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and Tennessee.

S. B. Buckley.



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MOUNTAINS OF NORTH CAROLINA AND TENNESSEE.

By S. B. BUCKLEY.

During the summer of 1835, Prof. E. Mitchell of Chapel Hill University, North Carolina, measured the highest point of the Black Mountain in that State, and announced its height to be 6476 feet. His stationary barometer was at Morganton, which he *estimated* to be 968 feet above the sea. The late railroad surveys show that the Morganton depot is 1169 feet high; making the place where Dr. Mitchell's stationary barometer hung, 1200 feet above the level of the sea. Hence the height of Mount Mitchell—the name which has justly been given to the highest part of the Black Mountain—according to the indications given by Prof. Mitchell's barometer in 1835, is 6708 feet. This measurement of 1835 was first published in the Raleigh Register, and again in Silliman's Journal in 1839, with some additional remarks by Dr. M., in which he alludes to the great apparent height of the mountains in Haywood county, and also to the highest in the Great Smoky Range. The Highland Messenger, published at Asheville, near the Black Mountain, in 1840 when alluding to Dr. M.'s measurement of it, says: "we are perfectly willing to concede the name of Mount Mitchell to that particular point of the Black Mountain which Prof. Mitchell, after a degree of labor and expense, which none other than a genuine devotee of science would have incurred, demonstrated to be the most elevated point of *measured* land east of the Rocky Mountains. We say *measured* land, because we have long believed, and still believe that there is one, if not two points, in the same range of mountains higher than that measured by Prof. Mitchell, from forty to sixty miles west of the Black Mountains." This is from an editorial by the Rev. D. R. McKelley, D.D., now editor of the Christian Advocate at St. Louis, Missouri. We have quoted it, because his *higher points* are probably the two highest which we have recently measured in the Smoky Range, about sixty miles nearly west of the Black Mountains.

In the Transactions of the Smithsonian Institution for 1855, is Mr. Clingman's account of the Black Mountain, the highest point of which he estimates to be 6941 feet, which is 233 feet higher than Prof. Mitchell's corrected height of the same point. Prof. Turner the engineer has since found its height to be 6711 feet, and in 1856 Prof. Guyot by a series of barometrical observations, ascertained it to be 6701 feet high. There is little discrepancy between the measurements of Professors Mitchell, Turner and Guyot, and hence there can be little doubt that Mr. Clingman's estimated height of the Black Mountain, as first given in the Smithsonian Transactions, and now in Colton's new atlas of the World, and also in Lippincott's Gazetteer, is at least 230 feet above its true height.

Prof. Mitchell in 1838 and 1844 again visited the Carolina mountains, at which time his stationary barometer was at Asheville. The following measurements, then made, are taken from a letter of his, published in an Asheville newspaper.

Above the sea.		Above the sea.	
"Asheville,	2200 feet.	Chimney Top,	4433 feet.
French Broad river at Asheville, 1977 "	"	" " above Zachary's, 1109 "	"
Lower Ford of Pigeon,	2475 "	Burnsville,	2763 "
Waynesville,	2722 "	Top of Black Mountain,	6772 "
Head of Scott's Creek,	3240 "	Morganton,	1081 "
Tuckaseige Ford,	1927 "	Table Rock,	3584 "
Gully Whee Gap,	3897 "	Grandfather,	5719 "
Blue Ridge head of Tuckaseige, 3795 "	"	Roane,	6187 "
Col. Zachary's Cashiers valley, 3324 "	"		

It should be remembered that these measurements were also made previous to the railroad surveys, by which it is now known that the height of Asheville near the court house is 2260 feet.

For the convenience of future observers we give below, Prof. Guyot's measurements in 1856, in and around the Black Mountains, the three last excepted.

