

In the last annual report some statistics of the trade of Washington were given. The value of cotton shipments alone is \$1,400,000, and of naval stores and lumber over \$400,000; so that the improvement has been a decided benefit to the interests of commerce and navigation.

G 19.

SURVEY OF DAN RIVER, BETWEEN DANBURY, NORTH CAROLINA, AND DANVILLE, VIRGINIA.

UNITED STATES ENGINEER OFFICE,
Washington, D. C., July 15, 1879.

GENERAL: I have the honor to submit the following report upon a survey of the Dan River in Virginia and North Carolina, between Danbury, N. C., and Danville, Va., provided for by the act of appropriation for rivers and harbors approved June 18, 1878, and assigned to me by your letter of July 8, 1878.

The party which had been engaged in the survey of the Yadkin River were, on December 30, 1878, transferred to the Dan River, when the survey was commenced at Madison, and completed as far as Danville on January 25, 1879. The upper part of the river from Danville to Madison was not surveyed until the following spring.

The portion of the river covered by these two surveys (between Danbury and Danville) is embraced in the following report.

The survey of the river between Danville and Clarksville will be made during the present summer if the work is authorized by the Secretary of War.

The Dan River, which is 325 miles in length, is the longest river in the State of North Carolina. For 300 miles it flows within the State, crossing its border five times, and leaving Danville, the largest city on its course within the boundary of Virginia. It rises near Buffalo Knob, Patrick County, Virginia, becomes the Roanoke River after its junction with the Staunton, and empties into Albemarle Sound. Its fall from Danbury to the sound is 836 feet. After the report of Mr. Isaac Briggs (dated Richmond, February 12, 1823), the river above Danville was improved for bateau navigation for 60 miles, or as far as Sauratown, although bateaux sometimes reached Hairston's Shoal, 12 miles below Danbury.

In the following report the river is described under two sections: The *first* from Danbury to Madison, and the *second* from Madison to Danville. The upper section is divided in two subsections by the considerable fall at Hairston's Ford. From Danbury to the foot of this fall the distance is 13.45 miles and the fall 97.64 feet, or an average of 7.26 feet per mile. The distance from Hairston's to Madison is 14.94 miles, the fall 52.08 feet, or an average of 3.49 feet per mile. The country below the falls is much better cultivated and more thickly settled than that above.

FLOODS.

The river is subject to floods, which rise and fall too rapidly to be made available for navigation. The highest flood which occurred during the progress of the work was that of January 12, 1879, when the river rose at Leaksville 15.65 feet above ordinary low-water. The highest water at Madison of which any record could be obtained was the flood of August, 1850, when the river rose 28.4 feet above ordinary low-

water. At Wilson's upper ferry, 6.1 miles above Danville, the high-water of the fall floods of 1878 was 16.3 feet above ordinary low-water. At Danville, just above the Richmond and Danville Railroad bridge, in the fall of 1873 the river rose 17 feet above ordinary low-water.

AGRICULTURE OF THE DAN VALLEY.

The farm products include corn, wheat, rye, oats, potatoes (sweet and white), fruits, products of the dairy, and tobacco.

Between Danbury and Leaksville the land appears to be best adapted to tobacco culture, and a fine grade is produced, although there are some short stretches of very good bottom land. Further down the valley widens, and broad bottoms are found cultivated in corn and wheat. Five miles below Leaksville is that celebrated portion of the State of North Carolina known as the "Meadows," consisting of thousands of acres of rich undulating land, well adapted to the growth of the cereals and grasses.

This section of land was conveyed to Col. M. Byrd by the colonies of North Carolina and Virginia, for his services in making the survey of the dividing line between them, and was called by him the "Garden of Eden" in the interesting Westover manuscript.

MANUFACTURES OF THE DAN VALLEY.

There are two tobacco manufactories at Danbury, but the principal manufacturing interests are at Leaksville, on Smith River, where are located the various establishments of J. Turner, Morehead and Company, comprising cotton mill, saw-mill, flouring mill, &c., employing several hundred persons. A mile above is the foundery and flouring mill of Mr. Rodenhizer, and farther up the river the tobacco factory and mill of Mr. King. There is also a tobacco factory and warehouse at the village of Leaksville.

Danville is one of the most flourishing cities in Virginia, and does a large business in the way of shipping and manufacturing tobacco.

COMMERCE OF THE DAN RIVER.

The Dan River is navigable for 60 miles above Danville for bateaux carrying 12,000 lbs. The boats ply between Danville and various points along the river, carrying down timber, farm products, and the manufactures from the mills of Morehead, Rodenhizer, King, and others, and bringing up raw material for manufacturing purposes, fertilizers for the farms, and the varied articles of stock for the mercantile houses of the valley. The boats, being propelled by poles, cannot be run during the continuance of floods, hence their trips are irregular, necessitating the transportation of farm products and manufactures across the hilly country to Reidsville or Danville, on the Richmond Railroad. The river in its improved condition, navigable for steamboats, would be the carrying medium for portions of the counties of Carroll, Patrick, Henry, and Pittsylvania, in Virginia, and Stokes and Rockingham in North Carolina. These counties are rich in mineral and agricultural resources, and abound in fine water-powers and forests of valuable timbers, which include chestnut, walnut, hickory, locust, cherry, pine, poplar, oak of several varieties, and others.

The produce carried by the river would include the half of that raised in Henry and Rockingham Counties, one-third of Surry, and all that

which is raised in Patrick and Stokes, making an aggregate, of tobacco, 2,659,000 pounds; of oats, 193,800 bushels; of corn, 569,200 bushels; besides other articles.

IRON, COAL, STONE, MINERALS, ETC.

The Dan Valley is rich in coal and iron. At Danbury and vicinity are extensive beds of iron ore, which have been worked to some extent for more than half a century, and an excellent quality of iron produced. Coal-beds in the vicinity have furnished good specimens. Coal is also found at various points along the river. On the farm of Grief Wade, 3 miles above Leaksville, coal has been mined at different times for the last 10 or 15 years. Recently the value of these mines has become more apparent, and a more extensive and thorough examination of them is being made with a view to their general development. Below Leaksville, at the "Meadows," coal has been mined. The following account of the coal is taken from Dr. Genth's report.

