SUB-BITUMINOUS COAL IN THE WHITE MOUNTAINS, INTERIOR ALASKA

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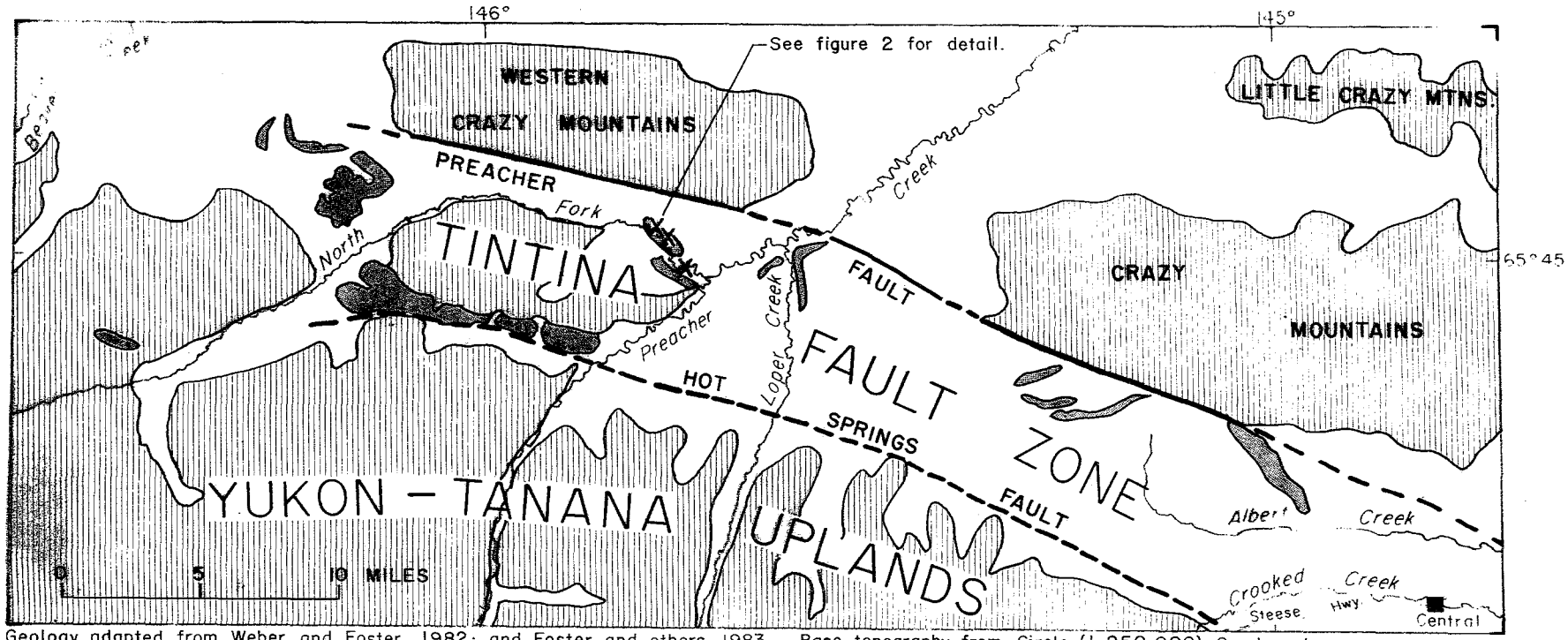
Sub-bituminous coal occurs in the Preacher Creek drainage of the White Mountains, approximately 85 miles northeast of Fairbanks (fig. 1). Coal in the area was first reported by Weber and Foster, 1982, who noted chunks of coal float at the junction of the North Fork and Preacher Creek proper. During the present investigation in 1985, coal was mapped as rubble and outcrop at three sites on the North fork. Additional occurrences may likely be found further upstream.

