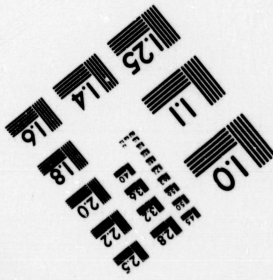
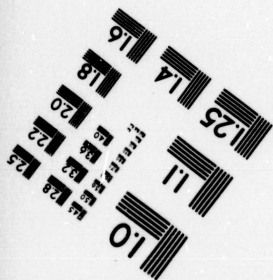
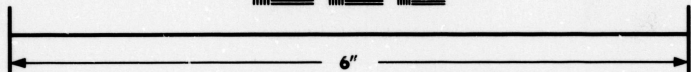
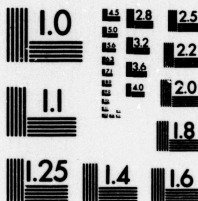


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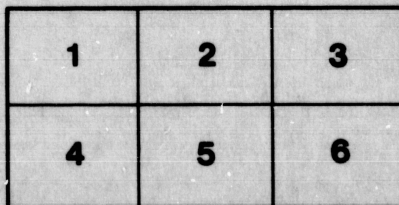
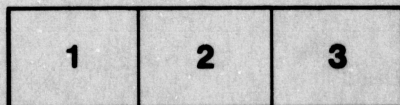
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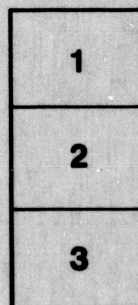
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THE
Cumberland Coal Fields,
NOVA-SCOTIA.

REPORT

OF

J. CAMPBELL,
(PRACTICAL GEOLOGIST,)

ON THE

COALS OF THE SOUTH SHORE OF CHIGNECTO CHANNEL, OR (JOGGINS COAL.)

—
OCTOBER, 1871.
—

TO THE PROPRIETORS AND OTHERS

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REPORT.

THE Coal Property, to which public attention is sought to be drawn by this report, is situated in the Western portion of the Cumberland Coal field, in the Province of Nova Scotia, on the Joggins Shore, so called. It is bounded northwardly by an area of four square miles owned by the General Mining Association of London, G. B., on which they opened a Mine about twenty years ago, and kept it in operation more or less ever since. The Coal is extracted in this Mine by two Shafts worked by Horse Gins, and conveyed to the loading pier by a Railway incline, about six hundred yards in length.

The quantity of Coal shipped in 1851, the first year, was about 2400 chaldrons; in 1864, it had risen to 6053; and in 1866 to 8478,—it was exported principally to the city of St. John, New Brunswick. The parties working this Mine at present will probably ship this season about 16,000 chaldrons, and they contemplate extending their works by sinking Shafts farther to the dip, or close to the northern line of the area on which I am now reporting. The geographical position of this part of the Cumberland Coal-field presents advantages that cannot fail to prove of immense value to any company that may undertake to operate here on a large scale, and have to compete in the market with those operating in the eastern Coal-fields of the Province, or

even with those operating in the eastern portions of this Coal-field. Both the Pictou and Cape Breton Coal-fields are over two hundred and fifty miles farther away from the United States markets than Mines opened on the South shore of the Bay of Fundy will be. This area of four square miles adjoining the General Mining Association's property to the South and to the dip of the Coal is the best, and I may say the only mining area on the Bay shore, now available; for the Coal under-lying the land to the southward of it is at too great a depth from the surface—being no less than four thousand feet at the shallowest part—and descending at the bottom of the trough, or synclinal, to a depth of five or six thousand feet over the upper seam or main seam; there will therefore be no chance for competition on the Bay shore, except by those operating on the adjoining area to the North, *now* in successful operation. Along with the advantage of being so much nearer to the principal markets than the Pictou and Cape Breton Mines, there will be the great advantage of being able, at all seasons of the year, to send the Coal to the markets of the United States and the West Indies; for the navigation of the Bay of Fundy is open during the whole year; and its harbours, are very seldom, if ever, obstructed to any extent by ice, on account of its extraordinary high tides, which have a rise and fall of fifty and seventy feet. This keeps the harbours free from ice during the severest winters, particularly those that have no large stream of fresh water falling into them to fill them at times with drift ice. It is no small boon to a Company to have access to the principal markets with their Coal during two and sometimes three months, while all other operators are shut out from them. This advantage alone will be enough to ensure complete success to any parties who may undertake to work the Bay Shore Coals.

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Along with the advantages that must result from being thus accessible to shipping at all seasons of the year, the Bay Shore Mines, as before stated, have a much shorter distance to send their Coals to the United States markets. These advantages give value to every chaldron of Coal that will be sent from these Mines equal to one dollar at least over Pictou and Cape Breton Mines ; or even the Mines of Pennsylvania.

