

GEOLOGICAL REPORT

OF PROFESSOR MITCHELL, made to the Board of Agriculture, at their Annual Meeting, Jan. 1829.

I shall not perhaps find a more appropriate introduction to this my first regular report to the Honorable Board of Agriculture, than what is furnished by the following remark of a distinguished French Philosopher (D'Aubisson) in relation to the progress and result of the investigations of the geology of England & Germany.

"What the most eminent mineralogists have done in a small part of Germany in the course of half a century, a single individual (Mr. William Smith) has undertaken and accomplished for the whole of England, and his labours alike beautiful in their result and astonishing from their magnitude, have led to the conclusion that England is regularly divided into beds or strata—that the order of superposition is never inverted, and that the same fossils are found in the same bed at great distances."

The object of this quotation is to show, what in the judgment of men the best qualified to form an opinion upon the subject, is the amount of time and labour necessary to bring an undertaking like that to which this Report relates, to a successful conclusion, and that after the general survey of the geology and mineralogy of the State furnished by the preceding Reports, no very extensive results are to be expected from the investigations of a single year. Much remains to be done. England is a small fraction only larger than North Carolina. If the entire life of an individual could be spent upon the geology of that country, and half a century upon that of a part of Germany, without exhausting the subject, it may well be expected that there will remain many things unascertained in relation to the geology of this state. It is not my purpose to ask, nor do I wish any farther assistance in the prosecution of the business. The Board of Agriculture and the Legislature have been sufficiently liberal in their appropriations to this object. It will not however be neglected. Whatever portion of my time is not occupied by my duties at the University, will be zealously devoted to the geology and mineralogy of the State, and if the Board shall continue its annual publications, I hope to be able to furnish them every year with a paper, which though not very long nor very important, perhaps in its details may be thought worthy of being preserved.

A second visit to the Low Country has afforded additional evidence of the correctness of the views taken in a former Report, and more fully developed in the pages of the accompanying pamphlet, of the geological character of this portion of our state and the mode of its formation. New localities of Marble were noticed in a number of different places, especially in the banks of the Tar River, but of these it seems unnecessary to give a particular account. It would appear that the marble beds abound in every part of this district, either at the surface or a small depth below, so that no person need doubt that a careful search for them would be rewarded with their discovery, if not in his immediate vicinity, at least at no great distance. It remains for our agriculturists to ascertain by a few well-conducted experiments, whether this substance will repay the labour of transferring it from the beds to their plantations. The Low Country is hardly entitled, in an economical view, to further examination. Fine clay, marl, shell, limestone and iron pyrites, are abundantly, as well as extensively distributed through it; but besides these, it does not appear to contain any valuable and scarcely any interesting minerals. To the scientific enquirer into the early history of our globe, and the revolutions it has undergone, it will long present an alluring field of research and discovery.

OF THE NORTH-WESTERN COUNTIES.

On the gold mines, the details that have been communicated in former publications of the Board, are sufficiently ample, except so far as matters of mere science are concerned. With reference to these, and with a view of correcting some of Mr. Rothe's blunders, I drew up a paper for one of the scientific journals, which I suppose to be in the press at this time, and some copies of which will be laid before the Board at their next meeting.

I shall proceed therefore, directly to an account of the counties of Ashe, Wilkes and Surry, which were examined with more or less accuracy, during the last summer. With the exception of an exceedingly narrow, broken, barren, unsettled and uninteresting strip along the western border of Ashe, adjacent to Tennessee, the rocks of these counties, are all primitive, granite, gneiss, mica-slate, gneissoid, hornblende rock, hornblende slate, and some chlorite and talcose rocks. The principal valuable mineral substance that has hitherto been discovered, or of which there are any considerable indications, is iron ore. I did hope to be able to draw lines along the map, indicating the distribution of the different rocks through the country, with their boundaries, but found them at length so involved with each other, and alternating in so many different ways, that I was obliged to give it up as a hopeless undertaking. It is not a matter of much importance. The alterations referred to, are well exhibited on the road from Wilkesboro' to Ashe Court-House, especially in the descent to Reddie's River.

