OPEN FILE

FK- LAKE KATHLYN 40(1)A TELKWA

LAKE KATHLYN COAL AREA

G.S.G. MEMOIR 226, E.D. KINDLE 1940

Min. Report 1917
Pages 125-126

FK - LAKE KATHLYN 40(1)A

LAKE KATHLYN COAL [illegible]

This property consists of ten coal leases near Lake Kathlyn owned or controlled by Frank X. Frank. The showings of coal are on the lower slope of Hudson Bay mountain and distant about five miles from Smithers, the Grand Trunk Pacific divisional point. The nearest point on the railway is the flag station at Lake Kathlyn from this point a wagon road has been constructed to the camp, a distance of two miles, and the seams outcrop a few hundred feet above the camp. The property is nicely situated for economical working, but has not yet been developed to any great extent.

The formation exposed on this property is not the usual Skeena coal bearing formation of the Skeena and Bulkley valleys. The rocks in which the coal occurs are slates, argillites, and sandstone which is nearly changed to quartzite. These rocks are a portion of the Hazelton formation, which formation forms the greater part of Hudson Bay mountain. Regional metamorphism has affected these rocks to a considerable degree, so that now they are considerably altered from their original condition as sediments. Since their deposition these rocks have been twisted and tilted considerably, and in this section are standing at an angle of from 40 to 70 degrees.

The coal seams found in this formation are in part true coal and in part are bands of highly carbonaceous slate. The metamorphic action which has affected the rock formation as a whole is plainly shown in its effect on the bands of coal, which in places have been changed nearly into graphite. The coal seams are enclosed

usually in walls of slate, and as a rule show a band of coal in the centre, with alternating bands of slate and coal to the walls.

There are a number of seams exposed on the property which vary from 1 foot to 5 feet in thickness, but only a part of the seams consist of coal. The seams run up and down the mountain with a strike of S. 75° E. and dip at about 60 degrees to the north east. These coal seams look more like veins than ordinary seams of coal, as they stand up firmly and are enclosed in walls of fairly hard rock.

The first seam on which work has been done is at an elevation of 2,700 feet and is developed by a tunnel 40 feet long. This shows the seam to contain a width of 1 foot of coal and 2 feet graphitic material, and it is therefore of no commercial value.

One hundred feet above this a 50 foot tunnel has been driven on another parallel seam which shows from 2 to 4 feet of coal. Three samples were taken from this seam --No. 1 across 2½ feet at the face, excluding 4 inches of bone; No. 2 across 3½ feet, excluding 4 inches of bone; at a point 10 feet in from the mount of the tunnel; and No. 3 selected coal from the dump.

