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EVALUATION OF PEAT SAMPLES AS PART OF A PEAT FUEL INVENTORY IN THE PROVINCE OF NEWFOUNDLAND

T.E. T ibbets

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by

T.E. Tibbetts*

INTRODUCTION

Peat is an unconsolidated, hydrophilic, carbonaceous sediment, formed by accumulation of partially fragmented and decomposed, more or less altered and commonly heterogeneous, plant remains. Peat deposits preserved by persistent moisture relationships may be buried, consolidated and form coal.

Peat is organic matter in various stages of decomposition and with widely diversified physical and chemical properties. These properties predicate the potential use of the peat and peat deposits (peatlands).

For all practical purposes peat is regarded as a non-renewable resource. It has been used to a large degree in Europe for heating and electric power generation. The USSR, which has the lion's share of the world's peat resources, will consume an estimated 70 million tons of peat fuel in 1976. Ireland will consume 5.2 million tons. In Finland the annual consumption of peat for heating and electric power generation by 1980 is expected to be about 3 million tons. Even though peat is of little importance in the overall world energy supply, it is of considerable local significance. It accounts for about one-third of Ireland's energy supply, for about 17 per cent in the Leningrad district of the USSR and for about 2 per cent in the USSR in general.

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*Head, Coal & Peat Resources Evaluation, Energy Research Laboratories, CANMET, Department of Energy, Mines & Resources, Ottawa, Canada.

About 60 per cent of the world's peat resources are located within the boundaries of the USSR. About 80 per cent of these resources have been investigated. Canada is second to the USSR in probable resources; however, only a small fraction of these resources have been investigated.

The use of peat fuel in Canada has not been significant, because of economic factors, except during wartime when the security of energy supply to the industrial heartland, Ontario, was thought to be endangered. During these periods considerable research and development was directed to peat production and processing technology as well as peat combustion. The continuous rise in fuel prices and forecast shortages of fossil fuels throughout the world coupled with the development of peat utilization techniques could place peat fuel in a much improved economical position. In certain regions of Canada peat is the only indigenous energy resource and as such could provide a secure supply of fuel particularly for small plants and industries, safe from international disturbances and disruptions.

In November, 1975 a request was submitted by the government of Newfoundland for the services of EMR in having 66 peat samples analysed "as part of a peat fuel inventory being undertaken in Newfoundland"(1). The results of evaluation of these samples would serve as an indicator for a detailed assessment of the peat resources throughout the province.

The writer applied for and was granted approval to carry out the appropriate tests at the Energy Research Laboratories under Project ES1 - Resource and Reserve Assessment: Coal Quality and Peat. Element ES1.4 - Canadian Peat Resources - Inventory, Science and Technology.

The objective of this ERL activity is to add to the knowledge of the magnitude of Canadian peat deposits; to identify the types and properties of the peat material; to increase the capability in Canada of using the resource knowledge to realize optimum benefits from utilization of a potentially significant and non-renewable energy resource.

SAMPLES AND SAMPLING SITES

The samples were collected from a cross section of peat soils located in central and western Newfoundland as shown in Table 1. Locations are approximate as determined from maps provided by the field officers.

TABLE 1

Locations of Peat Sampling

Sample No.	Location No.	Map Reference	Sample Area (See Map)	Approximate Latitude/Longitude	Sample Depth (M)
1	1	12B Ed.2 MCE Series A501	Grand Lake	48°39'55"/58°12'10"	1.00
2					2.00
3					2.50
4	2	12B Ed.2 MCE Series A501	Grand Lake	48°37'10"/58°14'25"	1.00
5					2.00
6					3.00
7	3	12B Ed.2 MCE Series A501	St.George's River	48°32'40"/58°17'20"	1.00
8					2.00
9					2.25
10	4	12B Ed.2 MCE Series A501	Black Duck	48°35'00"/58°19'40"	1.00
11	5	12B Ed.2 MCE Series A501	Black Duck	48°33'50"/58°24'00"	1.00
12					2.00
13					3.00
14					3.50
15	6	12B Ed.2 MCE Series A501	Long Gull Pond	48°32'40"/58°26'40"	0.25
16					1.00
17					2.00
18					2.75
19	7	12B Ed.2 MCE Series A501	St.George's River	48°31'15"/58°25'45"	1.00
20					2.00

TABLE 1 (continued)

Sample No.	Location No.	Map Reference	Sample Area (See Map)	Approximate Latitude/Longitude	Sample Depth(M)
21	8	12A Ed.2 MCE Series A501	Buchans	48°54'30"/56°50'10"	0.25
22	9	12A Ed.2 MCE Series A501	Buchans	48°52'40"/56°45'40"	0.75
23 24	10	12A Ed.2 MCE Series A501	Buchans	48°53'05"/56°43'05"	0.50 1.00
25	11	12A Ed.2 MCE Series A501	Buchans	48°57'05"/56°43'10"	0.50
26	12	12A Ed.2 MCE Series A501	Buchans	48°50'20"/56°40'40"	0.25
27 28	13	12A Ed.2 MCE Series A501	Buchans	48°50'00"/56°40'10"	1.50 2.00
29 30	14	12A Ed.2 MCE Series A501	Buchans	48°49'25"/56°37'00"	0.50 1.00
31 32	15	12A Ed.2 MCE Series A501	Buchans	48°52'50"/56°34'35"	0.50 1.00
33	15A	12A Ed.2 MCE Series A501	Buchans	48°52'40"/56°34'35"	0.50
34	16	12A Ed.2 MCE Series A501	Buchans	48°52'50"/56°37'30"	0.50
35	17	12A Ed.2 MCE Series A501	Buchans	48°53'40"/56°32'50"	0.25
36	18	12A Ed.2 MCE Series A501	Buchans	48°56'50"/56°32'30"	0.50
37	19	12H Ed.1	Buchans	49°01'40"/56°34'05"	0.25
38	20	12H Ed.1	Buchans	49°04'10"/56°39'55"	0.25
39	21	2D Ed.2 MCE Series A501	Gambo Pond	48°34'50"/54°28'00"	1.00
40	22	2D Ed.2 MCE Series A501	Deer Pond	48°33'20"/54°34'40"	0.50
41	23	2D Ed.2 MCE Series A501	Deer Pond	48°29'55"/54°39'10"	0.25
42	24	2D Ed.2 MCE Series A501	Port Blandford	48°21'20"/54°16'20"	1.75
43	25	2D Ed.2 MCE Series A501	Shoal Harbour Pond	48°11'45"/54°10'50"	0.25
44	26	2D Ed.2 MCE Series A501	Tug Pond	48°05'15"/54°00'10"	1.00
45	27	2D Ed.2 MCE Series A501	Tug Pond	48°05'15"/54°11'10"	1.00

TABLE 1 (continued)

Sample No.	Location No.	Map Reference	Sample Area (See Map)	Approximate Latitude/Longitude	Sample Depth(M)
46	28	2D Ed.2 MCE Series A501	Clode Sound Pond	48°20'25"/54°23'35"	1.00
47					1.50
48	29	2D Ed.2 MCE Series A501	Gander Airport Bog	48°56'30"/54°30'40"	1.00
49					2.00
50					3.00
51					4.00
52	30	2E Ed.2 MCE Series A501	Indian Bay Pond	49°04'40"/54°26'40"	1.00
53					2.00
54					3.25
55	31	2E Ed.2 MCE Series A501	Weir's Pond	49°09'30"/54°23'50"	1.00
56					2.00
57					3.25
58	32	2E Ed.2 MCE Series A501	Indian Bay Pond	49°08'40"/54°08'40"	1.00
59					2.00
60					3.00
61	33	2D Ed.2 MCE Series A501	Caribou Lake	48°34'15"/54°50'50"	1.50
62	34	2D Ed.2 MCE Series A501	Caribou Lake	48°34'40"/55°01'05"	1.00
63					2.00
64					3.00
65	35	2D Ed.2 MCE Series A501	Gambo Pond	48°38'00"/54°53'00"	1.00
66					2.75

ANALYSES METHODS

The samples were received in small plastic bags and contained an average of 91.5% moisture as received.