Above the sea.		Above the sea.	
Jesse Stepps, Lower Mountain house, Swanino valley,	} 2770 feet.	Bowlen's Pyramid at north end of the Black,	} 6345 feet.
Terminus of carriage road up Black Mt. to Wm. Patton's Mt. House,		3244 "	
Potatoe Top,	6389 "	Mt. Mitchell, "highest,"	6701 "
Mitchell's Peak,	6577 "	Guyot's Peak,	6661 "
Mount Gibbs,	6586 "	Hairy Bear,	6597 "
" Haulback,	6401 "	Junction of Cattail Fork and Caney river,	} 2824 "
Sandoz Peak,	6612 "	Burnsville court house square, near Penland's Hotel,	
Cattail Peak,	6595 "	Mount Pisgah,	5760 "
Rocky Trail Peak,	6486 "	Roane Mt.,	6318 "
Deer Mountain,	6216 "	Grandfather, measured in 1858, 5897 "	
Long Ridge Middle Peak,	6253 "		

Prof. Guyot remarks in a letter to us containing his measurements in 1856, that "these heights may be modified by a few feet in" his "final publication, the point of base not being identified within three feet."

The following are the heights of some mountains and places in North Carolina and Tennessee, south and west of Asheville, which were measured by us with two of Green's standard barometers during the months of September and October in 1858. Prof. J. LeConte of Columbia, S. C., observed the stationary barometer at Waynesville, N. C., for the measurement of most of the highest Smoky Mountains, but being called away by the duties of his professorship, the stationary barometer was removed to Col. Cathey's, at the Forks of Pigeon, Haywood Co., N. C., and placed in charge of Miss S. Cathey. We also received material assistance from Mr. T. J. Lenoir and Mr. Turner Cathey, during our mountain excursions.

Above the sea.		Above the sea.	
Waynesville,	2815 feet	Lenoir's Bald Mt.,	6040 feet.
Col. Cathey's,	2750 "	Mount Hardy,	6257 "
Platt's Peak,	6196 "	Mount Lenoir,	6413 "
Jones' "	6337 "	N. Peak of Mt. Lenoir,	6399 "
Amos Platt's Balsam,	6406 "	Sarah's Mountain,	5993 "
Cold Mountain,	6105 "	Mount Cathey,	5742 "
Shining Rock,	6063 "	" Starling,	6456 "
Father Old-Field,	6116 "	" Emmons,	6465 "
Hyman's Peak,	6095 "	Flat Creek Balsam,	6087 "
Cathey's "	6240 "	Whiteside,	5076 "
Wilson's Balsam,	6270 "	Top of Whiteside to base of precipice,	} 1510 "
Mount Hargrove,	6156 "	Mount McDowell,	
Devil's Court House,	6057 "		

The following points are in the Smoky Mountains, and many of them are on the State line, between North Carolina and Tennessee.

E. P. Hopkins's house, 1995 feet. | White Rock Mountain, 5002 feet.

This last is a misnomer of the hunters, being composed of a dark gneiss and mica slate, covered in many places with white lichens, the most abundant of which are *Cladonia rangiferina*, and *Cladonia Caroliniana*.

Mount Safford,	6296 feet.	Old Field Knob,	6220 feet.
" Henry,	6425 "	Peck's Peak,	6388 "
" Guyot,	6734 "	Safford's Peak,	6559 "
" Floyd,	6073 "	Mount LeConte,	6670 "
" Mingus,	5779 "	Mount Buckley,	6755 "
Summit of Road Gap near	} 5314 "	Curtis' Peak,	6511 "
the Alum Cave,		Mount Collins,	6241 "
Right Hand Gap,	5162 "	Robert Collins House,	2535 "
Mount Ocona,	5978 "		

It is proper to state that most of these heights are the result of a single barometrical observation, and hence they will probably be modified somewhat by future observers. Observations were made on the two highest at two different visits, and a mean result between the two calculations is given as the height of Mount Buckley, while the height of Mount Guyot is given as ascertained by the first visit, it being made in a more settled state of the weather. The second observation at its summit gave its height as 6994 feet. It is well known to those conversant with the barometrical measurement of heights, that accuracy requires a series of observations, and it was out of our power to make them at so many points during the time to which we were limited by the lateness of the season.