EXTRACT FROM MINERAL RESOURCES OF NORTH CAROLINA, BY FREDERICK A. GENTH.

[Read before the Franklin Institute at the monthly meetings of November and December, 1871.]

The Dan River coal-fields embrace an area of over 30 square miles; it has hardly been developed. Small quantities have been mined near Madison, Rockingham County, which were used by the blacksmiths in the neighborhood, and the North Carolina Centre Iron and Manufacturing Company of this city has made a few trial pits, which have proved the existence of 5 beds of coal although it is probable that there are others besides. The coal which I have examined from two of the seams near the outcrop gave respectively 11.44 and 13.56 per cent. of ash, 75.96 and 76.56 per cent. of fixed carbon, and about 12 per cent. of volatile matter.

These results are very encouraging.

The Dan River coal-field, being the northwest continuation of the Deep River, has probably the same seams, and, where the coal is undisturbed, the same quality of coal. These coal-fields are not only of general value, but, when it is remembered that they lie in close proximity to some of the largest and best iron beds in the State, their importance can then be fully appreciated.

Granite sandstone, limestone, and slate are found at various points; extensive beds of the latter on Smith River, near Leaksville. Copper has been found in the vicinity of Eagle Falls, and quartz and garnet at Danbury.

For a detailed description of the river and the obstructions to its free navigation, I respectfully refer to the accompanying memoranda and tabulated statements, giving the characteristics of each mile, from the report of Mr. S. W. Evans, assistant engineer in charge of the survey.

The miles in section one are numbered from Danbury, and in section two from Madison.

MEMORANDA OF SURVEY OF DAN RIVER, FROM DANBURY, NORTH CAROLINA, TO DANVILLE, VIRGINIA.

SECTION I.

Danbury, the county seat of Stokes County, is a flourishing town of 200 inhabitants, situated on the high ground west of the river, containing the county buildings, two churches, two private schools, one boarding-house, two hotels, four stores, two tobacco manufactories, three blacksmith-shops, &c.

The Moratuc Iron Mines extend along the river for several miles above the town. The mines are not worked at present, and the old forge opposite the town is in ruins. The initial point of the survey was taken on the black walnut tree about 120 feet west of the river, in Colonel Hicks's field, above Danbury Ford.

NOTE.—The Deep River coal contains 1.02 and 1.35 sulphur.

1st mile.—At Danbury the river is 120 feet wide. The floods rise 12 to 18 feet. The bottom is rock, and very uneven.

Danbury Ford.—At Danbury Ford, 563 feet below the initial point, a dam for the improvement of the ford has been erected, at which the vertical fall is 1.24 feet. The depth for this mile ranges from 1.2 to 5 feet, and the total fall is 10.6 feet.

2d mile.—At 800 feet from the beginning of the mile the descent is 0.96 of a foot in a distance of 91 feet.

Ryerson's Fish Dam.—At 2,248 feet is Ryerson's Fish Dam, where the vertical fall is 0.73 of a foot. In this mile the depths range from 1.1 to 5 feet; the bottom is rock, and the fall is 5.04 feet.

3d mile.—For a distance of 3,486 feet from the beginning of the mile to the head of Old Mill Shoal the fall is 1.47 feet, and the depth in the best channel is 1.7 to 8 feet. The mile ends in the shoal.

4th mile.—Old Mill Shoal.—At the foot of the shoal is a fish-dam with a vertical fall of 0.22 of a foot. The depth in the shoal ranges from 0.7 of a foot to 4 feet. The bottom is rock; length of shoal is 3,317 feet; fall, 6.22 feet; thence 921 feet to Red Shoal the depth 1.5 to 5.7 feet.

Red Shoal.—Near the head of the shoal the descent in a distance of 200 feet is 2.25 feet; length of the shoal is 2,337 feet; fall, 4.79 feet; depth, 1 to 9 feet; rock bottom. The mile ends 499 feet below the shoal.

5th mile.—Sink Hole Shoal.—At 254 feet is the head of Sink Hole Shoal. The bottom is rock and sand. Near the head of the shoal the descent in a distance of 73 feet is 0.64 of a foot; length of the shoal is 1,266 feet; fall, 1.13 feet; depth, 0.7 of a foot to 6.7 feet; thence 2,100 feet to Fulcher's Shoal, at Snow Creek, the depth ranges from 1.4 to 5.4 feet.

Fulcher's Shoal.—The bottom is rock, and many projecting points show above the surface; the depth ranges from 1 to 3 feet; length of the shoal is 810 feet; fall, 2.01 feet; thence 821 feet to Ducking Shoal the depth ranges from 1.3 to 4.8 feet.

6th mile.—Ducking Shoal.—The bottom is rock. There are several abrupt falls in the upper part and a fish-dam toward the foot of the shoal. The vertical fall at the fish-dam (Thompson's) is 0.49 of a foot; length of the shoal is 2,616 feet; fall, 6.44 feet; depth, 1 to 4.3 feet; thence 2,313 feet to Cow Ford Shoal the depth is 1.9 to 5 feet and the fall is 1.62 feet. The mile ends 50 feet below Walnut Island and 462 feet below the head of the shoal.

7th mile.—Cow Ford Shoal.—In the lower part of the shoal, immediately above Davis's Upper Ford, is Davis's Fish Dam, where the fall is 1.3 feet in a distance of 18 feet.

Davis's Fish Dam.—The bottom is rock and the depth 1 to 3 feet; length of the shoal is 1,841 feet; fall, 4.52 feet.

Davis's Upper Ford.—From Danbury to Davis's Upper Ford the distance is 6.16 miles and the fall is 45.15 feet. The width at this point is 170 feet; the high-water mark of 1850 at this ford is 24.9 feet above low-water; thence 1,867 feet to Davis's Shoal the depth ranges from 1.6 to 3.6 feet; the bottom is sand most of the distance, rock being found at one point.