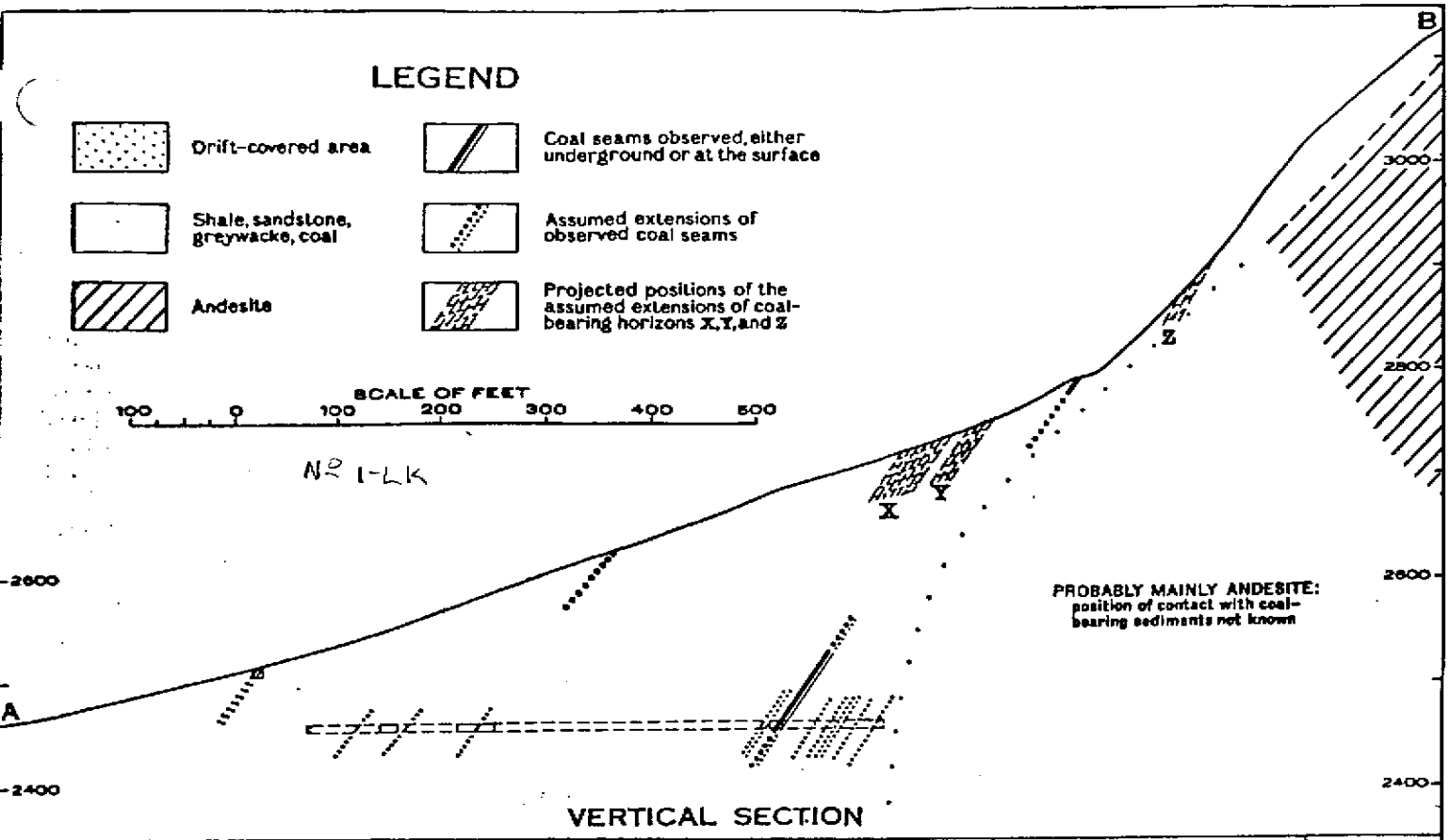
The analysis of these samples are as follows:--