ASHE COUNTY.

I had expected to find this county resembling in geological character the district lying north of it in Virginia, and hoped therefore, that there might be a chance of meeting with those minerals, especially lead and gypsum, which occur lower down New River, either upon its banks or at no very great distance from it, but I soon ascertained it to be altogether different. As has been already mentioned, the whole county is primitive, with the exception of a narrow strip adjacent to Tennessee, and this is a collection of rocks through which the primitive gradually assumes the characters of the formations west of it, rather than one of those formations. An imperfect recent granite is found upon the Stone Mountain, at both of the points where the great roads cross, within the limits of Tennessee. The lead and gypsum of Virginia would of course be looked for in vain. The iron ores of Ashe are near the northern boundary of the county, on the waters of Little River, and those of the North Fork of New River, and whether we regard the ease with which they are wrought, or the excellence of the iron manufactured from them, are probably not surpassed by those of any other county.

The value of the iron ores of North Carolina, depends upon the nature of the rock in which they occur, not less than upon the ore itself. Almost all those that are wrought, belong to the kind called shot ore—that is, they consist of small crystals of iron ore, (generally magnetic) disseminated through a rock not differing, except in the circumstance of its containing this imbedded substance, from the common rocks of the country. The rock therefore goes either partly (the rest having been removed by pounding and washing) or wholly into the forge or furnace, along with the proper ore, and when there serves to stamp a peculiar character upon the metal produced. It enters into intimate union either with the lime introduced as a flux (as in the furnace) or with a portion of the undecomposed oxide of iron, which appears in this case to perform the office of a flux, (as in the forge) is converted into cinder and flows off.

But the magnesian minerals (Soapstone, Chlorite, etc.) being exceedingly difficult of fusion, even with the aid of fluxes, require a large expenditure of coal for the reduction of the ore, nor is the metal obtained apt, after all, to be of a good quality.* This cir-

cumstance will always deprive the iron ore found at the place called the Bull Ruffin in Ashe, and indeed all that I met with in the southern part of the county, (some small specimens of loadstone found on George Wilson's land on the fork ridge excepted) of the value they might otherwise possess. But the characters of the ores on the North Fork of New River, are all favorable to the easy production of good iron. The ore itself appears to be a pure oxide—the rock in which it lies imbedded is gneiss, without any injurious ingredient—there is plenty of wood and water power. There are at present but two forges in operation in this part of the county; Col. Ballow's, and that belonging to Major Finlay and Col. Waugh. But it will be the fault of the persons to whom the ore beds belong, and of the workmen, if this district does not become the seat of a manufacture of iron, not surpassed for being converted into steel, or indeed for any other purpose, by any in the world. Why should not the people of the midland counties be supplied with this important article, directly by their fellow-citizens at the west? It is sometimes carried to Fayetteville and sold, and then re-transported to the interior.

Besides the magnetic oxide that is wrought, Ashe furnishes some other species of iron ore, especially the specular oxide, which is pretty common in the midland counties, and no where more abundant, as I believe, than in Chatham, where, though not in quantity sufficient to be manufactured into iron, very fine specimens may be had on the plantation of William Hardin, Esq. near Pittsborough. In Ashe, differing so much from the more common kind of iron ore in lustre and other characters, it was supposed to contain lead, antimony, or some other uncommon and valuable metal. It is a good ore of iron, but here as well as elsewhere, in the state where it occurs, the quantity is small. Brown Hematite is found on the land of Elisha Blevins, near the Virginia line, and the compact brown oxide of iron on that of Mr. Weaver, not far from the bank of New River. Of this last, which I find to contain a large portion of the black oxide of Manganese, mixed with the oxide of iron, a quantity had been raised with a view of extracting silver from it.