Tertiary rocks along the northern edge of the Yukon-Tanana Uplands have been briefly described by Mertie, in 1937, and Weber and Foster, 1982, as light-colored, terrestrial conglomeratic sediments, both poorly consolidated to locally fairly well indurated. The rocks are poorly sorted and stratified, suggestive of rapid local deposition. In 1983 the known extent of Tertiary sediments was depicted by Foster and others and shown to be confined to the area between the Preacher Fault and Hot Springs Faults of the Tintina Fault Zone (fig. 1). Weber and Foster suggested that deposition of the sediments may have been controlled by a graben or trench along the Tintina Fault. Alternatively, it may represent an erosional remnant of the Yukon Flats Cenozoic Basin which has been preserved due to downwarping of the trench-like Tintina Fault Zone. Composition varies locally but is largely chert with lesser quartzite, quartz, and phyllite. Rapid deposition is also suggested by the high degree of variability of roundness within exposed sections. Along Preacher Creek both well-rounded chert- and quartz-pebble conglomerate as well as conglomerate composed of sub-angular black chert, quartz, and various lithic fragments, including coal chips, were observed.



Geology adapted from Weber and Foster, 1982; and Foster and others, 1983. Base topography from Circle (1:250,000) Quadrangle.

EXPLANATION

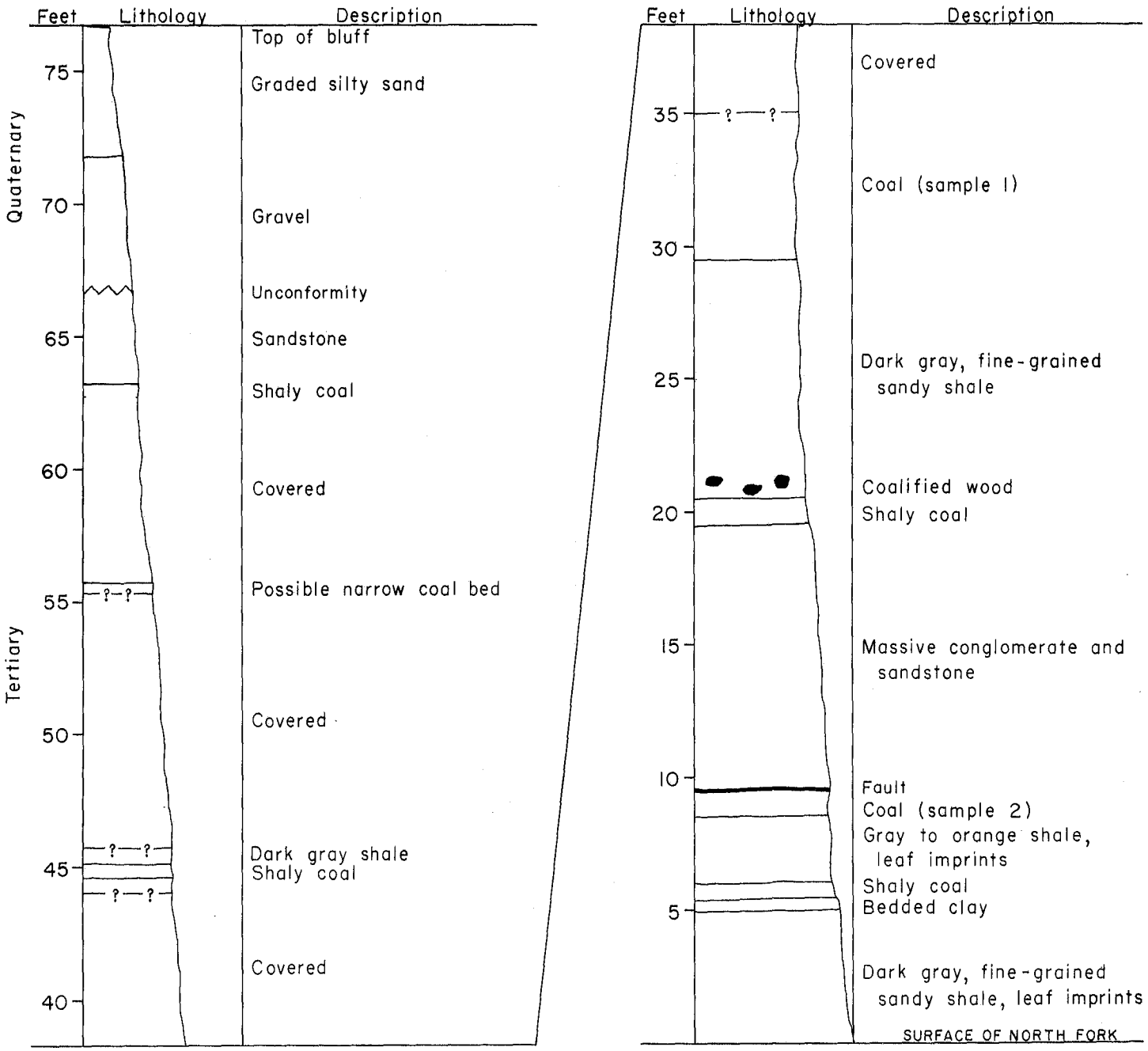
- Tertiary rocks
- Older rocks
- Fault, dashed where inferred
- X Coal occurrence