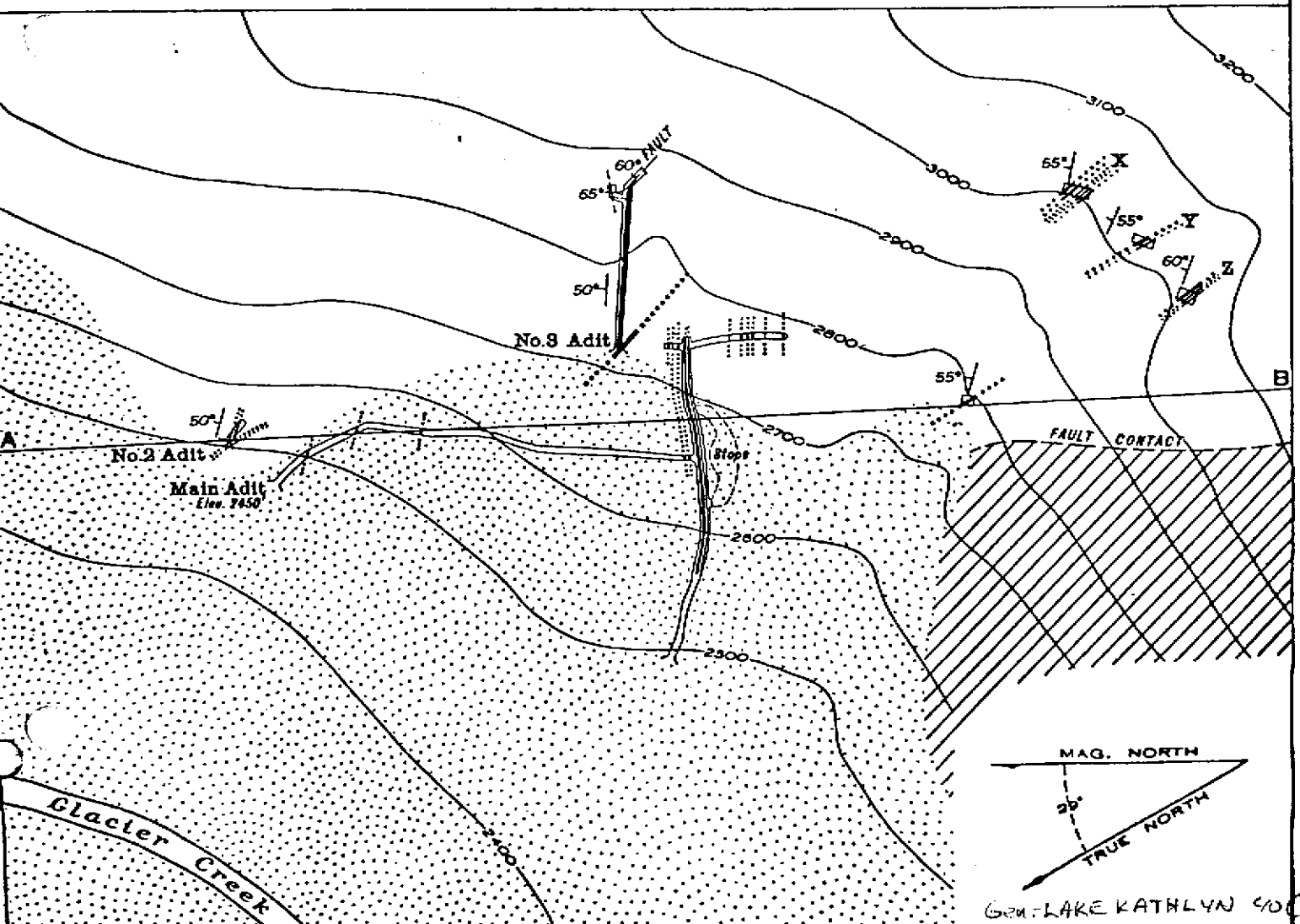
NO.	MOISTURE	V.C.M.	F.C.	ASH
1	4.8%	5.2%	73.2%	16.8%
2	9.9	12.2	61.2	16.7
3	9.3	7.3	67.4	16.0

The seam from which the samples were taken was the only one seen by the writer which was of sufficimet size to be of possible importance, but it is claimed that there are, higher up the mountain, seams outcropping similar to or better than this one. Samples were submitted to the writer by Geo. H. Ballard from these upper seams which are said to be representative of the clean coal. The analyses of these samples are as follows:--

NO	MOISTURE	V.C.M.	F.C.	ASH
1	13.9%	9.7%	64.5%	11.9%
2	13.5	8.9	60.8	16.7
3	14.3	8.3	72.3	5.1

In considering these analyses the most striking feature is the high percentage of moisture, which is unusual in a coal such as is indicated by the ratio of volatile matter and fixed carbon. Taking the average of the six samples analysed and recalculating the analysis free of ash, the resulting analysis is: Moisture, 12.8 per cent; V.C.M. 9.9 per cent; F.C. 77.3 per cent. By apply Bowling's Split Volatile ratio this coal is seen to have a numerical value on the scale of 4.6, which places it as a bituminous coal. It is evident though, from the low volatile matter and high fixed carbon that the coal should really be classed as a semi anthracite. The high moisture content effects the formula in Bowling's Split Volatile ratio so much as to render it not suitable for classifying this coal.