When the Canal between the Gulf of St. Lawrence and Bay of Fundy is constructed, as now contemplated by the Dominion Government, the Coal can be sent to the Gulf ports, and to Quebec, and Montreal ; and it is probable that large quantities will be required by steamers passing through the Canal, for they will have to pass quite close to the Shipping Piers of the Bay Shore collieries.

On reference to the plan attached to this report, it will be seen that the J. Campbell area (or area No. 30 on the official maps) is bounded westwardly by Chignecto Channel, Bay Fundy, and eastwardly by area No. 31, of A. Campbell ; and that the workable beds of Coal under-lying both areas have their outcrops on the area of the General Mining Association, along which they run obliquely on a course about S. 60 ° , E., while the course of the side lines of the area is S. 73 ° , 30, E. In consequence of this, the outcrop of the main seam comes very close to, if it does not cut across, the north-east angle of area No. 30 ; and enters the area No. 31, or the A. Campbell area, at its north-west angle—should no faults occur throwing it farther to the north-ward. The distance between the outcrop of this bed and the northwest angle of area No. 30, or the J. Campbell area, is about 45 chains. At

this point the main seam is about 990 feet below the surface ; and at a point on the Shore 20 chains South of this the main Coal may be reached at a depth of 1287 feet. This would be the most desirable site for the works, because the shafts would be quite close to the Shipping Pier ; and, with the exception of a few yards, no Railway would be required ; and the grip that would be got on the Coal above the underdrainage level would be about 1280 acres.

But should the point at which the proposed shafts, No. 1 and No. 2, marked on the line of the vertical section on the plan, be chosen, the Coal can be reached in No. 1, at a depth of 660 feet (this is ten chains from the north line of the property) and at No. 2, which is twenty chains from it, a shaft not exceeding 924 feet in depth will reach it. In shaft No. 1, over two millions of cubic yards of Coal, in the main seam, will be above water level ; and a shaft at No. 2, would give over four millions of cubic yards above its drainage level. Between this point and the north-east angle of the area, the main Coal may be reached at any depth that may be deemed most desirable, even to a slope in the Coal itself, near the rear line of the lot.

The quantity of Coal contained in the main seam underlying area No. 30, is over twenty-five millions of cubic yards, though it should not average over six feet in thickness. After making all the usual allowance for pillarage and other necessary wastes, the area of four square miles will yield over fifteen millions of tons of Coal fit for the market from the main seam, and about half that quantity from the Queen seam which lies at a depth of 79 or 80 feet below it, or over twenty millions of tons from the two highest

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beds. And should the lowest bed marked on the vertical section and plan be included, the area would give about thirty millions of tons suitable for the market; but the Mount Scrabble seam must be regarded as lying at too great a depth, being 1139 feet below the main seam.

The strata, as exposed in section along the Bay shore, are seen to dip to the south-west, or ranging from S. 25°, W. to S. 30°, W., at an angle of 19 degrees. In the division of it containing the principal Coals, the direction of the dip is indicated on the plan by the arrows on the main and Scrabble seam out-crops. D and B mark the surface line of the vertical section; D and T mark the deepest Coal ^{at} Mount Scrabble seam.

Dr. J. W. Dawson in his *Acadian Geology*, last edition, at page 218—speaking of this coal says, “The principal deposit of this mineral now worked in Cumberland county is the Joggins main seam consisting of two beds three feet six inches and one foot six inches thick with a clay parting between, varying from one foot to a few inches which has been found to thin out as the coal is mined to the eastward.” This clay parting will extend but a short distance to the dip, for its composition, which is arenaceous, indicates clearly that it resulted from local drainage of neighbouring highland, while the Coal was forming; and that it was confined to a narrow border along the margin of the Coal forming swamp. “The Coal is a free burning bituminous variety of fair quality. Taking into account the comparative thickness of the seams, and facilities for extraction and shipment, there can be no doubt that the bed at present worked is the best in the section.”

On page 221 of the same work we find the following assay which show the good qualities of the Coal; although the samples analyzed were obtained from mere out-crops; for no Coal has as yet been mined from this bed below high-tide level, and cannot therefore be regarded as a fair test of the quality of the Coal that this bed will yield when mined at a sufficient depth and from under a sufficient amount of pressure.

Assay of Joggins Coal from the main seam :

Moisture.....	2.50
Volatile combustile matter.....	36.30
Fixed Carbon.....	56.00
Reddish Gray Ashes.....	5.20
	<hr/>
	100

The above assay shows that the Joggins Coal much resembles that of Sydney, Cape Breton, of which the following assay has been made by the same author.