Davis's Shoal.—Length of shoal is 205 feet; fall, 10.1 feet; depth, 1 to 4.2 feet; rock bottom. Thence 559 feet to Williams's Fish Trap Shoal the depth is 3.2 to 5.4 feet; the descent is rapid, the fall being 1.05 feet.

Williams's Fish Trap Shoal.—In this shoal there is no vertical fall, but the descent is very rapid. Length of the shoal is 390 feet; fall, 1.79 feet; rock bottom; depth, 1 to 4 feet. Thence to the end of the mile the depth is 1.3 to 4.5 feet.

8th mile.—Mount Horrible Shoal.—At 118 feet is Mount Horrible Shoal. In the upper part of the shoal the descent, in a distance of 8 feet, is 0.82 of a foot. The bottom is rock, appearing above the surface in many places, and the line of soundings represents the depth in a crooked and narrow channel between the rocks. Length of the shoal is 1,119 feet; fall, 1.85 feet; depth, 1.8 to 5 feet. Thence 3,096 feet to Big Rock Shoal the fall is 1.04 feet, and the depth 1.7 to 5.4 feet.

Big Rock Shoal.—722 feet below the head of the shoal is a fish-dam with a vertical fall of 0.30 of a foot. The mile ends 225 feet below the dam.

9th mile.—In the lower part of the shoal the fall is 2.49 feet in a distance of 502 feet. Length of the shoal is 4,033 feet; fall, 8.67 feet; depth, 1 to 3.9 feet; rock bottom. Thence to the end of the mile the depth ranges from 1.5 to 4.8 feet.

10th mile.—The depth for this mile is 1.1 to 10.8 feet. The bottom is rock. At 1,488 feet the fall is 1.10 feet in a distance of 225 feet. Total fall for the mile 6.65 feet.

11th mile.—To the pool above Hairston's Falls, 4,246 feet from the beginning of the mile, the descent is rapid. The bottom is rock, and only by frequently crossing from bank to bank could a channel of sufficient depth to float a canoe carrying three men be found. The depth ranges from a few tenths of a foot to 4.6 feet. For the remainder of the mile the depth is 2.1 to 8.2 feet.

12th mile.—At 609 feet is the head of Hairston's Falls. The depth to this point is 2.0 to 5.4 feet. The fall from Danbury to Hairston's Falls is 75.97 feet—6.33 feet per mile.

Hairston's Falls.—At the head of the falls the river is so thickly studded with rocks

that it was difficult for the boat to pass. The line of survey was carried on the right bank, and the soundings taken in the channel on the right of the large islands. The most rapid descent is in the first 762 feet, the fall in this distance being 7.89 feet, and of this 7.89 feet a fall of 2 feet occurs in a distance of 10 feet. The total descent to the foot of the falls below the old fish-dams is 14.89 feet. Length of the falls is 2,629 feet. The depth in the best channel ranges from 0.5 of a foot to 2.5 feet.

Dam and canal.—A dam was formerly located at the head of the falls and a canal constructed for a distance of 2,000 feet along the right bank. At the foot of the canal is an old saw and grist mill, which is undergoing repairs. The dam is to be rebuilt. The canal is 12 feet wide, and, when in good condition, was intended to carry a body of water 2 to 3 feet in depth. Thence to the end of the mile the depth ranges from 1.3 to 3.6 feet, with sand bottom.

13th mile.—For 2,638 feet, to an old fish-trap shoal, the fall is 1.29 feet; the depth, 1 to 3.5 feet; sand and gravel bottom.

A fish-trap shoal.—Length of the shoal is 1,517 feet; fall, 3.93 feet; depth, 1.3 to 3.3 feet. Rock bottom. Thence to the end of the mile the depth is 2 to 3.5 feet.

14th mile.—To the head of Hairston's Ford Shoal, 1,463 feet, the depth is 1.9 to 3.3 feet.

Hairston's Ford Shoal.—Length of shoal is 1,171 feet; fall, 0.87 of a foot; depth, 1 to 2.6 feet; rock and gravel bottom. From Danbury to Hairston's Ford the distance is 13.45 miles, and the fall is 97.64 feet, or an average fall of 7.26 feet per mile. At Hairston's Ford the river is 160 feet wide. To the end of the mile the depth ranges from 1.6 to 3.7 feet. The bottom is sand and gravel.

15th mile—Clay's Island Shoal.—At 982 feet is Clay's Island. The best channel is on the left of the island. The fall here in a distance of 477 feet is 1.4 feet and the depth is 1.2 to 3.7 feet.

Old fish-dam.—At 2,612 feet is an old fish-dam, and 484 feet below is Clay's Ford, to which from Hairston's Ford the fall is 5.39 feet. Near the end of the mile is another old fish-dam, with swift water. The depth for the mile ranges from 1.2 to 5 feet.

16th mile.—In this mile the depth ranges from 1.7 to 5.5 feet. The bottom generally is sand, although rock was found in a few places. At 2,600 feet is an old fish-dam. The mile ends 700 feet below Town Fork Creek.

Town Fork Creek.—From Hairston's Ford to Town Fork Creek the distance is 2.42 miles and the fall 10.03 feet.

17th mile.—At the beginning of the mile is an old fish-dam and swift water. At 1,939 feet is the head of Shoe-buckle Island Shoal.

Shoe-buckle Island Shoal.—The best channel is on the right side of the island, where the depth is 1 to 5.8 feet. The bottom is rock. Length of the shoal is 1,806 feet; fall 2.56 feet; thence 1,381 feet to Granny Angel's Shoal and Island the depth is 2.5 to 4.5 feet. The mile ends 60 feet below the head of the island.

18th mile—Granny Angel's Shoal and Island.—The best water is on the right side of the island, and is 1 to 2.5 feet in depth. The bottom is rock. Length of the shoal is 441 feet; fall, 1.33 feet; thence 2,933 feet to Dalton's Fish Trap Shoal the depth is 2.1 to 5.1 feet.