GEM-LAKE KATHLYN 40(1)A

Lake Kathlyn Coal Mine (51)

References: Ann. Repts., Minister of Mines, B.C.: 1917, p. 125; 1926, p. 161; 1932, p. 90; 1933, p. 113; 1934, p. G32; 1935, p. G27; 1936, p. G43. Geol. Surv., Canada, Sum. Rept. 1925, pt. A, p. 119.

The Lake Kathlyn coal mine (*See* Figure 11) is 5 miles northwest of Smithers on the southeast side of Glacier Gulch. The property is 2½ miles by good road west from Lake Kathlyn railway station. In 1917 the property was reported to consist of ten coal leases owned by Frank X. Frank of Smithers. In 1926, British Columbia Anthracite, Limited, leased the prospect and explored two coal seams by short adit drifts. Lake Kathlyn Anthracite Coal Company, Limited, carried on exploration work in 1932 and 1933 by driving a main crosscut adit over 400 feet. Between 1934 and 1936, intermittent work was carried on by Northwest Anthracite Syndicate, headed by Thomas Campbell. A small tonnage of coal was mined and marketed locally.

The coal seams occur in a series of sedimentary rocks consisting of black, carbonaceous shales, carbonaceous sandstones, argillites, greywacke, and sandstones, with one or more beds of pebble conglomerate above the coal horizons. The sediments have all been hardened, the sandstones, in particular, being indurated almost to quartzite. Surface exposures of these rocks have a characteristic light rusty coloration through oxidation of a small content of finely disseminated sulphide. Some of the shaly beds are distinguished by the occurrence of occasional round or oval-shaped ironstone nodules averaging 1 inch in diameter. Ripple-marked strata are not uncommon. The sediments strike from south 45 to south 60 degrees east and dip from 50 to 60 degrees northeast.

Fossil plants were seen in several argillaceous beds close to the coal seams, and a few poorly preserved fossil shells were picked up on the talus slope above the main adit. The plants collected were identified by W. A. Bell as follows:

Cladophlebis virginiensis (Fontaine)
Pityophyllum graminaefolium (Knowlton)
Podozamites lanceolatus (Lindley and Hutton)
Ginkgoites pluripartita (Schimper)

[1] Op. cit., p. 113.

G.S.C. Memoir 226.
Mineral Resources of the Hazelton-Smithers area
(Kindle)

"The above assemblage although small is made up of species common in the Kootenay of Alberta, and the beds are considered to be equivalent in age."

On the south side of Glacier Gulch development work has disclosed the presence of about twenty coal seams at irregular intervals throughout a 600-foot column of stratified rock. The total thickness of the formation as exposed on this side of the gulch is a little over 1,000 feet, and the coal is confined to the lower 600 feet. The greater number of the coal seams range from 6 to 12 inches in width, but there are two seams with widths up to 4 feet and two others with widths of 18 inches and 24 inches, respectively. There has been considerable fault movement along many of the coal beds with resultant pulverization and squeezing of the coal, so that these seams are in many places found to pinch suddenly along their strike. A strong fault contact between the sedimentary series and the older underlying volcanics and sediments of Jurassic age is exposed on both sides of Glacier Gulch immediately below the coal seams. The fault line strikes northwesterly and dips to the northeast at angles varying from 45 to 70 degrees.

On the north side of Glacier Gulch there are four small coal seams within 100 feet of the contact of the sedimentary series and the older volcanic rocks. The fault contact between the two formations strikes northwest and dips from 60 to 70 degrees northeast. It is marked by a narrow ravine with walls rising steeply for 50 to 100 feet. The hard, volcanic rocks along the foot-wall side are slickensided and grooved with fault striæ. At elevation 2,950 feet a 25-foot shaft is sunk on a small silver-lead-zinc vein 20 feet southwest of the contact in the volcanics. Opposite the shaft and 20 feet northeast of the fault contact there is a 12-inch and an 8-inch coal seam separated by 16 inches of shale. A 12-inch and a 24-inch coal seam outcrop on a steep slope 60 and 100 feet, respectively, farther east. These coal seams have not been prospected.

