lands.

With the exception of the northeastern part of the division, the slopes below the cliffs rest mostly on limestone. The sandstone which appears in the cliffs caps the whole plateau, while limestone forms its base. The former gives sharpness of outline to its crested margin.

176. The eastern border of the Table-land is comparatively a nearly direct, or gracefully curving line. The indentations made by the streams, are, upon the map, hardly noticeable.

177. Along its western border, however, it is remarkably

* The portion between these rivers, is a marked feature of the Tennessee and New River slope. See Map of this slope facing page 5.

different. Here the Table-land is irregularly scalloped and notched by deep coves and valleys, separated from each other by long spurs jutting to the west. These deep indentations, from which, and in some cases, through which, flow the different branches of the Elk, Collins' River, the Caney Fork, Roaring River, and Obey's River,* give the western outline a very ragged and dissected appearance.

178. Along the Kentucky and Tennessee line, the Table-land is about seventy-one miles wide. It becomes narrower southward. Across it, along the southern boundary of the State, including Raccoon Mountain and Sequatchee Valley, it is fifty miles. Altogether, the division proper, covers an area of 5100 square miles—nearly one eighth of the State. It includes within its limits, the counties of Scott, Morgan, and Cumberland; the larger parts of Fentress, Van Buren, Bledsoe, Grundy, Sequatchee,† and Marion; considerable parts of Claiborne, Campbell, Anderson, Rhea, Hamilton, Overton, Putnam, White, and Franklin; and finally, small portions of Warren and Coffee.

179. *Parts, or Subdivisions, and Outliers.*—Unlike the great Valley to the east, the Cumberland Table-land is comparatively simple in structure and parts. (§ 139.) There are, however, two partially detached portions, certain ranges and groups of mountains bordering, or resting upon it, and a number of outliers which maybe noticed.

The partially detached portions referred to have been already spoken of. One is the arm cut off by Sequatchee Valley; the other, the remarkable quadrilateral block detached by the Elk Fork and Cove Creek Valleys.‡

*In many of the coves and valleys referred to above at the base, and on the limestone or lower slope of the Table-land, are springs remarkable for their size and for the amount of water which they discharge. In quite a number of instances, these springs bring to the day, at once, large creeks, tributaries of the rivers mentioned. Some of them furnish excellent mill sites. Along the base of the eastern escarpment also, similar springs occur at intervals. These springs are the outlets of subterranean streams, many of which, doubtless, flow through long, and unexplored caves and passages in the great limestone bed upon which, the sandstone and shalecap of the Table-land rests. Not a little of the water which falls upon the surface of the Table-land is thus drained off.

†This county has been mentioned several times. It is proper to state however, that it has, at present, by a decision of the Supreme Court, no legal existence. It was made to include parts of Marion, Grundy, Bledsoe, and Hamilton, the most desirable portion of the county being in Sequatchee Valley.

‡See §§ 140, 141, and 142; also § 145 and Map.

180. The northwestern side of the "block" just mentioned, rises in a high-crested ridge, or margin, forming the long, straight, and bold *Pine Mountain*. (§ 144.) This ridge runs to the northeast into Kentucky. Its northwestern face rises up steeply, to an average elevation, above Elk Fork Valley, of at least 1000 feet.

181. The southeastern and southwestern sides of the block (that is to say, the sides extending continuously in a line from Cumberland Gap to a point a few miles beyond Jacksboro', or to Wheeler's Cove, and then turning and running to Elk Gap) are both singularly and closely bordered by a steep and roof-like ridge, which, after running in a nearly direct line on one side, gracefully curves around, and runs along the other. (See Map.)

182. This "block" is, however, not the only part of the Table-land thus bordered by a high, roof-like ridge. There is, indeed, a tendency toward the formation, and isolation, of such a ridge most of the way along the eastern side of the Tableland, from the point where the Tennessee River cuts it, to the Virginia line. It is called, too, *Walden's Ridge*, nearly throughout this whole distance.