Dalton's Fish Trap Shoal.—Length of shoal is 606 feet; fall, 2.59 feet; depth, 1.1 to 2.9 feet; rock bottom; thence to the end of the mile the depth is 2.5 to 4.5 feet.

19th mile.—To Ladd's Ford Shoal, 4,072 feet from the beginning of the mile, the depth is 2.2 to 4.5 feet.

Ladd's Ford Shoal.—There is a gravel bar in the middle of the river below the ford. The channel is along the right bank. Length of the shoal is 444 feet; fall, 1.18 feet; depth, 1.5 to 2.8 feet; gravel bottom. From Hairston's Ford to Ladd's Ford the distance is 6.32 miles and the fall 21.46 feet; thence to the end of the mile the depth is 2 to 3.7 feet.

20th mile.—Old fish-dams.—At 2,239 feet are some old fish-dams. The depth for the miles ranges from 1.8 to 5 feet. The bottom is sand and gravel, with rock, at a few points. The mile ends 235 feet above Buzzard Island.

21st mile.—Buzzard Island Shoal.—The channel is on the right of the island, and is 2 to 3.5 feet in depth. The bottom is gravel; length of the shoal is 220 feet; fall, 0.52 of a foot; thence 3,191 feet to Rutly's Shoal the depth ranges from 2.5 to 5.3 feet.

Rutly's Shoal.—Length of the shoal is 1,288 feet; fall, 2.09 feet; depth, 1.2 to 3.7 feet; rock and gravel bottom. To the end of the mile the depth is 3.5 to 6 feet.

22d mile.—To Carter's Shoal, at 1,863 feet, the depth is 2.8 to 8 feet.

Carter's Shoal.—At the head of the shoal is an old fish-dam, with a vertical fall of 0.62 of a foot; and near the foot of the shoal is Carter's fish-dam, where the vertical fall is 0.66 of a foot. Below Carter's dam is another old fish-dam not in use. Length of the shoal is 3,276 feet; fall, 4.7 feet; depth in the best channel, 1.7 to 5.5 feet; rock bottom. The mile ends 141 feet below the shoal.

23d mile.—At 3,541 feet is Sandy Island Shoal, to which point the depth ranges from 1.7 to 9.7 feet.

Sandy Island Shoal.—In the upper part of this shoal are 4 old wing-dams, with

sluices 10 feet in width. They were constructed to swell the water, but are in a dilapidated condition; and the depth in that part of the shoal is 1.2 to 2.4 feet. The mile ends in the shoal.

24th mile.—Near the foot of the shoal is an old fish-dam. Length of the shoal is 3,241 feet; fall, 3.51 feet; depth, 1.2 to 4.1 feet; rock and sand bottom. Thence to the end of the mile the depth ranges from 2 to 5 feet.

25th mile.—At 448 feet is a shoal with rocks and an old fish-dam.

Shoal with rocks and fish-dam.—Length of the shoal is 381 feet; fall, 1.17 feet; depth, 1.7 to 6.4 feet; rock bottom. Thence, 2,172 feet to Cross Rock Shoal and fish dam, the depth ranges from 2.3 to 10.5 feet.

Cross Rock Shoal and fish-dam.—At this point there are large rocks in the middle of the river, with a gravel bar below. The channel now used by bateaux is along the right bank through the rapid, and crossing to the left bank just below the bar. The depth in this channel is 2 to 3 feet, and the slope of the surface at the rate of 16.32 feet per mile. If properly graded it would be too crooked for steam navigation. A fish-dam closes the channel between the rocks and the left bank. The depth below the dam and to the foot of the shoal is 1.3 to 3.5 feet. Length of the shoal is 1,188 feet; fall, 2.36 feet; vertical fall at the dam, 1.38 feet; rock bottom. Thence, to the end of the mile, the depth is 2 to 3.7 feet.

26th mile.—To Wolf Shoal, at 4,540 feet, the depth is 1.9 to 5 feet. The bottom is rock. Length of the shoal is 305 feet; fall, 1.2 feet; depth, 2 to 3.8 feet. The mile ends 435 feet below the shoal.

27th mile.—For 3,250 feet, to Beaver Island Shoal, the depth is 2.1 to 5.9 feet; and the total fall to this point is 143.81 feet.

Beaver Island Shoal.—The best water is on the left of the island. The channel is crooked, and the descent rapid. The greatest descent is at the foot of the island, where the fall is 1.55 feet in a distance of 495 feet. Length of the shoal is 1,090 feet; fall, 2.44 feet; depth, 1.2 to 4.9 feet; rock bottom.

Beaver Creek.—Thence, to the end of the mile at Beaver Creek, the depth is 2.3 to 4 feet.

28th mile.—Velocity observations.—1,600 feet below Beaver Creek observations were taken which show the discharge of the river at that point to be 854 cubic feet per second. For the mile, the depth ranges from 2.6 to 5.4 feet.

29th mile.—Gravel Shoal.—At 870 feet is a gravel shoal, with a channel 2.2 to 3.3 feet in depth; length of shoal is 309 feet; fall, 0.49 of a foot. Thence 681 feet to a point 200 feet above Madison Bridge, the depth is 2.6 to 9 feet.

Madison Bridge.—Thence to the bridge the depth is 1.6 to 3.9 feet, and the bottom is rock. The distance from Danbury to Madison Bridge is 28.39 miles, and the fall is 149.72 feet, or an average fall of 5.27 feet per mile. The distance from Hairston's Ford to Madison Bridge is 14.94 miles, and the fall is 52.08 feet, or an average fall of 3.49 feet per mile.

MEMORANDA OF SURVEY OF THE DAN RIVER, FROM MADISON, NORTH CAROLINA, TO DANVILLE, VIRGINIA.

SECTION II.

Madison.—Madison is a thrifty town at the junction of Mayo and Dan Rivers; population, 300. Madison free bridge was taken as the initial point of this section.