Analyses requested were proximate (moisture, ash, volatile matter and fixed carbon), calorific value and sulphur. These analyses were conducted by ASTM standard test procedures for testing of coal as follows:

1. Moisture ASTM D-3173-73
2. Ash ASTM D-3174-73
3. Volatile Matter ASTM D-3175-73
4. Fixed Carbon (100-Moisture + ash + volatile matter)
5. Calorific Value ASTM D-2015-66 (1972)
6. Sulphur ASTM D-3177-75

Details of the test procedures are presented under the appropriate specification number in the latest Annual Book of ASTM Standards [2] and summarized as follows:

Moisture: Moisture is determined by establishing the loss in weight of the sample when heated under rigidly controlled conditions of temperature, time and atmosphere, sample weight, and equipment specifications.

Ash: Ash is determined by weighing the residue remaining after burning the coal under rigidly controlled conditions of sample weight, temperature, time and atmosphere.

Volatile Matter: Volatile Matter is determined by establishing the loss in weight resulting from heating a sample under rigidly controlled conditions. The measured weight loss, corrected for moisture as determined in Method D3173 establishes the volatile matter content.

Calorific Value: Calorific Value is determined by burning a weighed sample in an adiabatic oxygen bomb calorimeter under controlled conditions. The calorific value is computed from temperature observations made before and after combustion, taking proper allowance for thermometer and thermochemical corrections.

The calorific value is the heat of combustion of a substance. In Canada it is usually expressed in British Thermal Units (Btu) per pound.

In addition to the standard test procedures outlined above the peat samples were classified with respect to their degree of decomposition. The degree of decomposition of peat is very important in the consideration of peat as a fuel as the higher the degree of decomposition the higher is the proportion of chemical substances of high heat content, e.g. humic acids and hydrogen (bitumens) [3].

The von Post scale is widely used as an approximation of the relative degree of decomposition of the organic substance of peat. In 1926 von Post (Sweden) introduced a scale with 10 degrees of decomposition as shown in Table 2. The scale starting at H1 for a completely undecomposed peat proceeds to H10 for a completely decomposed peat. The location on the scale for a particular peat is determined by visual inspection of the colour of the water and the action of the peat substance as a result of pressing the substance in the hand. If only clear water comes from the hand when the peat substance is pressed, the peat is considered undecomposed and is classified as H1. As the water colour darkens (seemingly becomes more muddy) and peat substance exudes between the fingers the scale increases and at H_{10} practically all of the peat substance passes between the fingers when pressed in the hand and is considered completely decomposed. It is generally recognized that the best peat for fuel use, technically and economically, is well decomposed, dense peat and at least H5 on the von Post scale.

RESULTS OF ANALYSES

Table 3 presents the results of the tests on the 66 samples of peat following the ASTM Standard Test procedures outlined above. The results are presented on the dry peat basis and on a 40 per cent moisture basis. The latter was chosen as the lowest practical and safe moisture content of peat fuel.

TABLE 2

von Post Degree of Decomposition

DEGREE OF DECOMPOSITION von POST'S SCALE	
H_1	Completely unconverted and mud-free peat which, when pressed in the hand, only gives off clear water.
H_2	Practically completely unconverted and mud-free peat which, when pressed in the hand, gives off almost clear colourless water.
H_3	Little converted or very slightly muddy peat which, when pressed in the hand, gives off marked -uddy water, but no peat substance passes through the fingers. The pressed residue is not thick.
H_4	Badly converted or somewhat muddy peat which, when pressed in the hand, gives off marked muddy water. The pressed residue is somewhat thick.
H_5	Fairly converted or rather muddy peat. Growth structure quite evident but somewhat obliterated. Some peat substance passes through the fingers when pressed but mostly muddy water. The pressed residue is very thick.
H_6	Fairly converted or rather muddy peat with indistinct growth structure. When pressed at most 1/3 of the peat substance passes through the fingers. The remainder extremely thick but with more obvious growth structure than in the case of unpressed peat.
H_7	Fairly well converted or marked muddy peat but the growth structure can still be seen. When pressed, about half the peat substance passes through the fingers. If water is also given off, this has the nature of porridge.
H_8	Well converted or very muddy peat with very indistinct growth structure. When pressed, about 2/3 of the peat substance passes through the fingers and at times a somewhat porridgy liquid. The remainder consists mainly of more resistant fibres and roots.
H_9	Practically completely converted or almost mudlike peat in which almost no growth structure is evident. Almost all the peat substance passes through the fingers as a homogeneous porridge when pressed.
H_{10}	Completely converted or absolutely muddy peat where no growth structure can be seen. The entire peat substance passes through the fingers when pressed.

TABLE 3

Analyses of Peat Samples

Sample No.	Lab. No. (E.R.L.)	Properties of Dry Peat				Properties of Peat of 40% H_2O			
		Ash %	VM %	Sul. %	CV-Btu/Lb Dry	Ash %	VM %	Sul. %	CV Btu/Lb
Location No. 1									
1	3622-75	1.25	68.52	0.24	9000	0.75	41.11	0.14	5400
2	3623-75	1.00	69.32	0.20	9110	0.60	41.59	0.12	5465
3	3624-75	1.08	69.28	0.20	9100	0.65	41.57	0.12	5460
Location No. 2									
4	3625-75	1.09	67.45	0.22	9320	0.65	40.47	0.13	5590
5	3626-75	1.18	67.28	0.27	9190	0.71	40.37	0.16	5515
6	3627-75	3.29	67.38	0.45	9850	1.97	40.43	0.27	5910
Location No. 3									
7	3628-75	1.43	68.56	0.30	9190	0.85	41.14	0.18	5515
8	3629-75	1.61	69.54	0.30	10,340	0.97	41.72	0.18	6200
9	3630-75	2.11	69.14	0.33	10,160	1.27	41.48	0.20	6100
Location No. 4									
10	3631-75	1.07	73.59	0.23	8850	0.64	44.15	0.14	5310
Location No. 5									
11	3632-75	1.32	72.76	0.16	9090	0.79	43.66	0.10	5450
12	3633-75	1.65	70.28	0.28	9440	0.99	42.17	0.17	5660
13	3634-75	1.63	66.99	0.29	9920	0.98	40.19	0.17	5950
14	3635-75	1.92	67.62	0.32	9980	1.15	40.57	0.19	5990
Location No. 6									
15	3636-75	1.51	70.53	0.26	8680	0.91	42.32	0.16	5210
16	3637-75	1.46	69.29	0.25	8910	0.88	41.57	0.15	5350
17	3638-75	1.25	67.68	0.26	9130	0.75	40.61	0.16	5480
18	3639-75	1.47	67.75	0.23	9780	0.88	40.65	0.14	5870
Location No. 7									
19	3640-75	1.36	69.60	0.22	9070	0.82	41.76	0.13	5440
20	3641-75	26.75	53.76	0.16	6690	23.91	25.15	0.10	4015
Location No. 8									
21	3642-75	20.24	65.09	0.32	8030	12.14	39.05	0.19	4820