Assay of Sydney Coal :

Volatile Matter.....	26.93
Fixed Carbon.....	67.57
Ashes	5.50
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Assay of Pictou Coal—Drummond Pit.—E. Hartley :

Moisture and Sulphur	0.246
Volatile Matter.....	31.694
Fixed Carbon.....	60.320
Ashes	7.560
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Assay of Coal from Foard Pit, Albion Mines, Pictou—

E. Hartley :

Moisture.....	1.48
Volatile Matter	24.28
Fixed Carbon.....	66.50
Ashes.....	7.74

 100

The last two assays made by Mr. Hartley will be found in Sir W. E. Logan's Report of Progress in 1866 to 1869, Canada Geological Survey. The samples were obtained from the Foard Pit at a depth of 874 feet, and from the Drummond Pit at the Intercolonial Coal Company's Works—the best Coals in the Pictou Coal field, as may be seen on reference to Mr. Hartley's Report to Sir W. E. Logan.

Assay of Spring Hill Coal by Dr. J. W. Dawson :

Moisture.....	1.8
Volatile combustible matter.....	28.4
Fixed Carbon.....	56.6
Reddish Ashes.....	13.2

 100

Assay of Spring Hill Coal by Edward Hartley, F.G.S., Mining Engineer to the Canada Geological Survey :

	I.	II.	III.	IV.
Moisture.....	1.21	0.98	0.58	1.28
Volatile Matter...	33.08	35.52	33.27	35.66
Fixed Carbon...	61.49	59.42	63.85	58.53
Ashes white....	4.22	4.08	2.30	4.53
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	100.00	100.00	100.00	100.00
Coke.....	65.71	63.50	66.15	63.06

All these assays show that the Coal of the Joggins main seam is of fair quality, superior in some respects to the Pictou Coals, and very closely resembling the Sydney coal of Cape Breton ; and as for the last four assays made of samples of Spring Hill coals by Mr. Hartley, there is every reason for believing that the bed from which they were obtained is identical with the Joggins main seam. The Spring Hill Mine, at which Mr. Edward Hartley obtained the specimens No. 1, 2, 3 and 4, analyzed by him, lies about eighteen miles south-east from the Joggins Mine. And the depth of strata over-lying the Spring Hill main seam is found to be a few hundred feet in excess of the quantity found over-lying the Joggins main seam ; measured along the coast section to the Shoalie River, or the centre of the trough—4745 feet vertical is the depth here, and 5200 feet is the depth found to over-lie the Spring Hill main seam in two separate vertical sections measured across the basin ; being 455 feet more Rock over-lying the main Coal in the Spring Hill basin than is found in the Joggins Basin over-lying the Joggins main Coal.

The division of these Coal Fields into two separate basins is caused by a line of disturbance and fault running in a direction North-east and South-west obliquely across the trough or synclinal, subsequently in age to the deposition and consolidation of the coal measures, and therefore no evidence that the rocks of the Spring Hill District are of later age than those of the Joggins District.

The quantity and composition of the group of strata overlying the main coal, in both divisions of the field, may be regarded as sufficient to show that the group which contains the coal beds in both districts, is of the same age ; though all the coal bed

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worked in each may not be identical. This I regard as scarcely admitting of a doubt, and I have reason to believe that the bed known at both places as the Main Seam is identical; but I am not altogether sure of the identity of the underlying beds at the Spring Hill Mines with the workable beds underlying the Joggins Main Seam. The superior qualities of the Spring Hill Coal are due to the fact that the beds ~~of~~ ^{there} were brought from the very bottom of the trough by the line of upheaval which I will call the Spring Hill Anticlinal. This line of upheaval is of the same age as the one which separates the Joggins and Spring Hill Basins from each other. They are about seven miles apart and their courses are nearly parallel.

It is quite reasonable, therefore, to expect that the coal of the Joggins Main Seam will be found to improve greatly when mined well to the dip where it is under great pressure; such as would thoroughly protect it; and it is ^{beds} reasonable also to expect a large increase in the thickness of the ~~beds~~ as we advance towards the centre of the basin, which in this case lies in the direction of the dip of the Coal. There is abundant evidence to prove that the centre of the trough in which the Coal is now found was also the centre, or not far from the centre, of the area in which the Coal was deposited.

It is only in cases where a Coal field of great extent has been folded up into a succession of folds, and the beds thus brought up, are exposed by abrasion along a number of lines of upheaval that we find the Coal beds at their crops as good in all respects as they will be found to the dip, particularly in their thickness and freedom from partings of earthy matter.

