CHAPTER X.

THE MIRAMICHI DISTRICT

Features of the District - Extensive Carboniferous basin - Division O, Contract No. 16 - Division P, Contract No. 10 - Division Q, Contract No. 20 - Miramichi River Crossing - Deepwater Branch - Division R, Contract No. 21 - Division S, Contract No. 22 - Division T, Contract No. 23.

This District commences East of the River Nipissiguit. The line is remarkably straight, there being but a slight bend in the general direction, at the River Miramichi, calling for the introduction of some curves. The District has the greatest length of tangents; and the longest single tangents, on the whole Railway, one being continuous for a distance of thirty miles.

The following are the Divisions:

Division O - Contract No. 16	**18¾ Miles long.**
Division P - Contract No. 10	**20 Miles long**
Division Q - Contract No. 20	**6 Miles long**
Division R - Contract No. 21	**25 Miles long**
Division S - Contract No. 22	**25 Miles long**
Division T - Contract No. 237	**22½ Miles long**
Total	**117¼ Miles long**

The first two divisions lie on the water-shed between the tributaries of the northwest Miramichi and those waters falling into the Bay Chaleur and the Gulf. The streams crossed are consequently small. The surface of the country is slightly undulating, and large tracts of flat boggy land and swamps are met. The land is wild, of a poor quality and generally covered with dwarf spruce; a growth which has sprung up since the great Miramichi fire, which devastated so much of the Province fifty years ago.

The River Miramichi lies in a low wide trough, and the approaches to it from both sides are through a somewhat broken country; the railway accordingly has a winding location in descending into the valley from the northerly side where it follows the slope of the deep, crooked, steep-sided valley of a tributary.

After crossing the Miramichi and ascending the southerly slope of the valley, the railway enters on another water-shed dividing the numerous rivers Kouchibouguac Richibucto, Buctouche, &c., falling into the Gulf, from Salmon river and the Washademoak, tributaries of the River St. John. The land is undulating, but the ridges are higher and the earthworks heavier than on the western portion. The soil somewhat improves, but the country is wild, though important settlements are not far distant.

This District spans a remarkable carboniferous basin, forming as it does one of the most conspicuous geological features of New Brunswick. Bathurst is at one side of the basin, while Moncton is at the other, and it extends far into the interior of the country. With the exception of a narrow fringe of lower carboniferous rocks, the strata within this extensive area belong to the middle coal formation and consist chiefly of greyish sandstone and shales in horizontal strata. Only a few thin seams of coal have yet been found.

On the south side of the Bay Chaleur, two coal seam, of only six and eight inches respectively, crop out; another, about two feet in thickness, occurs at Grand Lake, some distance to the west of the railway. Other seams have been reported, and there are reasonable grounds for supposing that "boring" to a considerable depth near the middle of the basin would develop workable beds of coal, near the line of railway.

Near Bathurst a stratum of shale contains nodules of vitreous sulphide of copper. An attempt to work this deposit has been made.

Southwesterly from Moncton, near Hillsborough, the remarkable mineral "Albertite," so valuable for gas making, is found and profitably worked.

Although the railway runs along a succession of water-sheds, the country is not in any place very elevated, the highest point being 514 feet above the sea.

The District ends at Moncton, the "Bend of the Petitcodiac." Here the railway between Saint John and Shediac is met, and at this place large workshops and offices have been erected.

The District Engineer, until the railway was transferred to the Department of Public Works, was Mr. Alex. L. Light. Previous to 1869, Mr. W. H. Tremaine had charge of the surveys.

DIVISION O.
CONTRACT NO. 16.

This Division has a course mainly due south, there is only one curve on the line, about 1,600 feet long and of long radius. The work throughout was light, and the grades in general are easy; some, however, rise 1 in 100, but the longest is only 1½ miles long. They generally rise towards the south; those descending towards the south have a total fall of 72 feet, and those ascending, have a total rise of 484 feet; the greatest difference of level between any two points being 412 feet; this difference being at the extreme ends.