TABLE 3 (continued)

Sample No.	Lab. No. (E.R.L.)	Properties of Dry Peat				Properties of Peat of 40% H_2O			
		Ash %	VM %	Sul. %	CV-Btu/Lb Dry	Ash %	VM %	Sul. %	CV Btu/Lb
Location No. 9									
22	3643-75	7.95	70.61	0.37	9650	4.77	42.37	0.22	5790
Location No.10									
23	3644-75	6.07	69.25	0.25	9500	3.64	41.55	0.15	5700
24	3645-75	4.20	67.45	0.25	9880	2.52	40.47	0.15	5930
Location No.11									
25	3646-75			0.09		48.15	7.67	0.05	2560
Location No.12									
26	3647-75	44.05	55.89	0.21	5190	26.43	33.53	0.12	3115
Location No.13									
27	3648-75	18.70	60.15	0.63	8540	11.22	36.09	0.38	5125
28	3649-75	15.37	62.80	0.55	8720	9.22	37.68	0.33	5230
Location No.14									
29	3650-75	3.25	73.88	0.11	8380	1.95	44.33	0.07	5030
30	3651-75	1.44	72.23	0.11	9510	0.86	43.34	0.07	5705
Location No.15									
31	3652-75	4.40	70.02	0.58	9660	2.64	42.01	0.35	5795
32	3653-75	5.86	68.28	0.56	10,020	3.52	40.97	0.34	6010
Location No.15A									
33	3654-75	6.21	70.20	0.34	9210	3.73	42.10	0.20	5525
Location No.16									
34	3655-75	2.49	73.01	0.30	9320	1.49	43.81	0.18	5590
Location No. 17									
35	3656-75	20.77	63.93	0.30	7830	12.46	38.36	0.18	4700

TABLE 3 (continued)

Sample No.	Laboratory No. (E.R.L.)	Properties of Dry Peat				Properties of Peat of 40% H_2O			
		Ash %	VM %	Sul. %	CV-Btu/Lb Dry	Ash %	VM %	Sul. %	CV Btu/Lb
Location No.18									
36	3657-75	2.00	73.32	0.23	10,010	1.20	44.00	0.14	6005
Location No.19									
37	3658-75	8.00	70.39	0.41	9550	4.80	42.23	0.25	5730
Location No.20									
38	3659-75	6.86	72.41	0.24	8930	4.12	43.44	0.14	5360
Location No.21									
39	3660-75	2.72	69.07	0.42	10,320	1.63	41.44	0.25	6190
Location No.22									
40	3661-75	1.59	72.32	0.28	9290	0.95	43.39	0.17	5575
Location No.23									
41	3662-75	1.46	74.25	0.16	9080	0.88	44.55	0.10	5450
Location No.24									
42	3663-75	3.67	72.30	0.20	10,310	2.20	43.38	0.12	6185
Location No.25									
43	3664-75	3.97	73.23	0.17	9960	2.38	43.94	0.10	5975
Location No.26									
44	3665-75	1.41	71.87	0.36	9500	0.85	43.12	0.22	5700
Location No.27									
45	3666-75	3.89	70.63	0.26	10,300	2.33	43.38	0.16	6180
Location No.28									
46	3667-75	2.23	72.94	0.15	8470	1.34	43.76	0.09	5080
47	3668-75	4.81	68.62	0.13	8440	2.89	41.17	0.08	5065

TABLE 3 (continued)

Sample No.	Laboratory No. (E.R.L.)	Properties of Dry Peat				Properties of Peat of 40% H_2O			
		Ash %	VM %	Sul. %	CV-Btu/lb Dry	Ash %	VM %	Sul. %	CV Btu/Lb
Location No.29									
48	3669-75	0.78	74.22	0.14	8900	0.47	44.53	0.08	5340
49	3670-75	0.92	73.19	0.11	8670	0.55	43.91	0.07	5200
50	3671-75	1.48	70.62	0.27	9580	0.89	42.37	0.16	5750
51	3672-75	15.35	60.19	0.34	8560	9.21	36.11	0.20	5135
Location No.30									
52	3673-75	1.81	70.26	0.20	9550	1.09	42.16	0.12	5730
53	3674-75	2.67	69.06	0.16	9250	1.60	41.44	0.10	5550
54	3675-75	9.07	62.71	0.32	9360	5.44	37.63	0.19	5615
Location No.31									
55	3676-75	1.18	71.22	0.19	8580	0.71	42.73	0.11	5150
56	3677-75	3.32	69.44	0.14	8530	1.99	41.66	0.08	5120
57	3678-75	6.61	65.66	0.36	9410	3.97	39.40	0.22	5645
Location No.32									
58	3679-75	0.84	72.78	0.17	8900	0.50	43.67	0.10	5340
59	3680-75	0.97	71.32	0.32	9990	0.58	42.79	0.19	5995
60	3681-75	2.20	68.80	0.46	10,100	1.32	41.28	0.28	6060
Location No.33									
61	3682-75	2.55	70.59	0.20	10,280	1.53	42.35	0.12	6170
Location No.34									
62	3683-75	0.53	73.13	0.17	9190	0.32	43.88	0.10	5515
63	3684-75	0.73	70.83	0.13	8910	0.44	42.50	0.08	5345
64	3685-75	1.35	69.43	0.24	9170	0.81	41.66	0.14	5500
Location No.35									
65	3686-75	0.75	72.81	0.30	8530	0.45	43.69	0.18	5120
66	3687-75	0.83	71.17	0.15	8950	0.50	42.70	0.09	5370

Table 4 presents the von Post Index of Decomposition of the 66 peat samples together with the calorific values calculated to the dry, ash-free basis.