The outcrops of Coal beds now found at the Joggins Shore, and along the northern edge of the trough to the eastward, consist of those portions of them that originally occupied the margin of the depressed area, or swamps in which they were formed. On this account they are more or less split at their outcrops by earthy partings resulting from the local drainage, and they are much thinner along their outcrops than they will be found farther to the dip, or towards the bottom of the trough.

There can be no doubt therefore that the Coal underlying the areas No. 30, and 31, will be found in good condition and of superior quality; and this fact when viewed in connection with the advantages of the location will be amply sufficient to ensure complete success to a mining operation conducted with ordinary prudence.

Respectfully submitted,

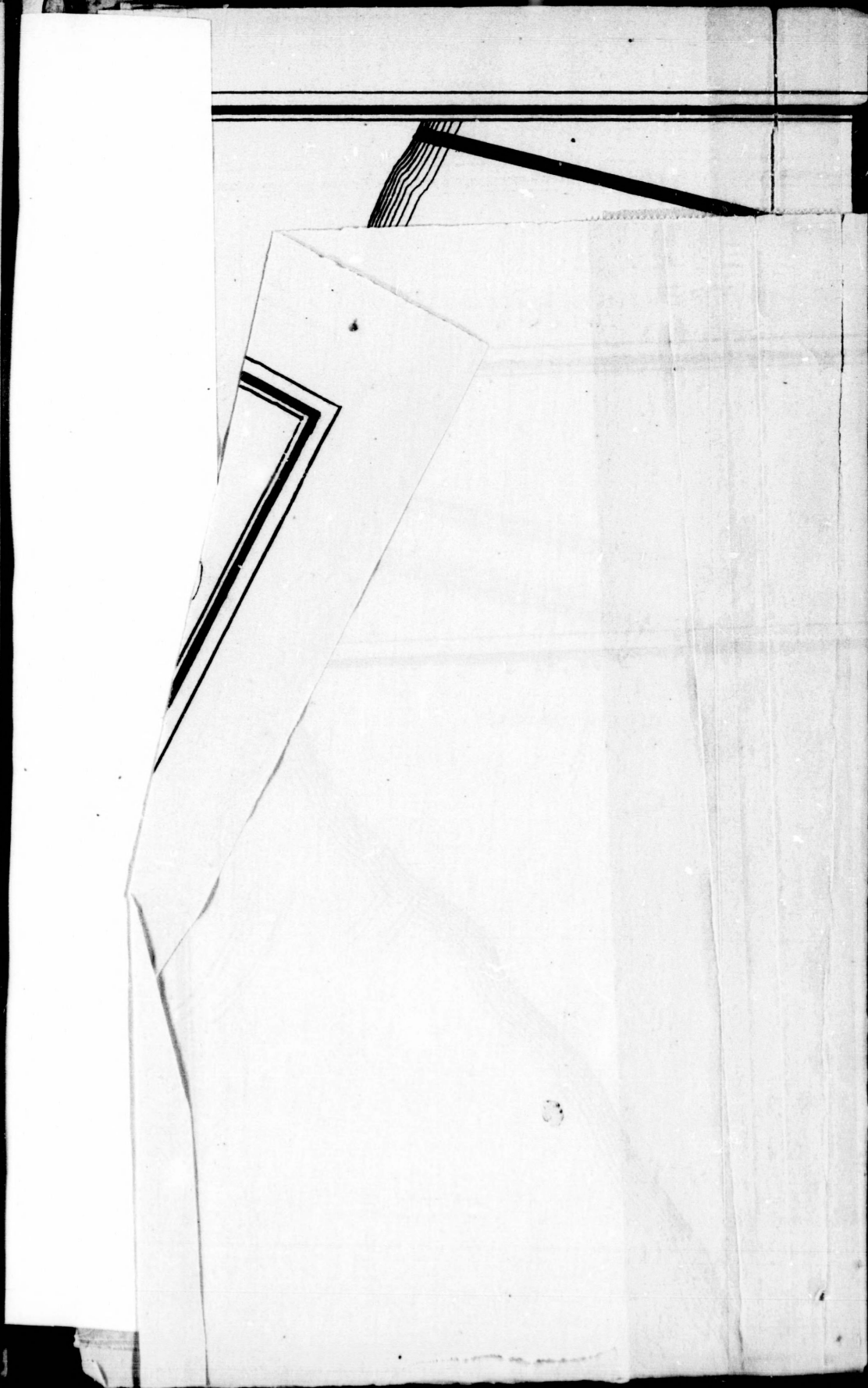
J. CAMPBELL,
Practical Geologist.