The line being on or near the water-shed, the culverts and bridges are neither large nor numerous. The number, however, which would have been required, was considerably reduced by extensive ditching along the line of railway, the ground being peculiarly suitable for this work. There are, however, several large open culverts of wide span, to permit the passage of the large flow of water accumulated by the drainage works.

The only bridge on the division has three spans of 40 feet each over the Red Pine Brook. The valley over which this bridge is built is about 36 feet deep, below formation level; but the abutments, on the side of the valley, are only about 25 feet high. The foundation is a shaly rock; the masonry is of granite, in massive blocks. Plate No. 23 shows this structure in process of construction.

The work was let, in May, 1870, to Messrs. King & Gough for $206,000, to be completed on the 1st July, 1872. During the construction of the work, the contractors and their sureties got into difficulties, and the conduct of the work devolved upon Mr. Gough alone. In March, 1874, a considerable quantity of work remaining to be executed, it was completed by the Government.

The line runs, throughout, over wild land. The length is 18½ miles; the average quantity of excavation, 18,600 cubic yards per mile, and of masonry 172 cubic yards.

The Resident Engineer was Mr. James W. Fitzgerald.

DIVISION P.
CONTRACT NO. 10.

This Division is straight for the first 8 miles; nine curves are met on the succeeding part of the line; the last is nearly three-fifths of a mile long, and extends nearly ninety degrees of a circle.

The greatest difference of level between any two points on the division is that between the extreme ends, the northern part being 366 feet higher than the southern. The grades on the whole division are rather steep, several being at the limit of 1 in 100, one being 3_ miles long.

The cuttings and embankments are heavy. Three cuttings had 187,000 cubic yards of earth, and 65,000 cubic yards of rock. One embankment has 185,000 cubic yards; another, only 450 feet long, has 71,000 cubic yards; three cuttings have an aggregate of 200,000 cubic yards.

Part of the southern end of the Division is on difficult ground, on the side of a deep valley; but, in general, although the country is in some places hilly in the direction of the line of railway, it is seldom so transversely.

The line being near a water-shed, there are very few important streams. Consequently, the culverts are generally small; many, however, are long. The only bridge is over the river Bartibogue, having one span 80 feet wide, and about 30 feet high from the foundation.

The rock formations on this section are sandstone of good quality. Many of the culverts are under heavy embankments, and display excellent examples of masonry of the class shown by Figure No. 34.

The work was let, near the end of 1869, to Messrs. McBean & Robinson for $362,083, to be completed on 1st July, 1871. Toward the end of 1870, however, when work to the extent of $30,850 had been done, the contract was annulled. A new contract was entered into with Mr. Duncan Macdonald, to finish the work by 1st July, 1872, for the sum of $365,920. It was completed on the 10th December, 1874.

The line generally passes through wild bush-land, of poor quality; the total length is 20 miles. The average quantity of excavation is about 47,500 cubic yards per mile, and of masonry 430 cubic yards.

The Resident Engineer was Mr. Walter M. Buck, who had been engaged on the Location Surveys in 1868-69.

DIVISION Q.
CONTRACT NO. 20

This Division, though only 6 miles long, was let for the highest amount of any division on the whole railway except Division E, but the mileage rate is two and one-half times that of Division E.

About three-eighths of the Division is on curves, but the curves are not of short radius. There are two grades of 1 per 100, of an aggregate length of 3½ miles; the rest of the line is nearly level.

The cuttings and embankments are comparatively light, the deepest cutting being 24 feet, and the highest embankment about 20 feet, except at two points, where the embankments enter the Miramichi River. There is scarcely any rock in the cuttings.

The culverts are very few and small. The principal work on the division is the crossing of the two Miramichi rivers, the bridges of which are specially described.*

The contract for all the work on the Division, except the superstructure of the bridges, was made in September, 1870, with Messrs. Brown, Brooks & Ryan, for the sum of $642,854, the work to be completed on the 1st July, 1873. Afterwards a change was made in the plans, by which the bridge over the North-west Miramichi was to be constructed with six spans, instead of five as originally intended, and the time was extended. For the additional span the contractors were to be paid the sum of $25,000. The work was finished at the close of the year, 1875, by the original contractors.