1st mile.—Madison Bridge.—An open truss-bridge of wood, with trestle approach on the north side, resting on stone abutments raised to the high-water mark of flood of August, 1850. Length, 206 feet; 3 spans; height in clear above low-water, 28.2 feet; width, 14 feet. The channel is under the central span. For 1,000 feet below the bridge the water is shoal, the channel having filled with sand during late storms. Thence 1,256 feet the depth is 2.5 to 4 feet, and the fall 0.92 feet. Here a gravel shoal occurs.

Gravel Shoal.—Least depth in channel, 18 feet; length, 750 feet; fall, 0.38 foot.

Mayo River.—At 3,412 feet Mayo River comes in from the north; rising at the foot of the Blue Ridge, it takes its course through a rich farming country, and forms an excellent water-power in its course to the dam. For the remainder of the mile the required depth, $2\frac{1}{2}$ feet to 3 feet, is found.

2d mile.—Roberson's Fish-trap Shoal.—At 440 feet is Roberson's Fish-trap Shoal; the channel now used is between two old fish-dams and at one point is only 10 feet wide. The required depth is found for most of the distance over the shoal in the sluice, but only 2.2 feet is found at one point. Length, 580 feet; fall, 0.30 foot. Thence to Cross Rock Rapid, 1,456 feet, the depth is 3.8 to 5.8 feet, and the fall is 0.83 foot.

Cross Rock Rapid.—The rocks extend from the northern bank three-fourths the distance across the river; there are narrow passes between them, but the main channel is close to the right bank, and is 20 feet wide. A short wing from the rock throws the water towards the bank and swells it above. Length of rapid, 150 feet; depth, 3.9 feet; fall, 0.65. Thence 500 feet, to Slink Shoal, the depth is 2.5 to 4.2 feet.

Slink Shoal.—The channel or sluice is near the right bank, and is formed by low wing-dams, some of them broken down. The sluice is too narrow, being 8 feet at one point, 15 feet at two points, 20 feet at one point, and wider elsewhere. At two points the channel passes through the ledge, and is 8 and 15 feet wide. There is sufficient depth most of the distance. The ridges of rock lie nearly at right angles to the river's axis, and probably are not more than 6 to 8 feet in width. At the foot are two old fish-dams. The sluice is through the right wing of the right dam. Length, 1,074 feet; fall, 2.58 feet; depth, 1.7 feet.

Sand Bar.—Thence 950 feet is a sand-bar 100 feet long, shoaling the water to 2.3 feet. Thence to the end of the mile the depth is 2.6 to 3.5 feet. General width, 250 feet.

3d mile.—Ledge and old fish-dams.—No improvement required except at one point, 4,296 feet from beginning of mile; here a ledge crosses the river; 2.5 feet least depth; a considerable amount of stone (remains of old fish-dams) is scattered on the bottom. Depth for the mile, 2.5 to 4.8 feet; width, 220 feet.

4th mile.—At 530 feet is a gravel bar 150 feet in length; depth, 2.5 feet. Thence to Lone Island, 2,561 feet, the depth is 3 to 4 feet; width 230 feet. Total fall to Lone Island, 9.35 feet.

Lone Island.—The channel is to the right. Just below the head of the island a ledge shoals the water to 1.7 feet; thence to the foot of the island, running close to the right bank, the depth is sufficient. Here the channel crosses to the left bank of the river. At the foot of the island a deposit of sand and gravel shoals the water to 2.2 feet. The water runs swiftly to 400 feet below the island, where the rapid ends. Distance from head of island to foot of rapid, 1,450 feet; fall, 1.93 feet. The island is sandy and uncultivated, and very little water flows through the left channel. To the end of the mile the depth is sufficient. General width, 230 feet.

5th mile.—At 519 feet a gravel shoal occurs. There is a sluice through of sufficient width and depth to the "Three Islands," so called.

Three Islands.—The best channel is to the right of the largest island, along the right bank. From a point 75 feet above to a point 75 feet below the head of the island the bottom is rock, with projecting points. Width of sluice, 9 feet; depth on the rock, 2.5 feet. The water runs swiftly for a distance of 883 feet to the foot of the island; fall, 1.62 feet. Thence 785 feet the depth is sufficient.

Wing-dams.—At this point is a dam to swell the water on the ledge; sluice, 10 feet; depth, 2.2 feet. Thence 2,027 feet is another dam similar to the last; depth in the sluice, 3 feet. To the end of the mile the depth is 3 to 5 feet; width, 200 feet.

6th mile.—Old fish-dams.—At 337 feet are some old fish-dams. Sluice 20 feet wide; depth in sluice, 2.7 feet. Should any improvement be made, sufficient stone will probably be found in the old dams. For 300 feet below the dams sand has deposited, shoaling the water at one point to 2.3 feet. Thence to the end of the mile the depth is 3 to 5 feet; width, 210 feet.

7th mile.—Mulberry Island.—Good navigation to Mulberry Island Shoal, 3,758 feet. Both channels are used; the right one has been filled with sand by recent floods, shoaling the water to 1.9 feet. It is only 21 feet wide at the head of the island. To obtain the necessary width would require 100 cubic yards of excavation. There are overhanging trees the whole length of the channel which it would be necessary to remove. The left channel is close to the island, and near the foot is crooked and about 18 feet in width; 2.2 feet in depth. From the head to the foot of the island is 1,250 feet and the fall 1.38 feet. The mile ends at the head of the second island.

8th mile.—At the foot of Mulberry Island the channel crosses to the right bank.

Dam.—At 910 feet is a dam with sluice 9 feet wide. Depth in sluice, 2.8 feet. Thence to the end of the mile excellent navigation. Depth, 3.3 to 6 feet; width, 190 feet.

9th mile.—This mile ends at Settle's Bridge; excellent navigation the whole distance. Depth, 3.4 to 7 feet; width, 200 feet. Fall from foot of Mulberry Island, 3.23 feet; fall from Madison, 22.74 feet.

Settle's Bridge.—This is a covered bridge 16 feet wide, 304 feet long. Three spans trestle approach on north side. Height in clear above low-water, 30.58 feet. The channel is under the central span.