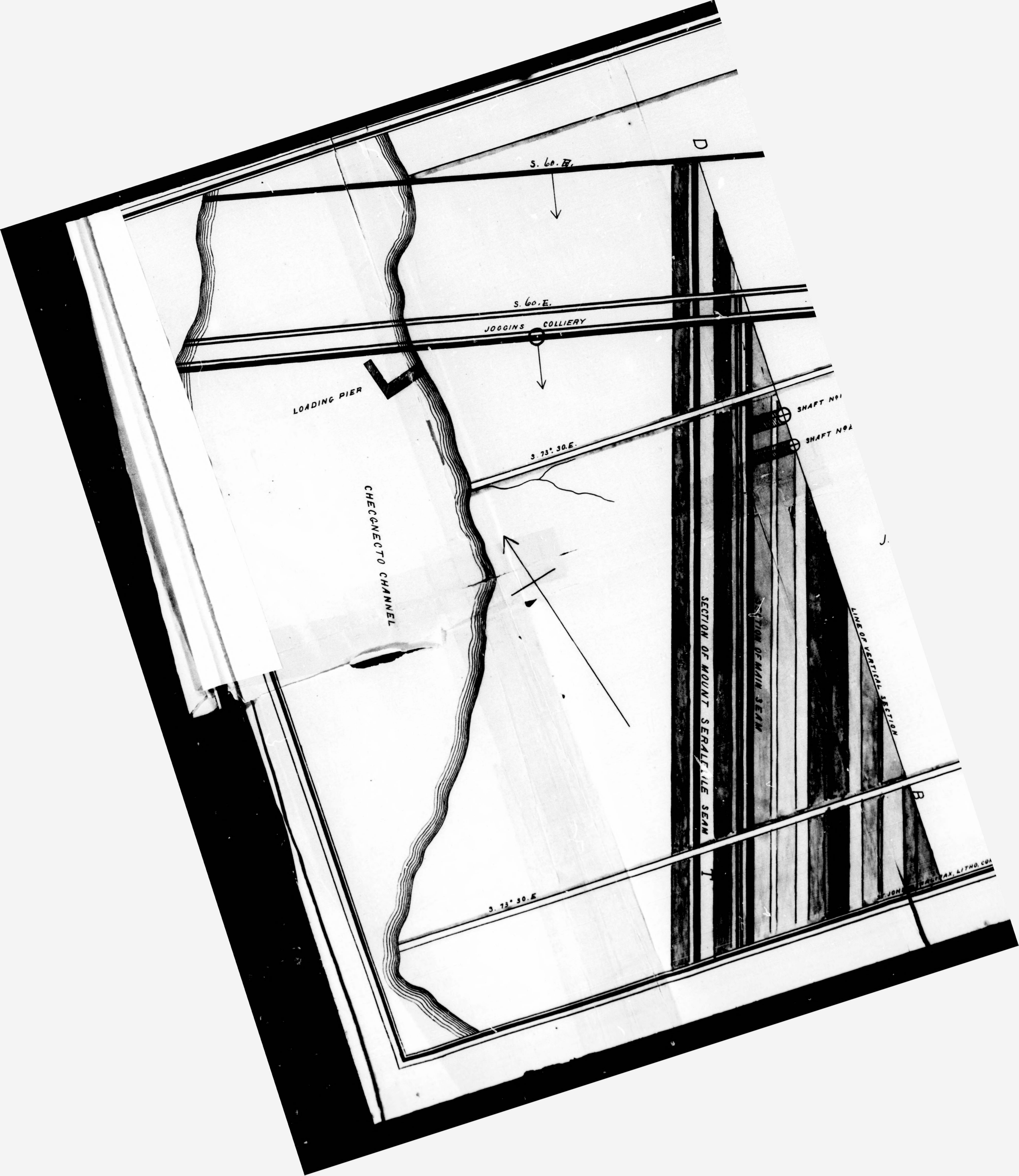
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MOUNT SERALELLE OUT CROP