Fortunately the months of September and October were uncommonly dry, which enabled us to continue exploring nearly the entire time. The toil was great, and the difficulties to be encountered can only be imagined by those who have ascended the steepes of the unfrequented Southern Alleghanies, through laurel thickets (*Rhododendrons* and *Kalmia*), and multitudes of the prickly locust, (*Robinia hispida*), which has a *penchant* for scratching the face and hands, tearing the clothes, and occasionally the skin beneath. We found the *Viburnum lantanoides* or hobble-bush with its straggling branches, very troublesome on the Smoky Mountains. Notwithstanding all this we have the mountains and their glorious scenery. We encamped eleven nights on their tops; and saw that the stars were brighter, and the planets apparently larger than when seen from the valleys below. Then also the wonderful comet (Donati's) made the southwest luminous with its bright head and mysterious tail, soon after the setting sun.

The scenery of these mountains, especially those in the Smoky Range, abounds in precipices and deep chasms, surpassing any thing we remember to have seen among the White Mountains of New Hampshire. The spectator on the highest Smoky Peaks can enjoy a more varied view than from any other points in the Southern Alleghanies. East Tennessee with its towns, rivers, and the Cumberland mountains in the distance, is spread beneath at the west. On the north can be seen the Clinch mountains extending into Kentucky. At the northeast, east, and southeast, in full

view are all the higher mountains of North Carolina, and at the south the smaller ones of Northern Georgia. Such prospects *pay* the explorer for his toil; their remembrance is always sweet. The country on the Tennessee side is much lower than in South Carolina, and the descent of the Smoky mountains is generally more abrupt and precipitous into the former State, than into the latter.

The highest Smoky mountains are near the head waters of the Oconalufu and Little Pigeon rivers, being accessible from Tennessee via Sevierville, and up the Little Pigeon to a Mr. Hawkins', who lives eight miles from the top of the gap road, which is near the alum cave; and from North Carolina by the road up the Oconalufu to Mr. Collins's house, seven miles from the top of the afore-named gap-road.

The geology of the mountains south and west of Asheville has a good deal of sameness, they being composed of crystalline rocks, with the exception of a narrow strip, extending southwest along the Unaka or Smoky mountains which belongs to the taconic system of Emmons. The taconic rocks here consist of dark colored shales in which we do not remember to have seen any organic remains. The strata of these rocks are in many places nearly and often quite vertical. They are well exposed along the Middle or Straight Fork of the Ravensfork in descending from Mount Guyot to the Oconalufu. They also occur at the summit of the gap-road near Mount Mingus, and extend two or three miles down the road into North Carolina. The chief rocks of the Haywood mountains are granite, gneiss and mica slate, excepting a small portion near the Smoky Range, where the taconic rocks are again found. The Shining-Rock mountain about eleven miles south of the Forks of the Pigeon is entirely of white or milky quartz, and is probably the largest mass of that rock at any one point in the Alleghanies. It has a fine appearance in the distance and is deservedly becoming quite a place of resort. We believe that Haywood and Jackson counties, N. C., have not as yet afforded any paying mines to those who have been at the expense of working them, but it must be admitted that they have been little explored for that purpose. Prof. Emmons the State Geologist, contemplates a survey of those mountains next summer, and we suspect that he will destroy the golden dreams of a few who build castles upon undeveloped mineral wealth.