The average quantity of excavation is about 47,500 cubic yards per mile, and of masonry, independent of the Miramichi bridges, 157 cubic yards. The bridges contain 11,082 cubic yards of masonry.

The Resident Engineer was Mr. W. B. Smellie.

NEWCASTLE BRANCH.

About a mile towards the west from the crossing of the North-west Miramichi, a branch leaves the main line and extends to deep water in the Miramichi Harbour, at the town of Newcastle. Its general course is easterly; its length 1¾ miles.

The line is almost straight for its whole length, and its maximum grade is 63 feet in a mile. At the point where the branch ends, the Government purchased the property including a wharf. This wharf has been extended a short distance into the river, and now forms a convenient landing for sea-going vessels. The rails are laid to the wharf, and extensive accommodation is afforded for shipping.

The work, including grading, ballasting, tracklaying, wharf extension, and station accommodation, was constructed in 1872, under contract with Mr. George Perkins, at a cost of $25,123.

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DIVISION R.

CONTRACT No. 21.

On this Division, 25 miles long, there are but six curves, the aggregate length of which is less than two miles. The last five miles of the Division are straight. One curve 500 yards long has a radius of half a mile; the other curves are easy.

The grades in general are light, there being but four which have an ascent of 1 per 100. Each of these is about one mile long. The greatest difference of level between any two points is 256 feet, these points being 16 miles apart.

There are but two places where the cuttings and embankments are heavy; the first is between the 11th and 15th miles, where the cuttings amount to 64,000 cubic yards of rock

and 50,000 cubic yards of clay, and the embankments to 279,000 cubic yards. There is also a river diversion with 7,000 cubic yards of rock and 8,000 cubic yards of clay. The second is between the 19th and 21st miles where two cuttings amount to 26,000 cubic yards of rock, and 33,000 cubic yards of clay; and a river diversion at the same place, where 7,000 cubic yards of rock and 3,000 cubic yards of clay have been excavated. The embankment between the two cuttings contains 150,000 cubic yards.

The masonry is light; there are but three bridges, each with a single span; one 100 feet wide, the other two being 80 feet. The foundations of the latter are on rock, attained at a depth of a few feet below the beds of the rivers; that of the first is hard clay at a depth of about 20 feet below the surface of the adjoining ground. The river had to be diverted for this bridge, the bottom at the original crossing being a mixture of quicksand and clay. The diversion is about 10 feet deep, made through gravel.

The three bridges referred to are over the Barnaby river and one of its branches; the course of the river is very winding, and crosses the railway at two points besides those just mentioned. At the first a tunnel about 115 feet long, and an open cutting at each end has been constructed through solid rock for the passage of the river. The total length of open cutting and tunnel is about 700 feet, the width is 20 feet, and the height of the tunnel is 20 feet: the rock being solid it was not necessary to line the tunnel. A culvert to perform the duty of this tunnel would have been under 40 feet of embankment, about 140 feet long, and would have greatly exceeded the tunnel in cost. This tunnel is shown in Plate No. 24.

At the last crossing of the Barnaby river there is an arch culvert 16 feet wide, built on rock in the line of a diversion, about 1,000 feet long. The diversion is 4 feet deep, in rock throughout its length, and the rock is so solid, that where the culvert is built, the abutments stand on top of the rock and not on the level of the bottom of the diversion.

Another large structure is a segmental arch over the Kouchibouguac river. It is built under an embankment 60 feet high, and is consequently nearly 200 feet long. There are no abutments of masonry, the river is diverted into a rock channel, and the arch 30 feet wide, springs off the sandstone rock. Figure No. 35 is from a photograph of the arch before the heavy embankment was carried over it.

Near the 22nd mile on the Division, there is a large bog, part of which was wet. The railway has a low embankment about 5 feet high over it. Where the bog was moist, a layer of trees was placed to receive the embankment: the bog sank two or three feet under the superincumbent weight, but the surface remained intact: the ground outside the railway line was in no way disturbed. The embankment is now quite firm.