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QUEEN SEAM OUT CROP

MAIN SEAM OUT CROP

SHAFT NO 1

SHAFT NO 2

J. CAMPBELL AREA.

A. CAMPBELL AREA.

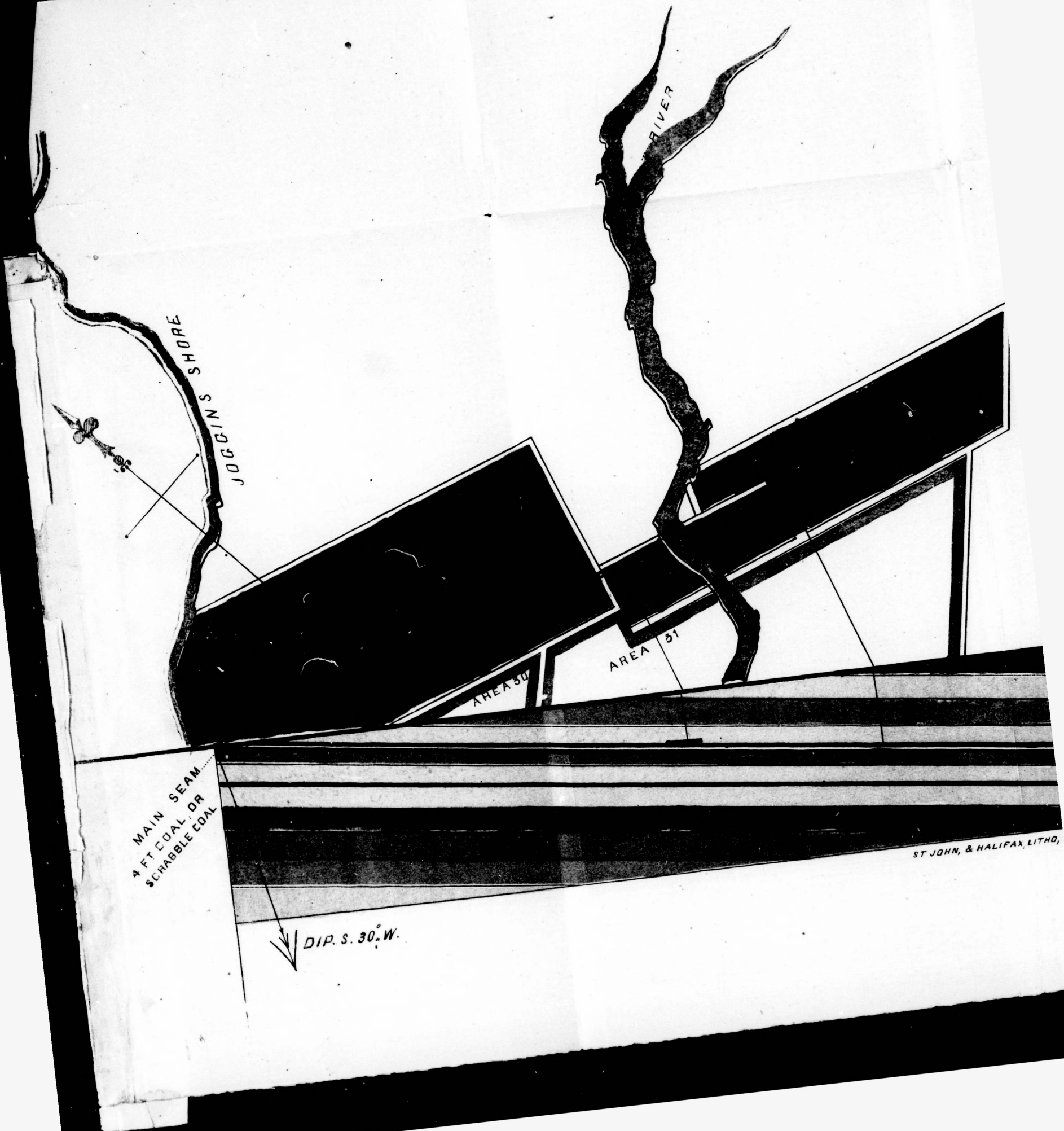
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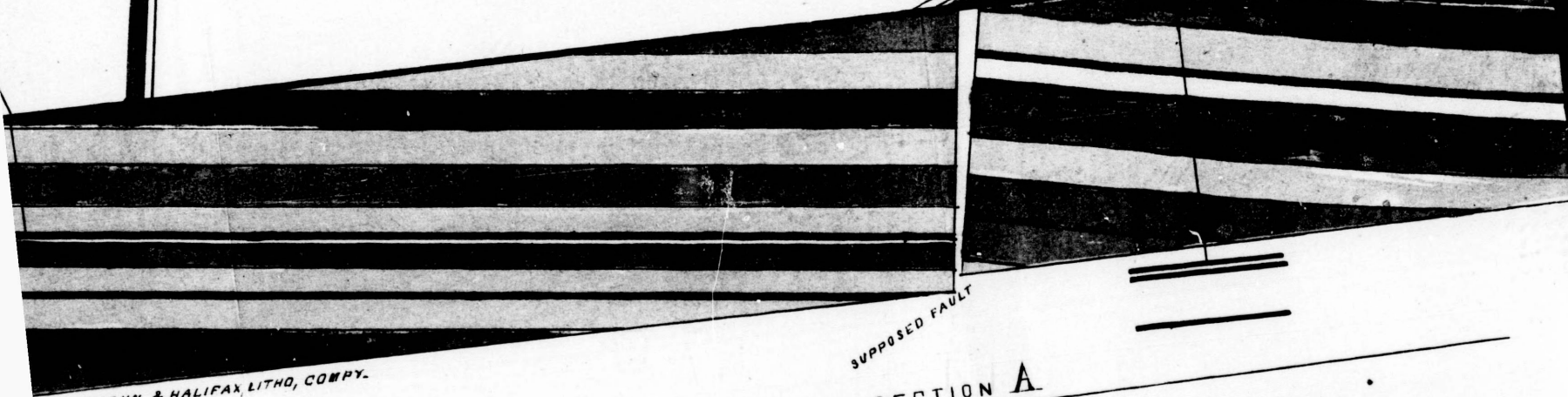
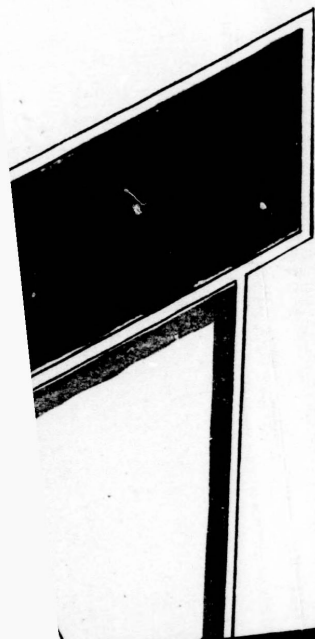
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MAIN SEAM SPRING H
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4 FT COAL