TABLE 4

Degree of Decomposition and Calorific Value

Sample No.	von Post Index	CV-Btu/lb Dry, ash-free	Sample No.	von Post Index	CV-Btu/lb Dry, ash-free
Location No.1			Location No.2		
1	7	9110	4	8	9420
2	7	9200	5	9	9300
3	7	9200	6	9	10,185
Location No.3			Location No.4		
7	8	9320	10	3	8,945
8	10	10,510			
9	9	10,380			
Location No.5			Location No.6		
11	5	9090	15	8	8680
12	8	9440	16	8	8910
13	10	9920	17	8	9130
14	10	9980	18	9	9780
Location No.7			Location No.8		
19	7	9070	21	5	8030
20	6	9130			
Location No.9			Location No.10		
22	6	9650	23	6	9500
			24	6	9880
Location No.11			Location No.12		
25	8	10,070	26	7	9280
Location No.13			Location No.14		
27	9	10,504	29	1	8660
28	8	10,300	30	4	9650
Location No.15			Location No.15A		
31	4	10,100	33	7	9820
32	6	10,640			

TABLE 4 (continued)

Sample No.	von Post Index	CV-Btu/lb Dry, ash-free	Sample No.	von Post Index	CV-Btu/lb Dry, ash-free
Location No.16			Location No.17		
34	7	9560	35	7	9880
Location No.18			Location No.19		
36	7	10,210	37	8	10,380
Location No.20			Location No.21		
38	8	9590	39	8	10,610
Location No.22			Location No.23		
40	5	9440	41	4	9210
Location No.24			Location No.25		
42	6	10,700	43	6	10,370
Location No.26			Location No.27		
44	8	9640	45	6	10,720
Location No.28			Location No.29		
46	4	8660	48	5	88970
47	7	8870	49	5	8750
			50	6	9720
			51	7	10,110
Location No.30			Location No.31		
52	7	9730	55	6	8680
53	7	9500	56	6	8820
54	8	10,290	57	6	10,080
Location No.32			Location No.33		
58	6	8980	61	8	10,550
59	7	10,090			
60	7	10,330			
Location No.34			Location No.35		
62	6	9240	65	N.D.	8590
63	5	8980	66	N.D.	9020
64	6	9300			

COMMENTARY TO ANALYSES

Actual moisture content for optimum performance is dependant upon the type of peat (i.e. sod peat or milled peat) and the type of boiler. Guidelines for best performance from milled peat in peat boilers in Ireland indicate moisture content of peat of 50-55 per cent.(5)

The following units are used in Finland and elsewhere to evaluate peat in comparison to other fuels:(6)

1MJ = 1MWs $\cong$ 0.239 M cal

1 toe = 1 ton oil equivalent $\cong$ 42GJ

1 ton milled peat MC40% $\cong$ 0.26 toe

1 ton peat dry matter $\cong$ 18.25 GJ $\cong$ 0.43-0.6 toe

In Newfoundland it would also be credible to compare peat to coal from the Sydney coalfield at 13,500 Btu/lb.

To place the analyses of the 66 samples in perspective a comparison with the peat used in other countries to produce electricity may be helpful. Peat used in Ireland between 1964 and 1975 varied from about 2.8% to 4.1% ash (dry basis) and from about 21.8MJ*/kg (9370 Btu/lb) to 22.1 MJ/kg (9500 Btu/lb) on the dry, ash-free basis(5). In Finland interim fuel peat standards are established for two qualities of both sod peat and milled peat and these are partially reproduced below(7).

		Milled Peat		Sod Peat	
		I	II	I	II
Moisture Content (Min.)	%	40	40	30	20
(Max.)	%	55	55	50	35
Ash (Monthly Average)	%	8	8	6	6
(maximum)	%	12	12	10	10
Net Heating Value (Hu)	MJ/kg	<8	$11^{+}_{-}2$	$13^{+}_{-}3$	$15^{+}_{-}3$
	Btu/lb	3440		5590	

*1MJ = 947.74 Btu = 238.84 k cal

The net or effective heating value of peat of known moisture content, Hu′, is defined as follows:(7)

$$Hu' = HO - 290 \times \frac{100-k}{100} - 5.83 \times K \quad \text{kcal/kg} \quad \text{where}$$

HO = heat of combustion of absolutely dry peat,

K = the moisture content of peat (% of wet weight).

Assuming the minimum net heating value, Hu′ = 8, is peat with 40% moisture and 8% ash, etc., the following values are obtained for dry, ash-free peat:

	Milled Peat		Sod Peat	
Net Heating value (Hu′) MJ/kg	8	11	13	15
Moisture content of Peat (K)	40	40	30	20
Heat of Combustion of Dry Peat (Ho) MJ/kg	16.18	21.18	20.84	20.58
Average ash (Moist Basis) %	8	8	6	6
Average ash (Dry Basis) %	13.33	13.33	8.6	7.5
Heat of Combustion of Dry, Ash-free Peat MJ/kg	18.67	24.44	22.80	22.85
Btu/lb	8026	10,507	9801	9565

Comparison of the quality expectations of Irish fuel peat mentioned above, and the interim standards for Finnish fuel peat indicates that similar types of peat are utilized although higher ash is expected and tolerated in Finland.

Referring to Table 4, it is apparent that with few exceptions, the calorific values of the Newfoundland peat samples fall within the limits (or expectations) of the fuel peat used in Ireland and Finland and meet the generally assumed minimum on the von Post scale. However, several of the locations are regarded as unlikely locations for fuel peat production because of high ash contents. Of the areas examined some general comments concerning suitability for fuel peat are offered in Table 5.

TABLE 5

Comments on Analyses of Peat Samples

Location No.		Location No.	
1	suitable fuel peat.	22	may be suitable fuel peat; low von Post.
2	suitable fuel peat.	23	unsuitable fuel peat; suitable peat moss.
3	suitable fuel peat.	24	suitable fuel peat.
4	unsuitable fuel peat; suitable peat moss.	25	suitable fuel peat.
5	suitable fuel peat below 1m.	26	suitable fuel peat.
6	suitable fuel peat below 1m.	27	suitable fuel peat.
7	suitable only to 1m; high ash.	28	suitable fuel peat at 1.50m.
8	unsuitable fuel peat; high ash.	29	unsuitable fuel peat; low von Post to 2m; high ash at 4m.
9	unsuitable fuel peat; high ash.	30	suitable fuel peat to 2m; high ash at 3.25m.
10	may be suitable fuel peat; high ash.	31	suitable fuel peat to 2m; borderline von Post.
11	unsuitable fuel peat; high ash.	32	suitable fuel peat.
12	unsuitable fuel peat; high ash.	33	suitable fuel peat.
13	unsuitable fuel peat; high ash.	34	may be suitable fuel peat although borderline von Post.
14	unsuitable fuel peat; suitable peat moss.	35	no sample for von Post; low heat value indicates low decomposition; may not be suitable fuel peat.
15	may be suitable fuel peat at 1m; von Post low.		
15A	unsuitable fuel peat; high ash.		
16	suitable fuel peat.		
17	unsuitable fuel peat; high ash.		
18	suitable fuel peat.		
19	unsuitable fuel peat; high ash.		
20	unsuitable fuel peat; high ash.		
21	suitable fuel peat.		