Immediately north of the Tennessee River the name Walden's Ridge is applied to the entire arm of the Table-land cut off by Sequatchee Valley. Before this arm connects with the main body of the plateau, around the head of the valley mentioned, it takes the form of a shallow trough, the edges rising up in crested ridges. Above Sequatchee Valley, and in a line with it, the western edge becomes blended with, or rather constitutes the eastern side of, a range of mountains,* which rise above the general level of the Table-land, and may be regarded as resting upon it. At the same time, the eastern edge becomes more prominent, and soon alone takes the name of Walden's Ridge. It is more or less sharply crested, and appears like a ridge placed along on the margin of the Table-land.

183. Further north, above Emery River, this sharp ridge becomes entirely detached from the body of the Table-land,

• This is the *Crab Orchard Range*, soon to be spoken of. The southwestern mountain of this range is, itself, known as Walden's Ridge.

being separated from it by a deep and narrow valley, or line of valleys. From the Salt-works, in Anderson County, northeastward, this ridge is very prominent and characteristic; it runs many miles in a direct course, then curves beautifully around to the northwest, after which it again pursues a direct course until intersected by the valley of Cove Creek, near Col. R. D. Wheeler's, in Campbell, where it falls away. Here, however, it is very nearly continuous with the ridge of similar character of which I have spoken, (§ 181,) at the point where the latter curves. The portion of this first mentioned ridge from Cove Creek to Cumberland Gap may be considered as continuing the line of Walden's Ridge on to Virginia.*

184. These ridges, from the Emery to Virginia, are among the greatest curiosities of the whole Cumberland Table-land. Sharp, bold, and roof-like, mostly made up of vertical sheets of solid sandstone, they appear like a vast military work, designed to protect the main mountain from the encroachments of the Lowlanders. There are very few gaps in them. Those that do occur are water-gaps formed by creeks. To get at the foot of the mountain, though it may not be more than half a mile off, it is often necessary to ride half a dozen, to find a passage through these skirting ridges.

185. The northeastern portion of the division under consideration, presents other local features which remain to be mentioned. These consist of groups of high ridges, or mountains, which, rising above the general level of the Table land, appear, when seen from the west, to rest upon it.

186. First we have the *New River Group*. The head-waters of *New River*† flow from a group of mountain ridges, among which its tributaries are deeply sunk.

The range that divides these waters from those flowing into the Clinch, (see Map,) is one of the most important of these ridges, and is a conspicuous object to an observer in the great

*Walden's Ridge, above the Emery, must not be confounded with the "little" sharp ridge which is often found along its southeastern base, and to which reference has already been made. (§ 121.) The latter ridge pertains to the Valley of East Tennessee. Walden's Ridge, together with the narrow valleys which lie along its northwestern base, in Anderson, Campbell, and Claiborne counties, belong to the Table-land, having the same rocks, etc.

†This river is a tributary of the Cumberland River—a very different stream from New River, of Virginia.

Valley to the east. It forms, for many miles in Anderson and Campbell counties, the eastern escarpment of the main Tableland, or rather, it is the most eastern ridge of the group, the plateau-character of the division in this region, being to a great extent lost. It is called, for a good part of its length, *Cross Mountain*. *Tellico Mountain*, west of Elk Fork Valley, (§ 144,) may be regarded as a portion of the same range. They connect around the head of the above valley. The average elevation of Cross Mountain, above the sea, is, perhaps, not far from 2800 feet. (§ 194.) Along its southeastern and northeastern base runs the remarkable skirting, Walden's Ridge. (§ 183.)

187. Other elevated ridges occur in this group. They are all within that portion of the Table-land lying southeast of Huntsville, and between Jacksboro' and Montgomery.

188. Between Emery River and the head of Sequatchee Valley, and in a line with this valley, is a nearly straight range of mountains of some interest. It may be called the *Crab Orchard Range*, or *Group*. Originally the mountains of this range formed, doubtless, a continuous ridge. It is now cut into three unequal parts by two gaps—Crab Orchard and Grassy Cove gaps. (§ 143.) The southwestern mountain of this range is known locally as *Walden's Ridge*, a name, as we have seen, applied to several parts of the eastern side of the Table-land. The northeastern portion of the range is *Crab Orchard Mountain*. The highest parts of these mountains are but little, if any, less than 1000 feet above the general surface of the Tableland. The mountain between the two gaps is short and not as prominent as the others.

These mountains and gaps, together with Sequatchee Valley, all in the same line, will be shown hereafter to be curiously related.