Near the 10th mile, the railway is carried across a shallow lake, the water having been drained by long and wide side ditches. Near the same place the railway is formed over high bog, on a platform of trees; the bog sank a little, but the work is firm.

The work was let to Mr. Patrick Purcell in 1870, to be completed on 1st July, 1872; the work was finished in November 1874.

Nearly all this Division is wild land, much of it marshy and boggy; there are several settlements on good land near to the Kouchibouguac and Barnaby rivers. The valley of the Barnaby river, from the railway to the Miramichi, contains some excellent land.

The length is 25 miles; the average quantity of excavation is about 32,000 cubic

yards per mile, and of masonry 269 cubic yards.

The Resident Engineer was Mr. F. J. Lynch.

At 700 yards from the beginning of the division, a branch, about 9 miles long, runs to the town and Port of Chatham, on the east side of the Miramichi. It is under construction by a private company, and almost complete.

DIVISION S.
CONTRACT NO. 22.

With the exception of a curve 1,700 feet in length; the railway is carried on tangents 30½ miles in length, extending 8 miles into the adjoining Division.

The grades are easy; a few rise 1 in 100, only one extending somewhat less than 1½ miles. The difference of level between the highest and lowest points, is 171 feet in a distance of 7½ miles.

The cuttings and embankments are light. An embankment at the river Kouchibouguac, near the beginning of the Division, contains about 40,000 cubic yards; another at the river Richibucto, about the middle of the Division, contains 105,000 cubic yards; and another 67,000 cubic yards. Two cuttings, one on each side of the river Richibucto, held about 14,000 cubic yards of rock and 56,000 cubic yards of clay. Another held 17,000 cubic yards of rock and 23,000 cubic yards of clay. Additional borrowing was, however, required for the embankments.

There are seven bridges, four with one span each; one of 80 feet, another of 30 feet, and two of 24 feet. Of the three larger bridges, one has three spans of 50 feet, and the other two, have each three spans of 40 feet.

The streams at the two last bridges are very rapid, in consequence of which, extensive protection works were provided. The masonry throughout is built of sandstone.

At the bridges last referred to, over the North and South Coal branch rivers, coal and bituminous shale have been found.

The work was let in December, 1870, to Messrs. C. Cummings & Company, to be completed by 1st July, 1872, for $331,000. At the end of the latter year, the work, being not more than one-half done, was taken out of the hands of the contractors, and completed by the Government in the Spring of 1875.

All this Division is in wild forest land. Its length is 25 miles. The average quantity of excavation is about 29,100 cubic yards per mile, and of masonry 270 cubic yards.

The Resident Engineer was Mr. W. J. Croasdale, who was succeeded by Mr. Charles Blackwell.

DIVISION T.
CONTRACT NO. 23.

This Division is almost straight; there are but four curves of ample radius. The difference of level between the highest and lowest points is 300 feet; the grades are generally steep, most of them ranging between 0.75 in 100 and 1 in 100, there being seven subordinate summits.

The cuttings and embankments are generally light; one embankment, however,

contains about 75,000 cubic yards. The adjoining cutting amounted to 60,000 cubic yards, in part rock.

Some trouble was experienced from one of the embankments having slipped. About 60,000 cubic yards of material were brought by train to make good the deficiency.

There are two extensive wet bogs, but the road has been successfully formed across them. A layer of whole trees with their branches was placed in the direction of the line of the railway; and another layer transversely, the butts being at the outer sides of the railway line. The embankment was then formed and stands well.

The masonry is light; the culverts are nearly all small, and there is only one bridge, over the North river. It has a span of 50 feet on a rock foundation.

The work was let in December, 1870, to Messrs. Sutherland, Grant & Company, for $276,750, to be completed by 1st July, 1872. It was eventually taken out of the hands of the contractors and finished by days' labour, by the Government, early in 1875.

The first engineer in charge of this division was Mr. Collingwood Schreiber. In 1871, Mr. Charles Blackwell was appointed.

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