Suitable Areas			Areas	
Fuel Peat		Peat Moss	of Doubtful Value	
1	25	4	7	15A
2	26	14	8	17
3	27	23	9	19
5	28		10	20
6	30		11	22
16	31		12	29
18	32		13	34
21	33		15	35
24				

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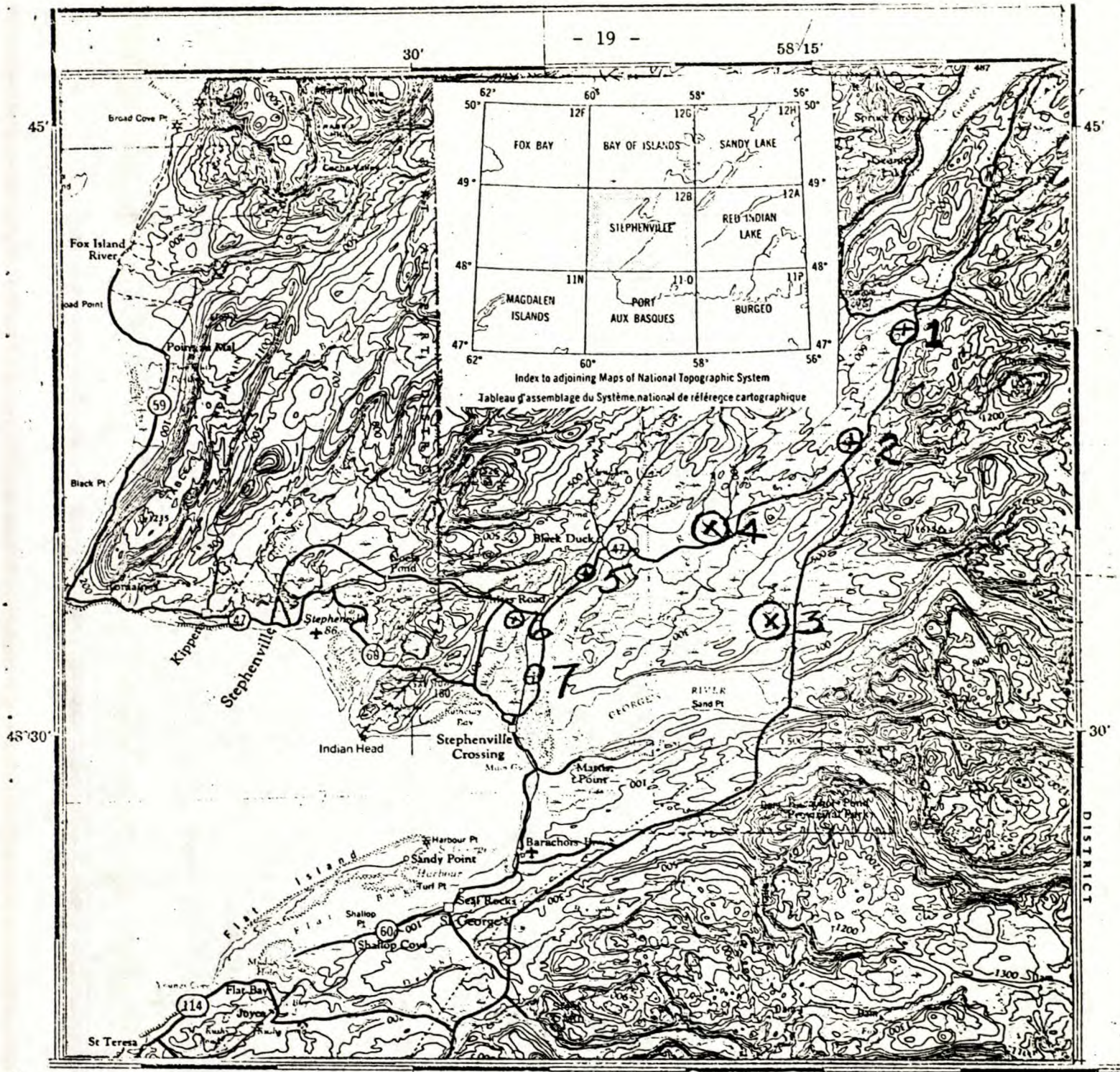