This region has long been a favorite place of resort for the botanist. Here there is a strange mixture of northern and southern species of plants, while there are quite a number which have been found in no other section of the world. In the months of May and June when the *Kalmia*, *Rhododendrons* and *Azaleas* are in bloom, these mountains and valleys present an array of floral beauty which is indigenous to no other section of the United States. The much vaunted western prairies with their interminable sameness, are by no means as beautiful. The *Rhododendron Catawbiense*, *Kalmia latifolia* and *Azalea calendulacea*, are not excelled by any native floral beauties; the two last abound in nearly every section of these mountains, but the first rarely descends into the valleys. Besides these the *Rhododendron maximum*, (laurel.) *Rhododendron punctatum*, *Azalea arborescens* and *nudiflora*, *Oxydendrum arboreum*, *Chionanthus Virginica*, *Halesia tetraptera*, *Clethra acuminata*, *Robinia hispida* and

viscosa, *Stuartia pentagyna*, *Liriodendron tulipifera*, *Magnolia acuminata*, *Umbrella*, and *Fraseri*, grow there more or less abundantly, and they are all ranked as among the most ornamental trees and shrubs of the Atlantic States. The *Pyrus Coronasia* is very common south of the French Broad river; *Catalpa* occurs in several places along the same river and in the mountain valleys near the Warm Springs; *Cladastris*, grows at Paint Rock, Tenn., which is near the Warm Springs. 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 have given it in their works. We measured some on Wilson's Balsam and near Cathey's Peak, which were more than three feet in diameter and from eighty to one hundred feet high. The black spruce appears to grow at a lower elevation than the balsam, but neither of them are often met beneath an height of 4000 feet.

The banks of streams and coves of these mountains have some of the largest trees in the United States east of Mississippi river. There is a Tulip tree or Poplar (*Liriodendron tulipifera*,) near the Pigeon river in Haywood Co., N. C., about eight miles from the Tennessee line, thirty-three (33) feet in circumference at three feet from the ground, or eleven feet in diameter, and upwards of one hundred feet high. Another on the western slope of the Smoky mountains in Tennessee, on the Little Pigeon river, is twenty-nine feet in circumference at three feet from the ground. Near this locality we also measured a chestnut (*Castanea vesca*,) thirty-three feet in circumference at four feet from the ground. It is a noble living specimen, apparently sound, and of nearly a uniform diameter upwards, for forty or fifty feet. About two miles farther up the same stream there is a hemlock, or spruce pine, (*Abies Canadensis*) nineteen feet and two inches in circumference at four feet from its base. Here also the *Halesia tetraptera* attains an uncommon size, being from two to three feet in diameter, and about sixty feet high. On Jonathan's Creek there is a white oak (*Quercus alba*,) nineteen feet in circumference at three feet from the ground. This list of large trees could greatly be extended, but enough have already been cited to show the richness of those coves and valleys.

The *Quercus Leana* of Nuttall occurs at several places on the Tennessee river near Franklin in Macon Co., North Carolina. It is evidently there a hybrid between *Quercus imbricaria* and *Q. tinctoria*. Its acorns are identical with those of the *Q. imbricaria*. On the Haywood mountains we saw a few specimens of the *Betula excelsa* (yellow birch), and Mr. Curtis says he found it on the Black mountain. Among several shrubs which we obtained for cultivation the *Pyrularia oleifera* or oil-nut is peculiarly interesting. It grows to the height of from five to ten feet, and bears a pear-shaped fruit little more than an inch in diameter, which is so oily that it will burn like a candle if a wick be drawn through it. Squirrels are fond of it, and cattle have a great liking for the young branches and leaves of the *Pyrularia*. Last spring we saw an abundance of it in the edge of some woods fenced into a wheat field, and in October we again went there after the fruit; but the harvest was past, the

field had been pastured with cattle, which had destroyed nearly all of the *Pyrularia*. Hence it has already become rare, and the general occupancy of the mountains with herds of cattle and flocks of sheep would soon destroy it entirely. Mr. Durand of Philadelphia thinks that the oil expressed from it is superior to the best olive oil. Our specimens of the *Pyrularia* have been planted at Philadelphia, New York, and at the botanic garden of Cambridge, near Boston, and also some of them have been sent to Paris to the Acclimating Society of France; whose object is to acclimate useful trees, shrubs and plants.