On the land of Col. James Maxwell, is a copper mine, unluckily not rich enough to repay the expense of working it. It is on the side of a hill of mica slate and gneiss, facing the east and rising from the bed of one of the small tributaries of New River. The rocky strata run S. 40° west, and dip rapidly towards the south-east. Between the other veins or beds of rock, are those which contain the ore of copper, the green carbonate. Two drifts have been run 50 or 40 feet into the hill, for the purpose of exploring these veins. It is a good ore of copper, easily reduced, but found here as well as in other parts of the world, in small quantity only.

Ashe appears to be rich in mineral species—that is, in those crystalline forms and rare combinations of the chemical elements which mere mineralogists are so eager to collect into their cabinets, but its wealth in this particular will not be ascertained till some person resident in the county, shall embark in the business of exploring it, and continue in it for some years. The neighborhood of Joshua Cox, near the mouth of Cranberry Creek, would probably afford him a richer harvest than any other. On Cox's own land, are splendid specimens of Staurolite on the bank of the river. On Canada Richardson's land, the garnet is large, perfect and beautiful. On James Mulkey's, limpid quartz is obtained in large pieces, and Capt. Smith gave me a large and very perfect crystal of Red Oxide of Titanium, picked up, as he told me on James Dickson's land. Besides these, there are other interesting minerals.

Ashe presents more peculiarities than any other county in the state. It differs widely from the country below the mountains, exhibiting a number of objects that are calculated to interest an inhabitant of the lower and midland counties—who, if he has the capacity of receiving pleasure from an union of the grand and beautiful features of natural scenery, will not regret a few days spent (especially in that season of the year when the chestnut, linn and laurel are in bloom) amongst the mountains and vallies of Ashe, with a plain but kind and obliging people.*

It is not merely in having a more uneven surface that this county differs from those below the ridge, but it is so much elevated above the rest of the state, (Buncombe and Haywood excepted, and it appears to be higher than either of those counties) as to have a different climate and vegetation, and different modes of culture. It is a body of high table land, having its upper surface studded with mountains. The seasons are four or five weeks later than in the central part of the state—the winters intensely cold, and the summers barely warm enough to bring Indian corn to perfection. The grasses flourish wonderfully here. In many places it is only necessary to clear away the timber and scatter a little Timothy seed over the soil, and it is presently and permanently converted into a luxuriant meadow. With the aid of the gypsum of Virginia, fine fields of clover are easily created—the perfection which the Irish potatoe attains amongst the mountains is well known.

The county appears to have been intended by nature for a grazing country, for the pasturage of cattle and sheep, and though a good many cattle are driven from it every year. Much of its surface is still in a state of nature, and with extensive forests overshadowing the soil and preventing the vigorous growth of those plants upon which they are fond of feeding, it is evident that the quantity of stock it can support under the present circumstances, is incomparably less than what it will maintain when the forests shall have been levelled and the hills and mountains have been converted into artificial pastures. Some judicious farmers are beginning to turn their attention more particularly to this object—a course which would be inexpedient if they were on the other side of the ridge, but is wise and proper here. The effect of such measures must be to make room for a denser population, and prepare the way for the introduction of schools and other improvements, so that there can be no doubt that Ashe become an old county, will be much more wealthy and respectable, and hold a higher rank amongst her sister counties than when the settlements were but recently made. No other county seems to possess in so high a degree, the means of ameliorating its condition through a succession of years. To this end, it would contribute greatly that the hunter habits should be more effectually laid aside. As the settlements advanced westward from the coast, the hunters kept retiring till they reached the Alleghanies, where they made a stand and permitted the tide of emigration to flow past them into Tennessee, and now that the game is almost gone, they do not willingly turn themselves to the cultivation of the soil of a broken but fertile county. Patient, persevering industry, is too much confined to the females, whose habits in this respect are worthy of much praise.