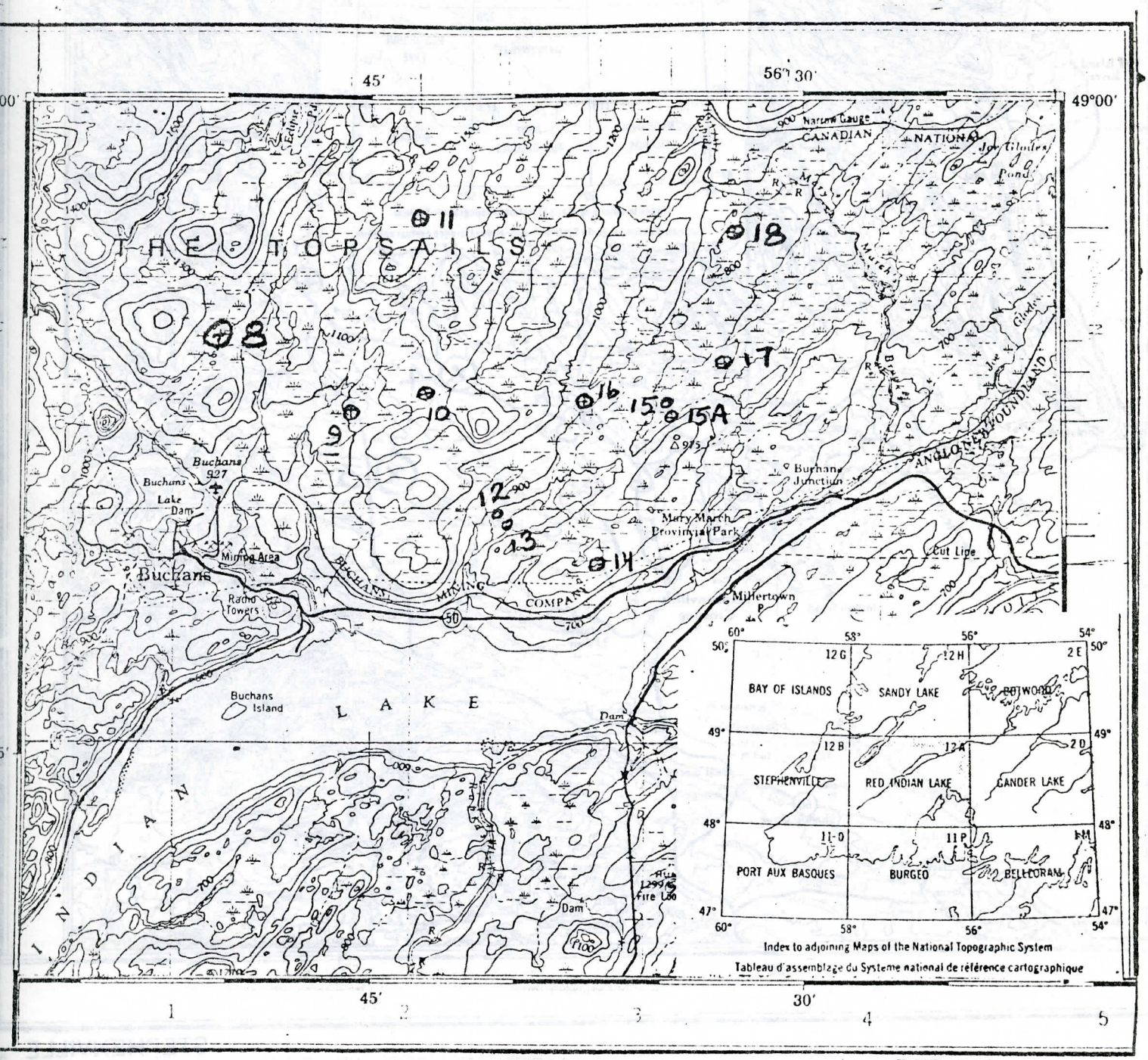
STEPHENVILLE
12 B
EDITION 2

STEPHENVILLE
NEWFOUNDLAND

Scale 1:250,000 Échelle

Miles 5 0 5 10 15 20 Miles

Kilometres 5 0 5 10 15 20 25 30 Kilomètres



RED INDIAN LAKE
12 A
EDITION 2

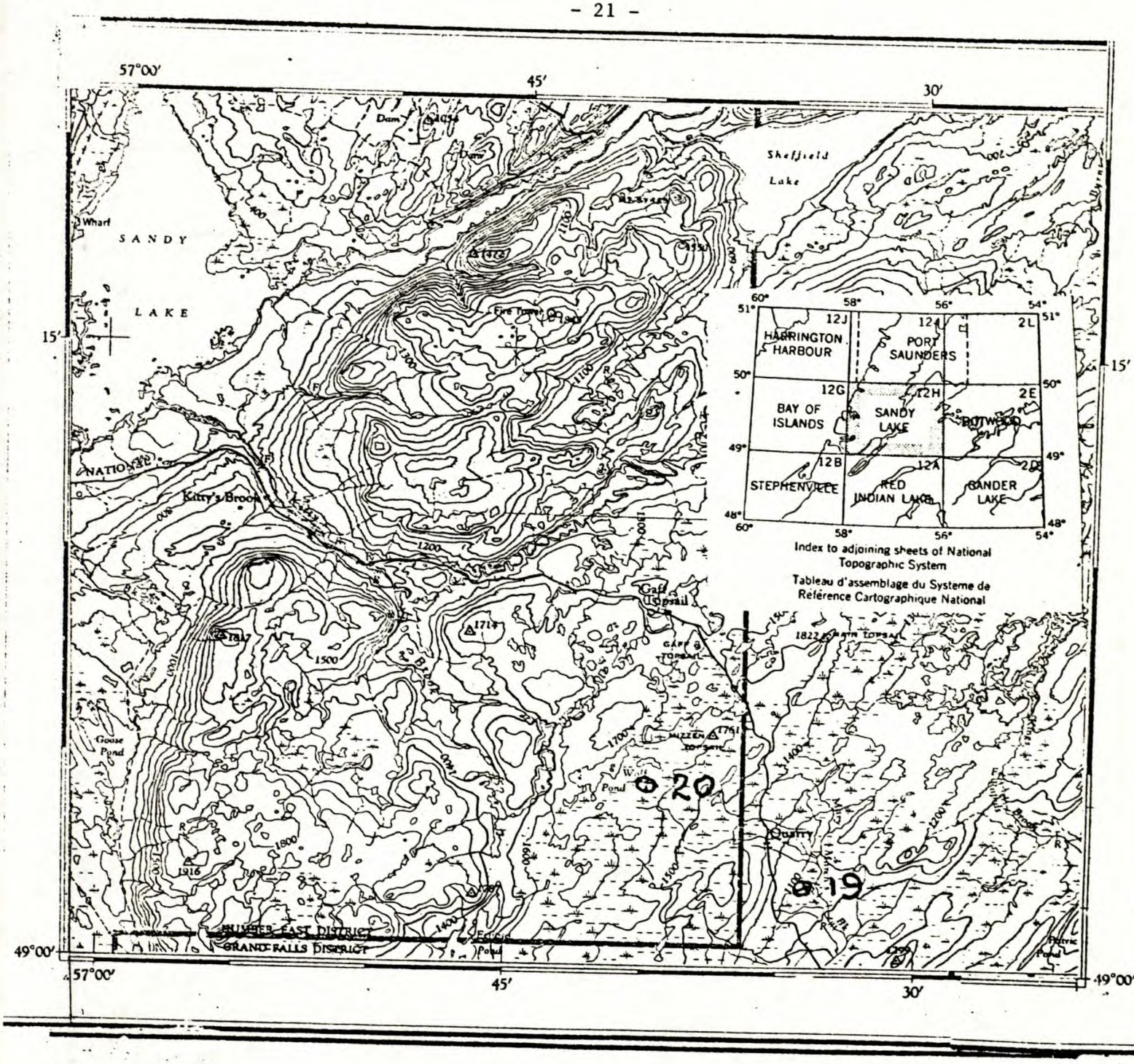
RED INDIAN LAKE

NEWFOUNDLAND

Scale 1:250,000 Échelle

Miles 0 5 10 15 20 Miles

Kilometres 0 5 10 15 20 25 30 Kilomètres



SANDY LAKE

NEWFOUNDLAND

SANDY LAKE
12H

Scale 1:250,000 Échelle

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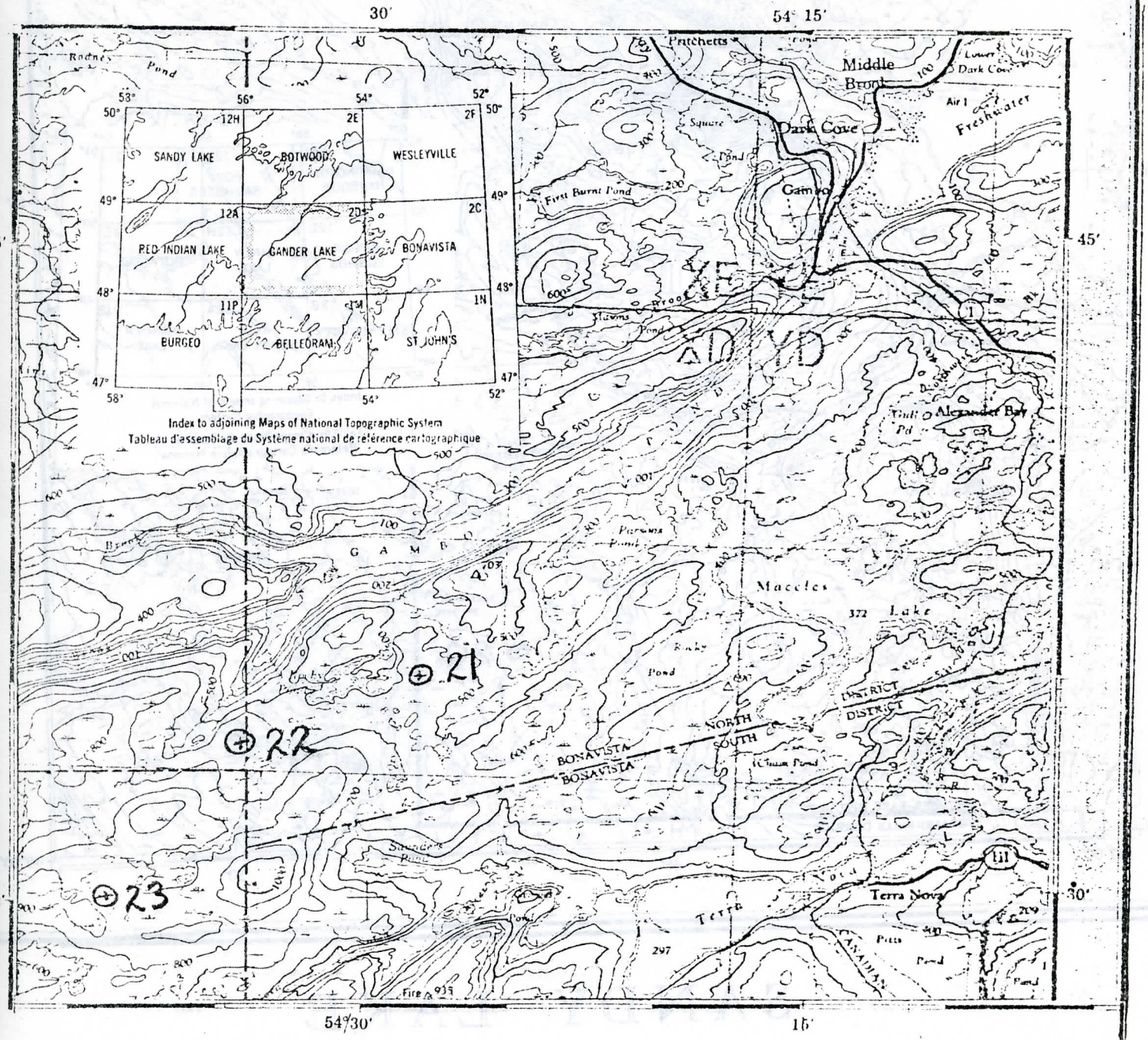
Kilometres 5 0 5 10 15 20 25 30 Kilometres