189. There are but few outlying mountains belonging to the Table-land. The only one of importance, on the eastern side, is the grand *Lookout Mountain*, which starts up boldly just within the limits of Tennessee and runs into Georgia. This is a long, narrow mountain, closely related, geologically, to the Table-land. From its northern rocky point, the view facing page 40 was taken.

Two short, detached mountains, one in the southern part of Rhea County, the other, near Cumberland Gap, in Claiborne,

both cut off by narrow valleys, are the remaining most conspicuous outliers on the eastern side.

190. Passing to the western side, we find, in the first place, several isolated and prominent peaks occurring at intervals along the base of the Table-land, and having nearly the height of the parent plateau. There are about half-a-dozen outliers of this class. Such, for example, are *Pilot Mountain*, in Warren, *Milk-sick Mountain*, in White, and *Pilot Knob*, in Overton.

In the latter county there is also a long, isolated ridge, west of the West Fork of Obey's River.

191. The most conspicuous, however, of the western outliers, are the *Short Mountains*.

These consist of two high ridges, separated but a little distance from each other. They form a small group, removed seventeen or eighteen miles from the Table-land. (See Map.) From many points along the entire western margin of the latter, this group may be seen. And on the other hand, from the southeastern end of the nearest ridge of the group, a great part of the western escarpment of the Table-land is presented in a beautiful and extended prospect; the great flat and wooded plain west of the plateau intervening.*

192. Thus far I have had reference to such outliers as have a height equal, or nearly equal, to that of the main Table-land. Along the western base of the northern half of this division, there is, however, another class of isolated ridges and "*little mountains*," which are of sufficient importance to be mentioned. These are comparatively low, have flat tops, and generally form beautiful little plateaus. With them, too, must be included the "*benches*," which, in this region, almost every-where run along the slopes of the Table-land, forming terraces along its sides, both around the spurs and back behind the coves.† All these plateaus and benches have the same height, about equal to half that of the Table-land. The ridges, or plateaus, are numerous, and some of them many miles long. Nearly all are known by local names; as, for instance, the *Hickory-nut Mountain*, near the Falls of Caney Fork, and the *Gum Spring Mountain*, to the northeast of the last.

*See plate facing page 66. In this view the centre of the picture is to the southeast.

†Those of my readers who have ascended the "Mountain" at Bon Air, can recall a good example of these terraces, the bench about half-way up, wide enough for a little farm, and furnishing a site for the toll gate, being one of them.

193. These flat-topped ridges, together with the benches, constitute a striking feature of this whole region. In the view from Short Mountain, (§ 191,) they are seen to the left, lying along in front of the main Table-land.

Along the base of the southern part of the Table-land, south of McMinnville, they do not appear to any important extent.

194. *Elevation above the Sea.*—The mean elevation of the Table-land is very nearly 2000 feet. Its *immediate* escarpments rise up steeply from the valleys and lower plains, to heights varying generally from 850 to 1000 feet. Below are the elevations of numerous points on both sides of the plateau:

(1.) Those pertaining to the eastern margin are first presented.

The following were obtained, in 1854, from Mr. John G. Newlee, of Cumberland Gap:

Cumberland Gap.....	1,636 feet.....	R. R. Survey.
Pinnacle, near Gap.....	2,680 ".....	" " "

(2.) The table below presents the elevation of points on the K. & Ky.

Railroad, and on *Cross Mountain*, (§ 186,) opposite Jacksboro'. The Gap on Cross Mountain, is that through which the path passes, leading from Col. R. D. Wheeler's across to Beech Creek. Immediately below this gap, is the point of Beech Creek referred to. The heights pertaining to Cross Mountain and Beech Creek, were determined by means of a small pocket level, and are approximately correct. The elevation of points in the valleys, are given for comparison. (See page 61.)