Of the luxuries received from Ashe, none is more generally acceptable than the Cranberry—as pleasant a tart unquestionably as the world affords. It grows almost exclusively on the east-side of New River in the glades and swamps lying between that stream and the Blue Ridge. The plant which produces it, is a small low vine that completely covers the soil with the branches and runners which it throws out in all directions. When loaded with fruit in

glittering plates of this substance to ornament their persons, or expected to extract metal from it. Such places never fail to become objects of interest to the people of the neighborhood, who flatter themselves that a diligent and careful search, would bring to light something valuable.

The people of North Carolina, are by no means aware of the number of wild and beautiful views that are within their reach along the great range of the Alleghanies, without ever crossing the state line. Some of those that present themselves on the road from Rutherfordton to Asheville, by the way of the Hickory-nut Gap, are magnificent, the road itself is execrable, after all the labour that has been bestowed upon it. From Asheville to Franklin, in Haywood County, the road winds for 70 miles, through romantic vallies, and amongst lofty mountains, and at the end of his journey, the traveller will be as handsomely entertained at Mr. Siler's on the banks of the Tennessee, as he could be in Raleigh. If he has a curiosity to examine the modes of savage life, an easy day's ride will bring him to the Indian settlement on the Hiwassee.

a favorable year it presents a beautiful object to the eye, reminding us of the gladness with which it will animate the lover of good eating in a distant part of the country, when it shall have been suitably prepared for the table.

The circumstance of its flouring almost exclusively on the north-western declivity of the Blue Ridge, is to be attributed partly to the characters of the soil and partly to the elevation and consequent moisture of the ground, for there can be no doubt that though it is a country of mountains, and there are high knolls far away to the westward, there is a gradual descent from the crest of the ridge to the warm vallies of Tennessee. Vegetation is earlier in the Watauga settlement, and corn ripens better there than in any other part of the county.

The geography of these western parts of the state as exhibited on the maps, is exceedingly defective. And yet in the course of a century at farthest, and it is to be hoped in less than half that time, they will be delineated with a degree of precision and accuracy which we shall find it difficult to attain in regard to the more level counties below the ridge. Many of the highest mountains from the Virginia line quite down to the western extremity of Haywood, are bald, and would furnish admirable stations for the prosecution of a trigonometrical survey. If a base line were once run and transferred to the mountains, it would be easy to cover the whole country both beyond and immediately below the ridge, with a network of triangles, and fix every point with the most minute exactness. The Grandfather Mountain is distinctly seen from the White Top, which is within the Virginia line, and the Pilot from both of these. The Yellow Mountain and the Black Mountain of Buncombe, (this last probably overtopping the Grandfather himself, and the highest land between the White Hills of New-Hampshire and the Gulf of Mexico) would furnish the next stations, and after leaving these, there would be no difficulty in finding conspicuous summits quite down into the Indian territory.

The counties of Wilkes and Surry being unquestionably primitive throughout their whole extent, possess very little interest for the Geologist, nor do they appear to contain a great number of rare or valuable mineral species. A succession of beds of iron ore extends along the base of the Bushy Mountains in Wilkes, and a forge has been erected during the past summer for manufacturing iron from it. It is moderately rich, and will probably afford iron of a good quality, but inferior to that derived from the mines on the north fork of New River in Ashe. Other beds occur on the head waters of the Yadkin, but they labour under the same difficulty with those about the Bull Ruffin—the ore is imbedded in a magnesian rock.

No county is more favorably situated for the iron manufacture, if a sufficient amount of ore could be had than Surry. It has extensive tracts of waste land that can never be turned to any other object than the growing of wood for coal, a noble body of limestone in the centre of the county for fluxing the ore, but the ore itself is unhappily wanting. A series of beds indeed extends through a great part of the county, beginning at its north-eastern corner and passing near the foot of the Pilot Mountain in a south-westerly direction. Four forges are supplied with ore from them. But the veins, though numerous, are generally feeble, not more than from a foot to three or four feet in thickness. Hutchins's, a few miles south of Rockford, which has been recently opened, and is the most powerful hitherto wrought, is seven feet in thickness. The ore is in general of a good quality, but sometimes contaminated with soapstone, which as has been already stated, renders it refractory, and it is not abundant enough at any point to justify the erection of a furnace, and taking advantage of the quarry of limestone that is just at hand.