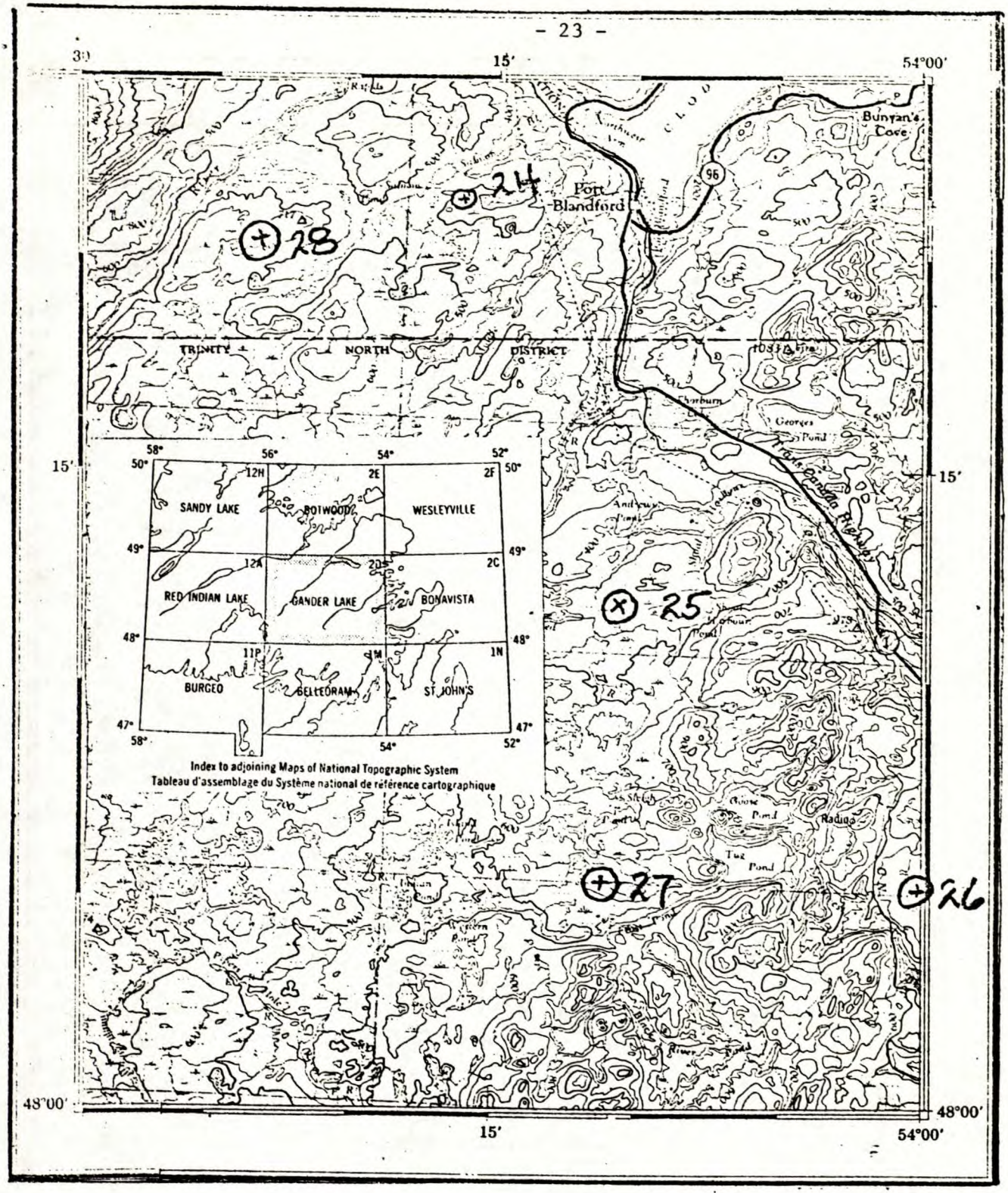
GANDER LAKE
NEWFOUNDLAND

GANDER LAKE
2D
EDITION 2

Scale 1:250,000 Échelle

Miles 5 0 5 10 15 20 Miles

Kilometres 5 0 5 10 15 20 25 30 Kilomètres



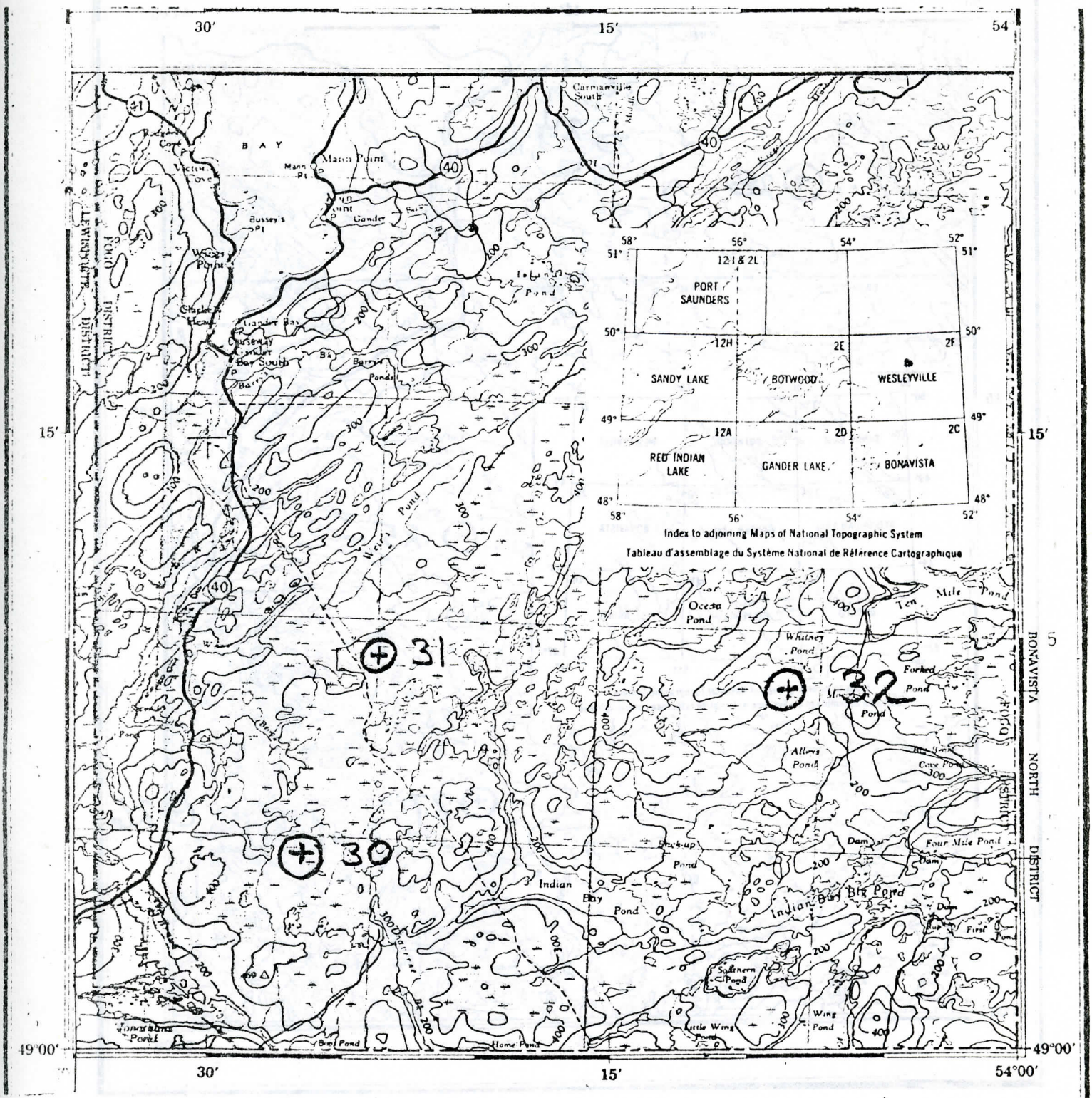
GANDER LAKE
2D
EDITION 2

GANDER LAKE
NEWFOUNDLAND

Scale 1:250,000 Échelle

Miles 5 0 5 10 15 20 Milles

Kilometres 5 0 5 10 15 20 25 30 Kilomètres



BOTWOOD
NEWFOUNDLAND

BOTWOOD