Elk Gap.....	1,702 (Surface).....	K. & Ky. R. R.
" ".....	1,602 ".....	" " "
Cross Mountain, Gap.....	2,875 (about)	
" " Point		
near Gap.....	3,370 (do.)	
Beech Creek.....	1,611 (do.)	
Cove Creek.....	1,041 (Surface)	K. & Ky. R. R.
" ".....	1,082 (Grade)	" " "

(3.) The heights of the Elk Fork Valley, and of the two high ranges on each side respectively, (§§ 144, 180, & 186,) may be indicated as follows:

Average of Bottom of Elk Fork Valley.....	1,200
Pine Mountain, general elevation, from.....	2,200 to 2,400
Tellico Mountain, points of summit ranging from....	2,000 to 2,700

(4.) A. M. Lea, Esq., who, in 1837, by order of the General Assembly of Tennessee, made a preliminary survey of a route for a proposed "Central Railroad," measured the heights of the two sides of the Table-land as presented in a line running from a point near Sparta, across through Crab Orchard Gap, (§§ 143 & 188,) to the eastern base on White's Creek.*

*Report of the Chief Engineer of the State of Tennessee, on the Surveys and Examinations for the Central Railroad, and for the Central Turnpike. Nashville, 1837.

Mr. Lea determined the total descent from a point in Crab-Orchard Gap, to the base in White's Creek Valley, to be 920 feet. From the base, to the Tennessee River, at White's Creek Shoals, he estimates the fall to be 90 feet, making the elevation of the point in the Gap, 1010, above the Tennessee River, which is about 1710 above the sea, the elevation of low water at the Shoals being approximately, 700 feet. This would give the higher plains of the Table-land, west of Crab-Orchard and Daddy's Creek, an elevation of at least 2000 feet above tide-water.

At the Gap, *Crab-Orchard Mountain* (§ 188) appears to rise nearly or quite, 1000 feet above the general elevation of the plateau, which makes its entire elevation not far from 3000 feet.

(5.) The highest part of the flat summit of *Lookout Mountain*—a point about half way between the hotel and the end of the mountain—is 1478 feet above the Nashville and Chattanooga Railroad, or (taking the elev. of the road here at 676 feet) 2154 feet above the sea.

(6.) A flat-topped ridge of the *Raccoon Mountains*, back of Whiteside Depot, on the N. & C. R. R., and above the uppermost coal banks, has an elevation above tide-water, of about 1900 feet.

(7.) Passing to the western side of the Table-land, we have, first, the following series of elevations along the *Sewanee Mining Company's Railroad*. This road connects with the Nashville and Chattanooga Railroad, near the western end of the tunnel, at Montgomery's Gap. (Page 62.) Running generally in a northeasterly direction, it ascends along the steep slope of the Table-land, and reaches the top of the latter, a little within six miles. From this point, the road runs over an open-wood and comparatively flat surface, thirteen miles further, to the coal banks near Tracy City.

The elevation of the junction of the Sewanee and N. & C. roads is taken at 1137 feet, which is sixteen feet below the grade of the tunnel.* The distances of points from the junction are given in miles.

Junction with N. & C. R. R.....	1,137	(Grade).....	S. M. Co's R. R.
Crossing above N. & C. R. R. at			
Tunnel	1,191	do.	" " "
Top of steep grade, 5.87 miles†.....	1,875	do.	" " "
do. do. do. do. do.	1,883	(Surface)	" " "
Average of next mile†.....	1,875	(Grade)	" " "
Point, 8 miles†	1,955	do.	" " "
do. do.	1,964	(Surface)	" " "
Average next half mile	1,957	Grade)	" " "
Porter & Logan Coal Bank 8.7 miles ..	2,006	?
Top of highest ridges in this vicinity...	2,076	?

* Owing to some difficulty in fixing on the N. & C. R. R. profile in my hands, the exact point at which the Sewanee road branches off, the difference—16 feet—may be too little or too great by a few feet—at the most, however, by not more than three or four. See section of the *Carboniferous Limestone* along the Sewanee road in the Second Part of this Report.

I take this opportunity to acknowledge my indebtedness, for profiles and other favors, to the kindness of Mr. G. S. Backus, and of Dr. J. C. Bebee, formerly engineers upon the Sewanee road, the former for many years Chief Engineer.

†This part of the road is within the grounds of the "*University of the South*."

THE CUMBERLAND TABLE-LAND.