On Mount Mingus we first met with the *Rugelia*, a new genus of Shuttleworth, in the natural order *Compositæ*, which has not yet been described in American works on botany. It is frequently found along the Smoky mountains to the extent of twenty-five or thirty miles. Dr. Gray recognized it at once, he having received it from Mr. Shuttleworth, a European botanist to whom Rugel sent plants. Sixteen years before, in the early spring, we had visited those same mountains with Dr. Rugel, a German botanist, and we were right glad to learn that his name was affixed to one of their interesting plants. The *Solidago glomerata* grows on most of the Balsam mountains, and the *Potentilla tridentata* of the New England mountains also grows on the bald peaks of Macon county, North Carolina.

The Carolina mountains have a great variety of huckleberries (*Vaccinium* and *Gaylussacia*) ripening in succession from July to September. When we first met with acres of those bushes, in September, covered with large delicious fruit, the temptation was so great that we partook rather freely, expecting to pay the penalty of over indulgence, but were happily disappointed. Judging from the experience of others and our own on many occasions, those berries are remarkably healthy. Most of them were larger than any we ever saw at the south. The *Vaccinium Constablei* of Gray, which sometimes grows ten or fifteen feet high (on Shining Rock), was covered with ripe fruit as late as the middle of October. There are several species of the huckleberry which are worthy of cultivation. The common high blackberry (*Rubus villosus*) is often found in dense patches on and near the mountain tops, with its stems smooth, and destitute of prickles. This rule is constant. We do not remember to have met with an exception. The same species growing in the valleys has its stems armed with prickles.

In the month of September many of the women and children dig "sang," (*Aralia quinquefolia*.) in the valleys and on the mountain sides. The dry roots of the ginseng or "sang," as it is always there called, are worth at home twenty-five cents per pound. We met with one man who had bought 30,000 pounds, and we remember being with one family whose children sold seventy pounds of dried sang. These roots are dug with a long narrow hoe called the "sang hoe."

Snow birds (*Fringilla nivalis*) we saw on the Black mountain, and also on many of the other Balsam mountains south and west of Asheville. They were solitary or in pairs, showing evidently that they breed in those places. Another species of bird, whose summer habitat is generally supposed to be confined to the north, also breeds and summers in those Balsam mountains. It is the Crossbill (*Loxia curvirostris*) whose curious

bill is well adapted to extract seeds from the cones of the black spruce and balsam trees. In the mountain valleys we frequently met with many northern birds, among which was that sweet songster, the rose-breasted Grosbeak (*Fringilla Ludoviciana*).

The tedium of the night, when encamping on the mountains, is almost always enlivened by the stories of the guides and their adventures in hunting. They all positively assert that the bears in early spring, when first emerging from their winter quarters, are as fat as when they first retire for the winter. During the winter they shed the soles of their feet, which renders their walking difficult in the first of spring, when their food consists of the young plants, on which diet they soon become lean, and remain so until the ripening of berries in August and September. They are very fond of hogs and pigs, pork and honey being their favorite diet. Why they bite and scratch the bark and limbs of the balsam and black spruce we cannot tell. It cannot be for food, because they do not generally leave the marks of their teeth on a tree, except in one or two places. Sometime they rise on their hind legs and make long deep scratches in the bark with their fore paws. It may be done for sport, or to let their companions know their whereabouts. We have seen those fresh bites and scratches on different trees at all seasons of the year. The bears show great sagacity in feeding at the leeward of the paths on the mountain ridges, along which the hunter is almost obliged to travel, hence if the wind blows it is almost impossible to get a shot at them, their keen scent discovering the hunter long before he gets within shooting distance. They are stupid and unwary about traps, entering without fear the log pens; these are shallow, with a depth of not more than two feet, over which is raised a very heavy top, which falls and crushes the bear when he disturbs the bait. Hundreds are caught in this manner every year. In the unfrequented parts of the mountains the large steel trap is concealed in the bear trail; but this is dangerous, and liable to catch dogs, of which we saw two caught in one morning to our great sorrow. The piteous yells of those unfortunate dogs rang in our ears long afterwards. The bears rarely disturb calves or young cattle, but in one locality of the Smoky mountains we were told that they did much damage in killing young cattle, and that there could be no mistake about it, because a large bear had been caught in the act of killing a young steer. The panther, wild cat, and wolf are all troublesome to the mountain farmer of those regions. The panther destroys sheep and hogs; the wild cat, lambs and pigs. Both are cowardly and thievish, being rarely seen.