2 E
EDITION 2

Scale 1:250,000 Échelle

Miles 5 0 5 10 15 20 Miles

Kilometres 5 0 5 10 15 20 25 30 Kilomètres

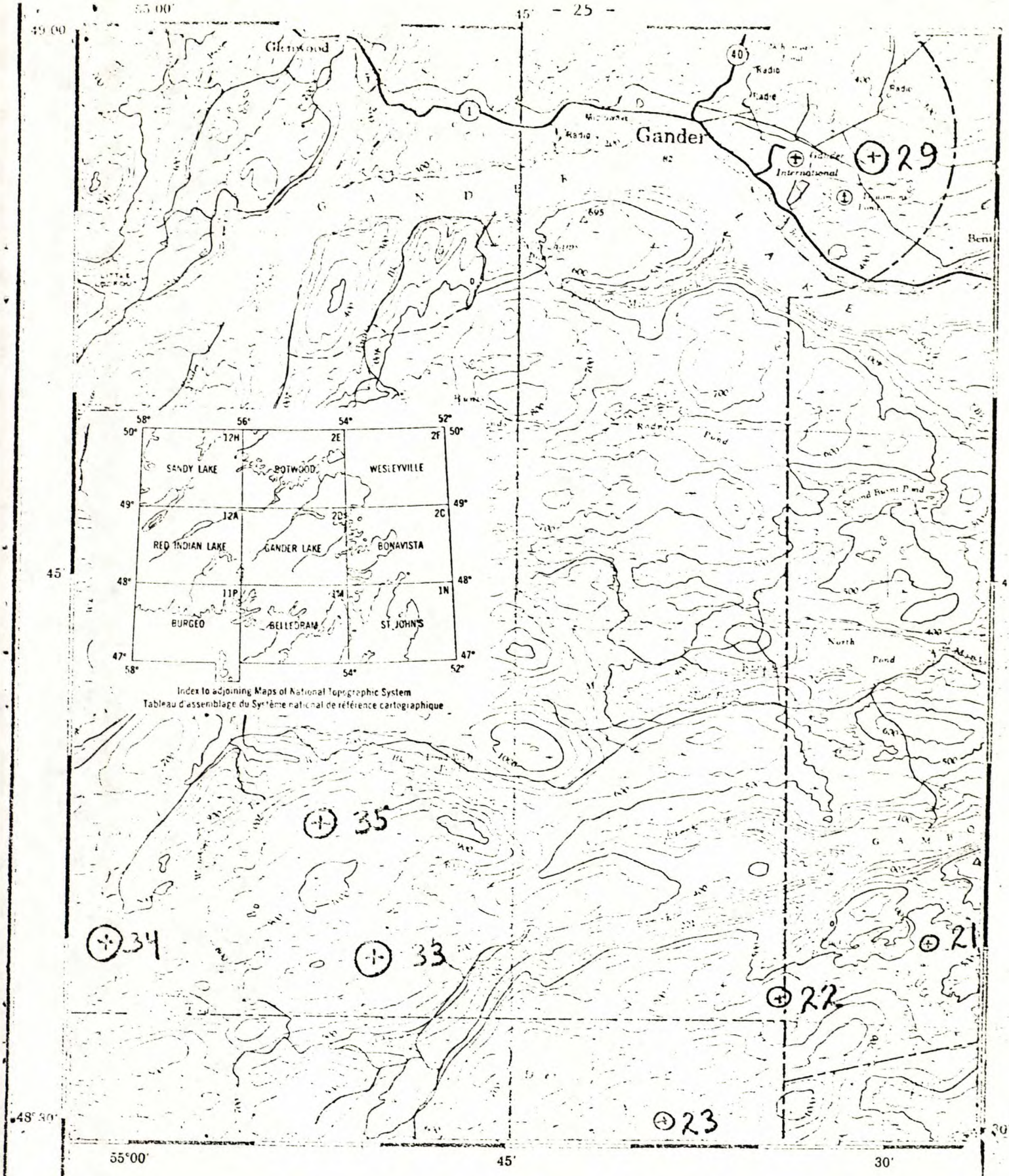


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Tableau d'assemblage du Système national de référence cartographique

GANDER LAKE

NEWFOUNDLAND

Scale 1:250,000 Échelle

Miles 5 0 5 10 15 20 Miles

Kilometres 5 0 5 10 15 20 25

GANDER LAKE
2D
EDITION 2