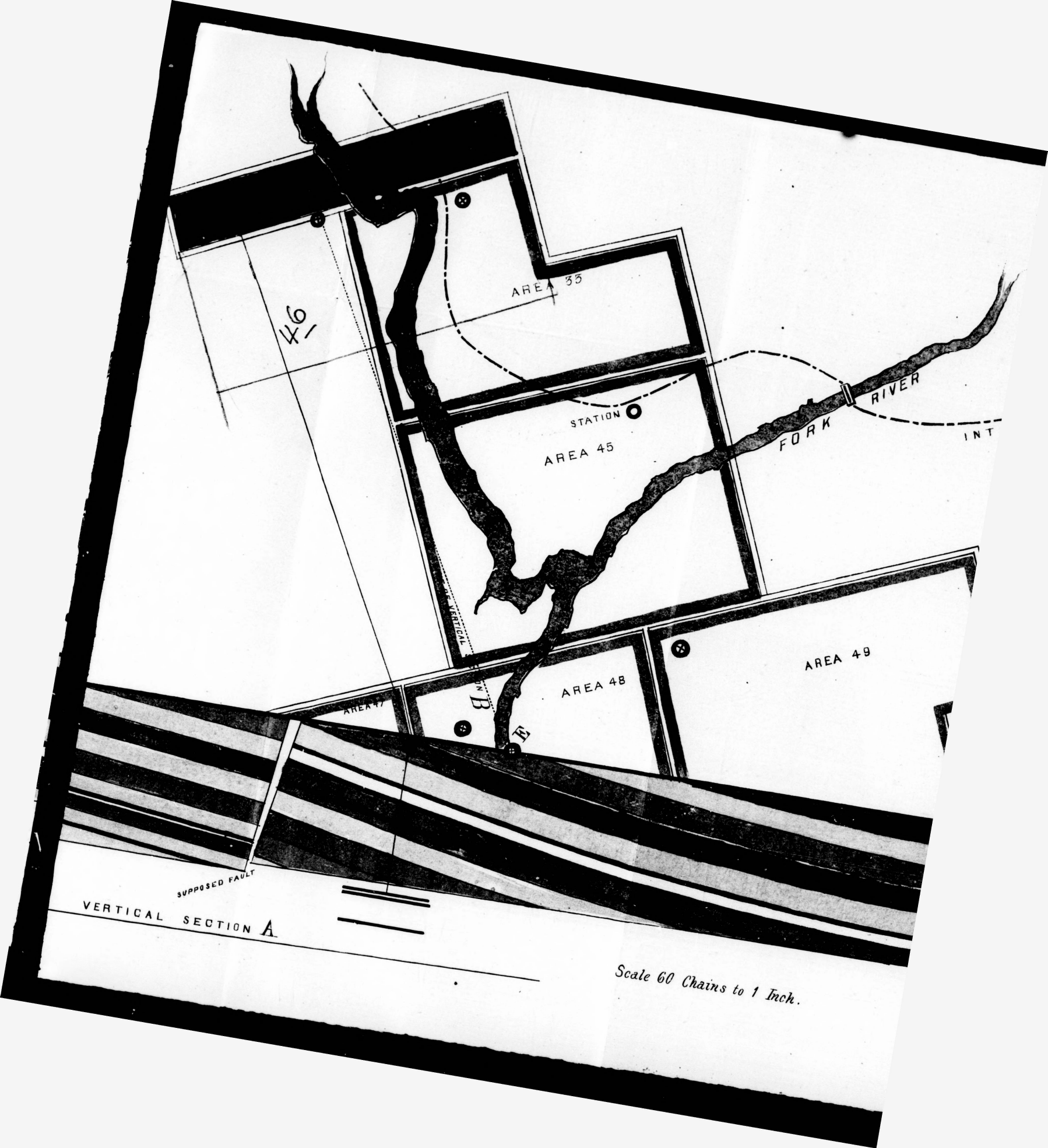
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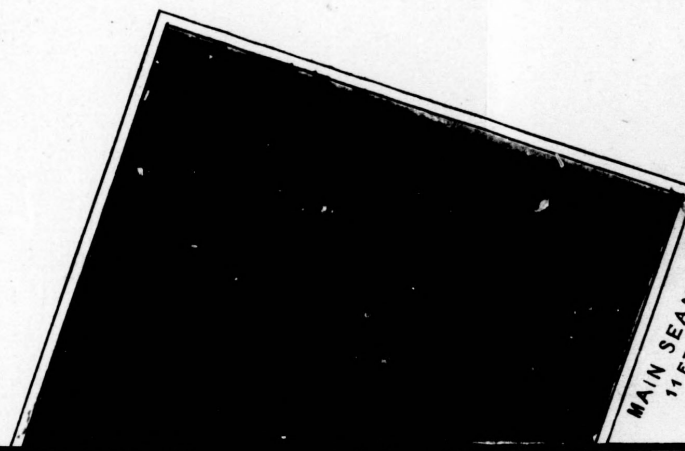
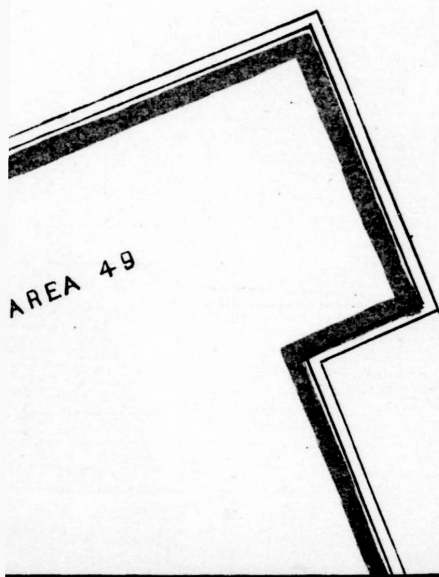