On the south side of Glacier Gulch (*See* Figure 11) the main adit at elevation 2,450 feet is driven south as a crosscut for 475 feet to a drift on two coal seams. In the roof of the drift at the crosscut, a 28-inch coal seam is separated from a 9-inch coal seam by 27 inches of carbonaceous sandstone. The larger seam is sheared and thins eastward along its strike. At the face of the east drift, 135 feet easterly from the main crosscut, the larger seam has thinned out to 8 inches of soft, dirty coal with 8 inches of sandstone separating it from the parallel seam, which consists of 6 inches of soft, sheared coal. The drift to the west follows these two seams for 133 feet and then passes through 90 feet of loose slide rock to emerge as an air adit at the surface, 20 feet above the adit level. At 85 feet west along the drift from the crosscut the main seam is 17 inches thick, and 15 inches of shale separates it from the parallel seam, which is 12 inches thick. A small amount of stoping has been done on these two seams above the end of the main crosscut. In the main raise 30 feet above the drift level, the larger seam is 4 feet wide and the parallel seam 10 inches wide, with 30 inches of shale between them. The 10-inch seam consists of firm, dull black coal, whereas the larger seam is a soft, dirty, sheared coal.

Channel samples 112 and 113, collected by the writer across these two seams, were analysed by the Fuel Testing Laboratories at Ottawa and gave the following results:

	No. 112 10-inch seam As received	No. 113 4-foot seam As received
	Per cent	Per cent
Moisture	16·6	14·0
Ash	9·5	15·7
Volatile matter	4·1	5·4
Fixed carbon	69·8	64·9
Sulphur	0·1	.....
B.T.U. per lb. gross	10,200	.....

About 60 feet above the drift level the raise follows the main seam, but does not break through to the smaller, parallel seam. The main seam is 40 inches wide there and consists of highly pulverized, soft, sheared coal with glistening, slickensided, intersection surfaces throughout its mass. This coal crumbles and soils the fingers readily on handling. It is probable that this part of the seam has been thickened through flowage under pressure. A channel sample (No. 111) taken by the writer across this part of the seam and analysed by the Fuel Testing Division at Ottawa gave:

	As received Per cent
Moisture	14·9
Ash	28·1
Volatile matter	5·6
Fixed carbon	51·4

From the end of the east drift, a crosscut extends 110 feet south and intersects six other coal seams at distances of 45, 56, 63, 68, 80, and 105 feet, respectively, south of the drift (*See* Figure 11). These coal seams are all less than a foot thick. The beds strike southeast and dip 60 degrees northeast. There has been a little movement along each seam, judging by the somewhat sheared nature of the coal. Three other very similar coal seams, each about 6 inches wide, are intersected at 5-foot intervals in a 20-foot crosscut to the north from the end of the east drift. In the main crosscut 10 feet north of the drift there is a 12-inch coal seam of the soft, crushed type, criss-crossed by innumerable, shiny, slickensided surfaces. A parallel, 9-inch seam of comparatively firm, clean coal lies 20 inches farther north. Three other coal seams are intersected by the main crosscut at distances of 45 feet, 105 feet, and 175 feet, respectively, south from the portal. These seams are less than 6 inches wide, and there has been some crushing along each one. The seam at 175 feet from the portal appears to be the downward continuation of the seam explored in the No. 3 or upper adit (*See* Figure 11).

No. 2 adit is 75 feet northeast of the portal of the main adit and 40 feet higher. It is driven 33 feet along two coal seams, each of which is from 6 to 7 inches in width and is separated from the other by 1 foot of carbonaceous shale. The coal is clean and black and is very little disturbed.