On the land of David Walker, in the south-western part of the county, plumbago occurs of a good quality in nodules, in a ploughed field. It appears to be extensively distributed through the western counties—being found in Lincoln, Burke, Tredell, Wilkes, Surry, Stokes, and probably all the others where there are ancient primitive rocks. Its economical uses were detailed in a former Report.

It is known that our distinguished countryman, Mr. Sparks, went to Europe last Spring, in order to collect materials for illustrating the life of Washington and the most important events of our history, from the beginning of the struggle for Independence. In July last, he proceeded from Germany to Paris, and has been constantly employed in that capital, in searching the public archives for papers, diplomatic and military, relating to our Revolution and the old French war in the Colonies. As Paris was the centre of all the diplomatic concerns connected with America, the documents are numerous, curious, and valuable. Mr. Sparks has experienced the utmost liberality and comity, on the part of the Ministers in whose departments the papers are deposited, and very earnest aid from French gentlemen of eminence. A kindly feeling towards the United States seems to be almost universal in France. All the correspondence of Dr. Franklin with the French cabinet has come under the eyes of Mr. Sparks. The Doctor sustains, in every part of it, a dignified, independent, and truly patriotic character. We shall in all likelihood, see a full refutation of the charge or story of plagiarism, to the wishes of Versailles, which has been copied into the newspapers from Mr. Cooper's "Notions of a Travelling Bachelor." Mr. Sparks will return to London to prosecute his researches there. He is also permitted to examine the diplomatic correspondence and military papers, and to make abstracts and selections. Some of the Whig noblemen in particular have entered warmly into his objects. The Marquis of Lansdowne, whom all men honor for his enlightened rectitude and generous courtesy, has opened to him all the papers of his father (Lord Shelburne) respecting the peace of 1763.—*Nat. Gaz.*

The following fact is recorded in an obituary notice of Mrs. Lydia Dearborn of Boston:

"One of the many proofs of her strength and cast of character, is fully substantiated by her correcting a deformity in the feet of one of her children; it was born bent upon the front bone, without the appearance of a correct and perfect ankle or heel; when two days of age, this anxious parent commenced an operation by gentle bandages, to bring down this crooked limb to a natural and useful position. These bandages were renewedly tightened as often as the health and strength of the child would permit, in a little time a wooden shoe was put to a cloth shoe with side supporters; then leathertied; and lastly an iron shoe with iron splinters for the sides, to give an additional force to the operation. Thus step by step for twelve years, did this matron advance firmly to the praiseworthy object of altering the perpendicular position of this foot to a horizontal one; when, after putting on and tightening the bandages but little short of eighty thousand times, complete success crowned her efforts; the bands were removed and the once crooked foot could never since be discovered from the straight one, in any walk or "mazy dance" of life. The daughter still lives to bless the memory of her affectionate parent, and the principles and facts of this act.—The shoes are also preserved for the benefit of those who may be placed in a similar situation with the offspring."

An old man and his wife passed thro' Augusta a few days since, from one of the lower counties of this State, on his way to visit his friends in North Carolina. He has not been long in Georgia and was going back to persuade his relations to "move" to that part of the State, where he resides. The old woman had filled a small bag with Sugar which they had made last season and intended to exhibit it to her friends as an inducement, and as evidence that Georgia, if it did not "flow with milk and honey," might at least be made to flourish with milk and molasses. They planted one acre and a half of pine land in cane, from which the old man and his son manufactured upwards of a hoghead of sugar. They pounded the cane in a trough, and most of course have lost nearly one third of the juice. The latter was boiled and manufactured into sugar under the old lady's directions, who for kettles borrowed all the pots she could get in the neighborhood.

The religious paper of the Methodist Episcopal Society, in New-York is extensively patronized; 200 hands are employed in this office; 20,000 papers are issued weekly, besides 11,000 magazines, for about 800 juvenile magazines, and other printing.