10th mile.—Dam.—At 500 feet is a dam-sluice 12 feet wide. Depth immediately above and below is sufficient; in the sluice, 1.7 feet. Fall from Settle's Bridge, 0.51 foot; 500 feet below this point is another dam with the same width of sluice; the depth is sufficient. There are no other obstructions to navigation in this mile. Depth, 3 to 5 feet; width, 210 feet.

11th mile.—To 2,525 feet the depth is 3 to 5 feet. Here the water begins to shoal above Eagle Falls.

Eagle Fall.—This fall is formed by a ledge rising in three ridges running from the right bank, at an angle of 75° with the axis of the river, to 50 feet from the left bank. The channel is on the left and is 35 to 40 feet wide, and 2.1 to 3 feet deep above the mill. A rude lock, 7.5 feet in width, forms the passage at the mill, below which the race is 25 feet wide for a distance of 100 feet, and wider below this point. The depth is from 2.4 to 4.7 feet. The water runs swiftly to the foot of the island below the mill.

The proper place for an improved channel is where that now in use is located. From the head of the shoal to the dam is 520 feet, and the fall is 0.23 foot; fall at the dam, 1.65 feet. From the dam to the foot of the island the distance is 770 feet, and the fall is 1.26 feet, making a total fall of 3.14 feet in 1,290 feet. To the end of the mile, the depth is 2.8 to 4.5 feet.

12th mile.—Very good navigation for the whole mile. Depth ranging from 2.5 to 6 feet. At 4,124 feet a ridge of rock crosses the river. The depth on the rock, at ordinary low water, is 2.5 feet. Total fall to this point, 29.22 feet.

13th mile.—To 995 feet Reese's Rock Shoal the navigation is excellent.

Reese's Rock Shoal.—The bottom is composed of rock. Generally the depth is sufficient. At 1,279 feet from the head of the shoal is a wing-dam. Width of sluice, 8 feet; depth, 2.4 feet; 1,000 feet further on a high point shoals the water to 2.3 feet. At the foot of the shoal is a wing-dam with a sluice 9 feet wide. Depth in sluice, 4.6 feet; length of shoal, 2,600 feet; fall, 2.82 feet. For the remainder of the mile good navigation.

14th mile.—For 1,481 feet to Galloway's Island, 3 to 4.5 feet in depth is found.

Galloway's Island.—The right channel is the better one. At the head of the island, for about 100 feet, a ledge shoals the water to 2.1 feet. The current is swift for 1,500 feet. Fall, 0.49. For the remainder of the mile the depth is 3 to 4.5 feet; width, 225 feet.

15th mile.—No obstructions for 3,740 feet to Galloway's Fish-Trap Shoal.

Galloway's Fish-Trap Shoal.—The dam is broken down. The sluice through the left wing is 12 feet wide. Depth in sluice, 2.2 feet. There is swift water for the remainder of the mile, 2.7 to 4 feet in depth.

16th mile.—Swift water continues. At 948 feet is a fish dam.

Dam.—The sluice is through the right wing, and is 12 feet wide and 2.5 feet deep. Gravel has deposited below the dam and shoals the water 1.7 feet. Swift water continues 400 feet further. Length of shoal, 2,898 feet; fall, 4.5 feet. To the end of the mile the depth is 3.3 feet to 4 feet; width, 230 feet. A short distance from the river on the left are the coal mines on the plantation of Grief Wade.

17th mile.—Gravel Bar at Hamblin's Island.—The only obstruction to navigation in this mile is a gravel bar, 400 feet in length, at Hamblin's Island. The best channel is on the right. Depth on the bar, 2 to 3 feet; fall, 0.30 foot.

Buffalo Creek, 4,100 feet from beginning of mile. Buffalo Creek comes in from the north. Depth in this mile, 3 to 5 feet; width, 250 feet.

18th mile.—Good navigation continues. Depth, 3 to 5 feet; width, 235 feet. The mile ends 1,500 feet below *Matrimony Creek*, which comes in from the north.

19th mile.—Good navigation for the mile. Depth, 3 to 6.5 feet; width, 220 feet. At 4,100 feet is Leaksville Landing. Total fall to this point, 46.22 feet.

Leaksville.—Leaksville is a thriving town of 700 inhabitants. The principal business is in tobacco. One mile from the Leaksville post-office, on Smith River, are the manufacturing establishments of J. Turner Morehead.

20th mile.—Leaksville Toll-Bridge.—At 1,167 feet is Leaksville Toll Bridge, which is a wooden lattice structure, covered, 273 feet in length, 13 feet wide, 2 spans, 29.9 feet in the clear above low-water. The channel is under the south span.

Dam and Bar.—A wing-dam, from the right bank, throws the water against the pier, which, with a parallel wall, extending 150 feet down the river, forms a channel 10 feet in width, and 2.9 feet deep; fall from Leaksville landing, 1.54 feet. Sand has accumulated below the dam, shoaling the water to 2.2 feet.

Wing-Dams.—At 2,810 feet and 2,892 feet, are wing-dams with sluices 10 feet wide; bottom is rock. Shoal water for 200 feet; least depth, 1.9 feet; fall from Leaksville Bridge to latter point, 0.58 foot.

Smith's River.—At 3,541 feet is Smith's River, which takes its rise at the foot of the Blue Ridge, in Patrick County, Virginia, and forms one of the finest water-powers the State affords. For the remainder of the mile there is good navigation.

21st mile.—Double Shoal.—To the head of Double Shoal, 3,339 feet, the water is deep, 4 to 16 feet; 440 feet below is a dam with the usual width of sluice; depth in sluice, 2 feet; rock bottom. For remainder of the mile the water is 2.8 to 8 feet in depth.

22d mile.—High Point.—At 220 feet is a high point of rock shoaling the water to 2.2 feet.

Wing.—At 1,200 feet is a wing running out from the left bank to meet the ledge, forming a sluice 10 feet in width; depth in sluice, 2.5 feet; fall from head of shoal to this point is 1.32 feet, and the distance is 3,142 feet. For the remainder of the mile a channel of sufficient depth and width is found by avoiding high points of rock.