No. 3 adit (*See* Figure 11) is at elevation 2,700 feet, its portal being 400 feet south of the portal of the main adit and 250 feet higher. It is 203 feet long, with a 25-foot crosscut to the northeast 40 feet from the face. For the first 180 feet from the portal, the drift follows a coal seam that ranges from 3 to 4 feet in width. At 180 feet from the portal a fault crosses the coal seam at a small angle. The coal is squeezed out along the fault and its easterly extension has not been located. The coal seam exposed along the roof of the adit has suffered only minor crushing. It varies from glistening black to dull graphitic black and is comparatively firm and clean, with only minor slickensided cross fractures. The following analyses of this coal are of channel samples taken across the roof of the adit by the writer and analysed by the Fuel Testing Division at Ottawa. Sample No. 109 was taken 18 feet from the portal across 46 inches of coal. Sample No. 110 was collected 155 feet from the portal where the seam measured 37 inches, but included two beds of bone, 2 and 3 inches thick, respectively, which were excluded from the sample.

	No. 109 46 inches As received	No. 110 32 inches As received
	Per cent	Per cent
Moisture	13·7	14·9
Ash	20·0	15·9
Volatile matter	3·1	3·2
Fixed carbon	63·2	66·0
Sulphur	.....	0·1
B.T.U. per lb. gross	9,100	9,790

At elevation 3,000 feet, and roughly 500 feet south of No. 3 adit, three groups of coal seams are exposed by a number of open-cuts (*See* Figure 11). The first group consists of five seams, which form part of a section, from north to south, as follows: 30 inches coal, 18 inches rock, 12 inches coal, 6 feet rock, 6 inches coal, 18 inches rock, 6 inches coal, 4 inches rock, and 24 inches coal. These seams strike south 45 degrees east and dip 55 degrees northeast. The 30-inch seam may be the upward continuation of the large coal seam in the main adit drift.

In open-cuts 75 feet farther south an 18-inch and a 12-inch coal seam, with 10 inches of intervening shale, are exposed. Carbonaceous shale immediately below the 12-inch seam is matted with stems and other plant remains. The 12-inch coal seam has undergone very little crushing and is comparatively clean and hard. A channel sample, No. 114, taken across it was analysed by the Fuel Testing Division at Ottawa, and has the following composition:

	As received Per cent
Moisture	14·8
Ash	14·5
Volatile matter	7·1
Fixed carbon	63·6
Sulphur	0·1
B.T.U. per lb. gross	9,500

The third group of coal seams is exposed in a cut 60 feet farther east. Here is a 12-inch seam of firm, clean coal with several, parallel, 3-inch seams over a width of 4 feet. These outcrops are only a short distance from the fault contact of the coal-bearing sediments with the older underlying volcanic and sedimentary rocks (*See* Figure 11). The upward extensions of these groups of coal seams were seen to outcrop for several hundred feet farther up the precipitous slope.

The coal on this property is soft and soils the fingers, and has a roughly cubical fracture where it is not sheared. Its low content of volatile matter is typical of anthracitic coal, but it has passed beyond the anthracite stage and falls into that class of coal known as super-anthracite, whose heating value is lower than that of anthracite.

DESCRIPTIONS OF MARL DEPOSITS

Robinson Lake Marl (16)

Robinson Lake is 6 miles northeast of Hazelton, a few hundred feet from the Nine Mile Mountain road. The lake is 1,900 feet long from north to south with an average width of 400 feet and a maximum width of 900 feet. It is a clear water lake, in few places over 5 feet deep except in the centre where there is 30 feet of water. Everywhere in shallow water the lake bottom consists of a thick deposit of soft white to grey marl. The marl is concealed in many places by a heavy growth of Chara, a plant in which lime is deposited in the cells and cell walls. These plants have evidently contributed largely to the deposition of the marl, but some shell remains were also observed. At the north end of the lake an inflowing stream flowing through low, marshy land has supplied dark vegetable matter, which is deposited locally with the marl. The best quality of white marl is found at the south, or outlet, end of the lake. Here a 12-foot pole pushed down into the deposit does not reach the bottom of it. Elsewhere the calcium carbonate layer is at least 6 feet thick, as a pole thrust into it pushes down that far before striking any resistance and comes up white covered.

The marl is of economic importance because of its value as a land dressing. It could be readily mined from the lake bottom by using a suction pump or small dredge.