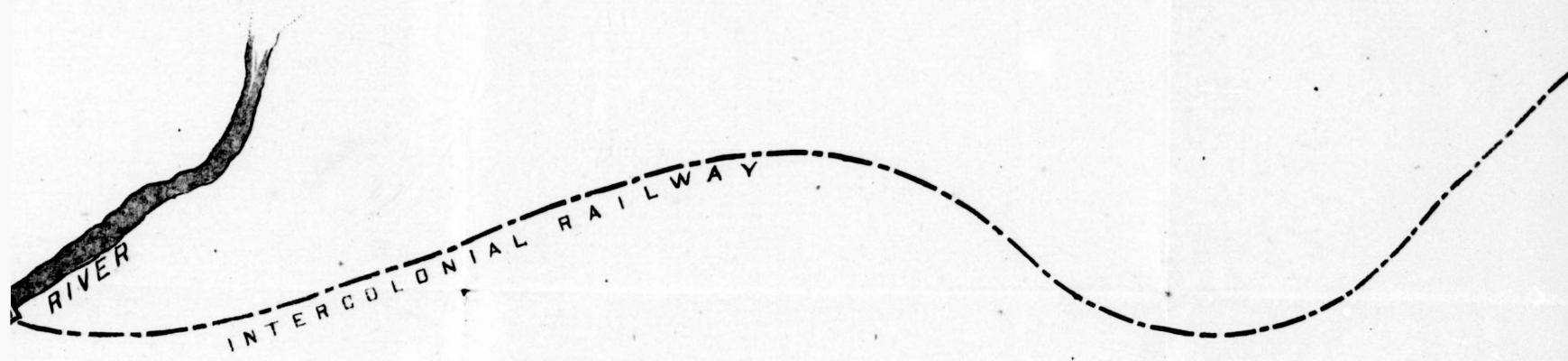


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VERTICAL SECTION A

SUPPOSED FAULT





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