23d mile.—Parallel Wall and Wing.—At 566 feet is a wall 200 feet long, ending in a wing, turning the water to the left bank. Depth in sluice, 2.5 to 3 feet; width, 60 feet; fall, from the head of the shoal, 5.33 feet; distance, 7,787 feet.

Dam.—At 1,358 feet is a dam with sluice 9 feet wide. Depth in sluice, 2.1 to 3 feet. This is the foot of Double Shoal. Length, 8,619 feet; fall, 5.85 feet. Thence 521 feet is Sauratown Ford Shoal.

Sauratown Ford Shoal.—At the foot of this shoal is a dam with sluice 9 feet wide. Length of shoal, 901 feet; depth 1.4 to 3.7 feet; fall 0.71 foot, gravel bottom; channel near the right bank. Thence to Indian Shoal, 2,377 feet; the depth is 4 to 8 feet.

24th mile.—Indian Shoal.—Current very strong; sluice towards the right. A wall runs from the foot about 300 feet up, bearing a little toward the left bank. A wing from the right bank at the foot makes a sluice about 20 feet wide. Rock bottom. Depth, 3.5 to 4 feet; length, 890 feet; fall, 0.64 foot. This is said by boatmen to be a difficult place to ascend in low water. At the time of examination the water was 2.3 feet high and the fall was distributed throughout the length of the shoal. Low water may concentrate the fall and change its appearance. Thence to the end of the mile the depth is 4 to 8 feet; width, 290 feet.

25th mile.—Dam.—The only exception to good navigation is at 3,508 feet, where a dam with sluice 9 feet wide is encountered. Depth in sluice, 3.9 feet.

26th mile.—Excellent navigation; depth, 4 to 8 feet; width, 280 feet.

27th mile.—Good navigation continues to 833 feet, to Wide-Mouth Shoal.

Wide-Mouth Shoal.—At the head is a dam with sluice 10 feet wide; depth, 3 feet. Another dam is found at the foot of the shoal with same width of sluice; depth, 2.3 feet; depth on the shoal, 2.9 to 10 feet; rock bottom; length, 3,135 feet; fall, 2.17 feet. Thence to the end of the mile the depth is 4 to 7 feet.

28th mile.—Cascade Creek.—This mile ends at Cascade Creek, which enters the Dan from the north, rising in Pittsylvania County, Virginia, and furnishing a good water power to saw and grist mills a short distance up from its entrance to the Dan River. Distance from Leaksville to Cascade Creek, 9.323 miles; fall, 19.41 feet; fall from Madison, 65.63 feet. Excellent navigation for the whole mile. Depth, 4 to 9 feet.

29th mile.—Good navigation continues to 2,035 feet to Devil's Jump Shoal.

Devil's Jump Shoal.—Above the shoal the channel is along the axis. At the head of the shoal it crosses to the left bank, which it follows through the shoal and then returns to the center. The channel between the rocks and the left bank is 50 to 60 feet wide; depth, 3.4 to 6 feet; length of shoal, 658 feet; fall, 0.37 foot. Thence to Tan-Yard Shoal, 1,640 feet, deep water is found.

Tan-Yard Shoal.—At 809 feet from the beginning of the shoal a line of rocks runs nearly across the river. The channel near the right bank is narrow (10 feet in width) and crooked, and the current swift.

30th mile.—Dams.—At the beginning of the mile is a wing-dam with the usual width of sluice; depth of sluice, 2.3 feet. At 876 feet is another dam of the same character. Thence 2,614 feet to the foot of the shoal the depth is 1.4 to 5 feet. At the foot of the shoal is another dam similar to those already noted. Length of shoal, 4,399 feet; fall, 5.28 feet; rock bottom. Thence to the end of the mile good navigation.

31st mile.—Beasley's Gallows Shoal.—At 506 feet is Beasley's Gallows Shoal. The channel near the left bank is sufficiently wide and deep. Length, 595 feet; fall, 0.60 foot. Thence 1,080 feet is a dam with sluice 12 feet wide; depth, 3.6 feet. Thence 2,576 feet to Hairston's Fish-Trap Shoal, there are no obstructions. The mile ends in the shoal.

32d mile.—Hairston's Fish-Trap Shoal.—The dam has been torn down. Depth on the shoal, 3.4 to 4 feet; length, 559 feet; fall, 0.42 foot. For remainder of the mile excellent navigation; depth, 5 to 9 feet; width, 300 feet. The mile ends 437 feet below Daniels' Ferry. Fall from Madison to Daniels' Ferry, 75.95 feet.

33d mile.—Excellent navigation; depth, 5 to 8 feet; width, 300 feet.

34th mile.—The only exception to good navigation is Cow Ford Shoal at 3,049 feet.

Cow Ford Shoal.—The bottom is composed of gravel and bowlders; channel, 13 feet wide; least depth, 1.8 feet; length, 689 feet; fall, 0.23 foot. Just below the shoal a sand-bar has formed during late storms, shoaling the water to 1.9 feet for a distance of 100 feet. This will probably be worn away by force of the current.

35th mile.—At 1,110 feet is Pruitt's Upper Shoal.

Pruitt's Upper Shoal.—The bottom is gravel and loose stones. The channel is 30 feet wide and 2.7 to 4 feet in depth; length, 657 feet; fall, 0.35 foot; 196 feet below is Pruitt's Lower Shoal.

Pruitt's Lower Shoal.—Here the channel crosses abruptly to the right bank. At the foot of the shoal is a dam with sluice 10 feet wide; depth in sluice, 2.4 feet; length of shoal, 631 feet; fall, 0.37 foot; rock bottom. Thence good navigation 2,231 feet to Ware's Shoal.

Ware's Shoal.—At the head of the shoal is a very rough, rocky place. The channel is near the right bank, and is only 10 feet wide through rocks and snags. Depth at this point, 3.1 to 7 feet.