Point 9.6 miles	1,957	(Surface).....	S. M. Co's R. R.
" 13.1 miles.....	1,959	do.	" " "
General average between last two			
points.....	1,951	do.	" " "
Summer's, 14.4 miles	1,952	do.	" " "
Gizzard Creek, 17.1 miles	1,819	do.	" " "
East bank of Gizzard	1,887	do.	" " "
Tracy City, 18.2 miles	1,847	do.	" " "
Terminus of road, 19 miles.....	1,889	do.	" " "
Main Coal, Wooton Bank.....	1,922	(Hill side above terminus.)	
Tops of highest ridges in this vicinity...	2,161		

(8.) The following are elevations of two well known points on the western margin of the Table-land. The first, *Ben Lomond*, is a circular mountain, lying nearly south of McMinnville, and terminating the ridge or arm of the main plateau which runs out between the waters of Collins' River and Hickory Creek. It has a flat, sandstone top, with an area equal to about one square mile.*

The second is the top of the Table-land just above *Bon Air*, and east of Sparta. The elevation given of this point, is approximate. Mr. Lea, to whose Report I have already referred, says: "In the vicinity of Sparta, the height of the crest of the mountain visible from its base, was ascertained to be 884 feet above the level of the 'barrens.'" This height is that of the immediate slope of the plateau. The elevation of the station of the Southwestern Railroad at Sparta, is 945 feet above low tide of Mobile Bay. How much above this the base of the Table-land below Bon Air is, I do not know. It is estimated to be at least 200 feet. We have, then,

Summit of Ben Lomond.....	1910.
" at Bon Air.....	2029?

195. *Views*.—The elevation of the Table-land is sufficient to enable an observer, standing upon either its eastern or western margin, to have extended and beautiful views of the country below.

From the eastern margin may be seen very satisfactorily, the great Valley of East Tennessee. The views extend quite across the Valley, and include in the distance, the high ridges of the Unaka Chain.†

The view from Lookout Mountain, to which I have several times referred, is one of the most beautiful and instructive in Tennessee. This

* I am indebted to Mr. E. F. Falconnet, formerly Chief Engineer of the Southwestern Railroad, and now of the Nashville & Northwestern Railroad, for the elevation of Ben Lomond above the McMinnville Depot, of the McM. & M. R. R. This elevation is 998 feet.

†Compare what has been said in reference to the views from the Unaka Mountains, § 80.

outlier (§ 189) is set at some distance from the Table-land, right in the great Valley, above which its summit has, too, a greater elevation than has, in general, the division to which it properly belongs. From its northeastern end, the observer can look, without any obstruction, many miles up into the valley. (See plate, § 91.)

196. From the western margin, the views, looking west, though beautiful, are not equal to those obtained from the other side. They owe their interest, for the most part, to their extent. They all present a great, flat and wooded country, extending, with an apparently uniform level, as far as the eye can reach. This is their most important feature.* From many points, the isolated Short Mountain Group (§ 191) can be seen, which serves to break the sameness of the view. In the northern part of the State, the outlying "little mountains," or low plateaus, (§ 192,) have the same effect. When with these a village or cultivated region and spurs from the table land are included, the views become most interesting. Those from Bon Air and Ben Lomond are of this kind. That seen from Sewanee, is also characteristic and highly pleasing.

197. *Climate*.—As indicative of the agreeableness of its climate in summer, it may be mentioned, that the Cumberland Table-land has been, for years, a favorite resort during the hot months. Hundreds of summer retreats, public and private, may be found upon its flat top, most of them located on, or not far back, from its sandstone edge. Much the larger number are temporary structures—log-cabins located at romantic and often wild points, near springs of crystal freestone, and not unfrequently of chalybeate water. Many of them, however, and the number is yearly increasing, are permanent and neat cottages. At several points, as at Beersheba, Lookout, and Bon Air, summer hotels have been erected; at these points, especially at the first two, there are, in addition, many elegant private cottages, altogether, forming attractive mountain villages. It will certainly not be many years before this beautiful plateau will become famous, as it ought, for the number and extent of such villages. The "University of the South" promises soon to cluster around it, upon a desirable portion of the Table-land, many summer villas of wealthy and intelligent

*The flat, wooded country referred to here, is well seen in the panoramic view taken from Short Mountain. See opposite page 65.

southern gentlemen. All this has been brought about by the agreeable summer temperature and the pure air of the Table-land, in connection with its pleasing, and, in the vicinity of its escarpments, its wild and grand topographical features.