The Red squirrel (*Sciurus Hudsonius*) called Mountain Buman in North Carolina, is common on all the higher mountains. They rarely descend into the valleys. They are fond of the seeds of the balsam and black spruce, and as they are rarely molested by the hunters, they are very noisy, active, and more fearless of man than their brothers at the north. The Ground squirrels (*Sciurus striatus*) are also very abundant, often destroying a good deal of corn, but as corn is plenty, and larger game common, the ground squirrel is rarely killed. We were told by a travelling fur merchant, whom we there met, that the skins which he bought among the mountains, equal in fineness and goodness those of

the north, and that northern merchants could not tell the difference; still in order to get the highest price he was obliged to send his skins to New York, through Ohio and *via* the Erie Railroad as if they had come from the northwest. The principal furs obtained in the southern Alleghanies are the skins of the otter, mink, black fox, red fox, raccoon, and muskrat.

From the great height of the southern Alleghanies, there being twenty-four peaks higher than Mount Washington, it will be readily inferred that they have a northern climate. A year ago, our guide to the top of Roane told us that he had been on its summit when it was covered with snow on the 17th of June. There is a table land extending from near the Roane to the head of Turkey Cove and Linville Falls, a distance of twenty or thirty-five miles, on which the inhabitants succeed with difficulty in raising Indian corn sufficient for their own consumption. Occasionally they have frost during every month in the year, and then they resort on horseback or on foot to the valleys for corn. About the first of last May we saw the mountains in Haywood covered with snow about six inches deep. The wheat harvest at the Forks of Pigeon begins about the first week in July; and we know of no better criterion for isothermal lines than the time of ripening wheat. We kept a record of it in western New York, and in ten years the annual time of beginning the wheat harvest did not vary three days from the 16th of July.

The valleys in the Carolina Mountains vary in elevation from two thousand to upwards of three thousand feet, hence a few miles travel will often take one to a much warmer or colder climate. This we experienced very sensibly in going from the valley of Jonathan's Creek to that of the Soco River. The former has a mean elevation of about three thousand feet and the latter near two thousand. The Chinese sugar-cane (Sorghum) is extensively grown, and may be regarded as a decided success. There are few portions of the Union where such a production is more needed. The absence of railroads and the cost of transportation render sugar and molasses dear; hence the introduction of the Chinese sugar-cane in that section is a great blessing, and will enable many a poor family to have sweet coffee.

In no section of the United States have we seen finer apples, and they are mostly from seedlings originally planted by the Indians. Silas McDowell of Franklin, in Macon Co., has devoted more than twenty years to the selection and grafting of those best native apples, and he now has an orchard of more than 600 apple trees, which bear fruit equal if not superior to the best northern kinds. There is said to be a line or belt on the mountain sides about three hundred feet above the adjoining plain or valley, and extending upwards several hundred feet, where fruit trees always bear, because the belt is free from frost. If this be true,—and we believe its truth has been pretty well tested by experiment,—the mountains of North Carolina might supply the South with an abundance of the choicest fruit, if the means of transportation were good. By the cultivation of more grass, and the introduction of the improved breeds of cattle into those mountain valleys, butter and cheese might also be made for the southern market. One great drawback to the raising of sheep is that they are destroyed by wild animals, and also killed by the dogs. Still we think it would even pay well to keep sheep, herd them at night, and have a shepherd with his dog to guard them by day, and thus revive old Arcadian times among those delightful mountains.

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