36th mile.—At 1,017 feet are two wing-dams, with sluices, 10 and 16 feet wide; depth in sluices, 2 to 3 feet. Thence the channel crosses diagonally to the left bank. At 2,970 feet are two wings and a parallel wall along the left bank, forming a sluice 8 feet wide. Depth in sluice, 1.9 feet. At 3,339 feet is the foot of the shoal; length, 3,794 feet; fall, 4.35 feet. Thence to the end of the mile the depth is 5 to 9 feet, and the width 350 feet.

37th mile.—Little Island Ledge Rapid.—Deep water continues to Little Island Ledge Rapid, 3,791 feet. Length of rapid, 619 feet; fall, 0.50 foot; depth, 3.5 feet. At the end of the mile is Adams' Fish-Trap Shoal.

Adams' Fish-Trap Shoal.—The present passage is through a dam with sluice 10 feet wide. There are fish-dams on both sides and bowlders on the right. Length, 532 feet; depth, 3.6 feet; fall, 0.81 foot.

38th mile.—Adam's Island Shoal.—At 1,739 feet is Adam's Island Shoal. The main channel is on the left of the island. At 2,041 feet and 2,674 feet are dams with sluices 10 feet wide; depth in and between the dams, 2.8 to 3.5 feet. At the foot of the island a gravel deposit shoals the water to 1.9 feet. At 5,083 feet is Granney's Dam; a diagonal wing from the right bank and a right angle wing from the left bank on the ledge form a sluice 9 feet wide and 1.7 feet in depth. The channel above the dam is along the left bank, thence to the axis through the dam and returning to the left again.

39th mile.—At 603 feet is the foot of Adam's Island Shoal. Length, 4,144 feet; fall, 4.38 feet; depth, 1.7 feet. Thence 3,779 feet to Wolf Island Shoal, navigation is excellent.

Wolf Island Shoal.—Depth, 5 to 10 feet; width, 300 feet. To the end of the mile the depth is 2.4 to 3.5 feet on the shoal. At the end of the mile are some snags caught on the rock, which obstruct navigation.

40th mile.—At 1,790 feet is a dam with sluice 8 feet wide. Depth in sluice, 2.4 feet. The shoal ends at 2,610 feet. Length, 3,508 feet; fall, 2.76 feet; depth, 2.4 feet. Good navigation for remainder of the mile.

41st mile.—Butter Spring Shoal.—To Butter Spring Shoal, 1,813 feet, the depth is 4 to 7 feet. Thence 1,203 feet the channel is along the right bank, and the depth is 3 feet and upward. At this point a wing makes the sluice at the right bank 10 feet wide; depth in the sluice, 2 feet. Thence to the end of the shoal the required depth is found. Length, 2,420 feet; fall, 2.78 feet. To the end of the mile, good navigation.

42d mile.—Glass' Shoal.—At 692 feet is Glass' Shoal. At 1,396 feet a wing turns the water to the left bank, making the sluice 10 feet wide and 2.3 feet deep. Between this point and 2,153 feet are two wings turning the water away from the bank and forming, with the ledge, sluices 10 feet wide; depth, 2 to 3 feet. At 3,163 feet is another dam with the same width of sluice; depth, 3 feet. Between these dams the depth is 3.5 to 7 feet. For the remainder of the mile the depth is 3 to 7 feet on the rock.

43d mile.—At 343 feet is a dam similar to the last described. Depth in the sluice and for 300 feet below, 2 to 3 feet. Length of shoal, 6,228 feet; fall, 5.63 feet. Good navigation for the remainder of the mile, which ends at Wilson's Upper Ferry. Total fall to this point, 106.8 feet.

44th mile.—Long Shoal.—To the head of Long Shoal, 4,763 feet, the depth is 3 to 7 feet and the width 430 feet. Total fall, 107.52 feet. At the head of the shoal a ledge extends the full width of the river. The improved channel is a little to the left of the middle of the river. A short distance down is a wall bearing slightly to the right and extending several hundred feet; at the foot of which a wing forms a sluice 12 feet wide. The sluice is along the left side of the wall, and is 2.4 to 3.6 feet deep. This mile ends opposite the wall.

45th mile.—The improved channel bears to the right and at 608 feet is at the right bank and follows it for the remainder of the mile. At 1,405 feet are two wings to direct the water to the bank. The depth above these dams is 1.4 to 4 feet. Thence to 2,700 feet are several wings and narrow passes in the rock with depths ranging from 2.4 to 4 feet. At 4,280 feet is the beginning of Long Wall. A series of ledges running diagonally down and toward the wall act as wings. Depth in sluices, 1.9 to 2.4 feet. The mile ends 175 feet below the wall. In the latter part of the 44th mile, and to 1,400 feet of the 45th mile, there is a very good channel along the left bank. After passing the island it is necessary to cross nearly at a right angle to the river's axis to the deeper water on the right.

46th mile.—At 600 feet is Bull Sluice, a narrow, crooked, and swift pass, close to the ledge at the right bank. The sluices generally in this shoal are 8 to 14 feet in width. In the next 600 feet are several wings turning the water to the bank. Depth in the sluices, 2 to 3 feet. At 1,300 feet is Monkey Race, a wing turning the water away from the right bank. Here the channel crosses diagonally to the left bank, which it follows 500 feet, and then returns to the right bank at 2,730 feet. This point should be considered the foot of Long Shoal, as the general character of the river changes here and better water is found below. Length of shoal, 8,527 feet; fall, 18.73 feet. Thence 2,357 feet the depth is 2.8 to 5 feet. Here a wing-dam turns the channel to the right bank. Width of sluice, 25 feet; depth, 3 to 5 feet. Good depth for remainder of the mile.

47th mile.—Lynch's Shoal.—Very good navigation, 2,052 feet to Lynch's Shoal. Depth, 2.5 to 6 feet. The best channel is along the right bank for 700 feet, thence to the left bank, following this 800 feet, and then crossing again to the right. Length, 2,531 feet; fall, 2.53 feet; depth, 2.3 to 4 feet. For remainder of the mile, fair navigation; depth, 2.5 to 4 feet; width, 430 feet.