I regret that it is not in my power to present the results of systematic observations for a series of years upon the climate of the Table-land. These are much desired. The thermometer has been observed at several points, but not with much system, for any great length of time.

198. During the summer of the year 1859, Benj. Bentley, Esq., of Spring Grove, upon the Table-land, in Cumberland County, and Prof. A. H. Buchanan, of Lebanon, made regular and systematic observations, at their respective residences, in order to furnish data for the comparison of the mean temperatures of the two places. The following tables contain the results:

(1.) *Mean Temperatures for the Summer of 1859, at Spring Grove, Cumberland County, Tenn.*

	June.	July.	August.	Summer.
6 A. M.	64.03	66.74	64.16	64.98
2 P. M.	78.46	83.71	77.00	79.72
9 P. M.	66.83	71.03	68.58	68.81
Mean.	69.77	73.82	69.91	71.17

(2.) *Mean Temperatures for the Summer of 1859, at Lebanon, Wilson County, Tenn.*

	June.	July.	August.	Summer.
6 A. M.	66.96	71.09	68.80	68.95
2 P. M.	80.55	85.87	80.42	82.28
9 P. M.	72.65	78.06	74.30	75.00
Mean.	73.38	78.34	74.50	75.41

(3.) *Extremes of Temperatures, or the Maxima and Minima, observed during Summer.*

	Maxima.	Minima.	Range.
Spring Grove.	July 19 & 21...93°	June 5...42°	51°
Lebanon	July 18 & 19...97°	June 5...46°	51°
Difference. ...	4°	4°	00

199. According to the first two tables, the summer mean, at Spring Grove, is 4.24 degrees less than at Lebanon. The former has, however, a lower latitude than the latter. Correcting for this, (§ 30,) or supposing the points to be on the same parallel, the difference in temperature becomes greater, and is equal to about 4.5 degrees. Observations taken at Nashville during the same summer, show very nearly the same result.

200. It would be interesting to compare the above summer mean of the Table-land with that of Knoxville, for the same season. Observations, however, so far as the writer knows, were not made at Knoxville during that period. The average summer heat of 1852, '54, and '55, at Knoxville, was, as we have seen, (§ 31,) 73.6 degrees, being 2.43 degrees greater than at Spring Grove, the latitude being nearly the same.

201. From these data we may assume, for the present, that the average summer temperature of the Table-land, in general, is from *two to three* degrees less, (comparing points on the same parallel,) than that of the Valley of East Tennessee, and from *four and a half to five* less than that of the Central Basin. (§ 25, (5.)). This difference in temperature is doubtless, in the main, due to difference in elevation. Those parts of the Tableland rising higher than the average elevation (as, for instance, the outlier, Lookout Mountain) will, of course, present greater contrasts.

202. The corresponding extremes of temperature, at Spring Grove and Lebanon, respectively, show nearly the same difference as the means ; it is 4 degrees, or, for points on the same parallel, about 4.3 degrees.

203. It is further shown, by the tables, that *at night*, the temperature of the two places compared, present a greater contrast than at midday; the difference between the means of 9 P. M., is 6.19, while between those of 2 P. M., it is only 2.56 degrees. We may, therefore, conclude that, while midday on the Table-land is but 2.5 or 3 degrees cooler than in the Central Basin, the nights are as much as 6.5 or 7 degrees cooler. The means of Spring and Autumn, compared with those of the Basin, will be found, most likely, to differ by about half as much as those of the summer. Those of the winter will differ still less, there being, in this season, a greater approach to uniformity throughout the State.

204. The mean annual temperature of the Table-land, on the parallel passing through the middle of the State, may be placed at about 56 degrees ; and ranging along a meridian, through the State, from 54 or 55, to 57 degrees.

205. Winds and rain have, doubtless, about the same character that they have in the central part of the State. The quantity of rain is, perhaps, a little greater.

It is to be hoped that some of the many intelligent gentlemen residing upon this beautiful plateau, will undertake to record systematic observations upon its climate. The "University of the South" will be expected, before long, to furnish, year after year, full and complete materials for the elucidation of the climate of its southern portion.