Age of the sedimentary rocks was first suggested to be Tertiary by Mertie, 1937, p. 175. The Tertiary-age sediments can be distinguished from overlying Quaternary terrace gravels which are much less consolidated and exhibit a cleaner sandy matrix than the muddy wacke matrix of the Tertiary rocks. Fossil leaf impressions are common in the fine-grain Tertiary sediments. Recent examination of the fossils indicate a range of possible age from Oligocene to perhaps as young as mid Miocene (Weber, personal communication).

Lateral continuity of the Tertiary coal-bearing rocks cannot be assessed due to the sparse outcrop and complicated structure caused by proximity to the major faults. Along the North Fork the Tertiary section strikes parallel to the Tintina Fault Zone but dips vary from steeply north to steeply south. Typically the section forms recessive topography underlying unbroken forest and tundra cover and outcrops occur only in bluffs and cutbanks along the larger creeks. Coal exposures are primarily hosted by soft shale and mudstone and consequently weather and slough rapidly. Additionally, the high incidence of Interior Alaska forest fires eventually result in destruction of surface coal exposures and further sloughing.

An exposed section of Tertiary rocks containing several coal beds is located in an 80-ft-high bluff about 2.5 miles northwest of the mouth of the North Fork (fig. 2). Shales, some of which are carbonaceous, and very fine-grain micaceous sandstone intervals also contain beds of shaly coal. The best coal bed consists of a minimum of 5.5 ft of fractured lustrous coal. The footwall to the coal is fine-grain micaceous sandy shale, dipping 35^{o} north with a 098^{o} stike. The upper contact, however, was covered by slide material.

FIGURE 2. – STRATIGRAPHIC SECTION, NORTH FORK OF PREACHER CREEK



Not Completed

Fracturing and internal deformation of coal along bedding planes indicate the coal beds have acted as slip-surfaces for the more competent sandstone and conglomerate as indicated on fig. 2. Sample 1 is a 20-lb channel sample from a trench across 5.5 ft of the upper coal bed whereas sample 2 consisted of 15 lbs from a second 1-ft-thick coal bed located 20 ft down section. Coal from the lower bed had a similar appearance in hand sample to the upper coal bed except for some unidentified bright yellow fracture coatings.

Analytical testing was performed at the University of Alaska, Mineral Industry Research Laboratory, according to ASTM standards. Results shown in Table 1 indicate that coal rank from both seams can be estimated as sub-bituminous A. Although care was taken to avoid inclusion of wall rock in the samples both contain a relatively high ash content apparently due to disseminated mineral material. Upgrading of the coal by washing may be possible, however no testing of the washability characteristics has yet been conducted. Vitranite

TABLE 1. - Coal analyses by ASTM standards

Sample	Basis*	Moisture	Pct Volatile Matter	Pct Fixed Carbon	Pct Ash	Heating Value btu/lb	Total Sulfur
1	1	6.71	25.84	35.66	31.78	8144	0.48
	2		27.70	38.23	34.07	8730	0.51
	3		42.20	57.98		13241	0.77
2	1	7.27	28.48	34.92	29.33	8464	0.69
	2		30.71	37.66	31.63	9127	0.74
	3		44.92	55.08		13349	1.08

*1 - Equilibrium bed moisture
2 - Moisture free
3 - Moisture and ash free

reflectance values for sample 1 average 0.67 and 0.66 for sample 2. These values are approximately twice those found in other coals of the Yukon Flats region (Barker, 1981). It is possible that the reflectance values have been upgraded due to faulting.

Sub-bituminous A coal of sufficient thickness and rank to warrant further evaluation is present in the Preacher Creek area and may represent a local energy source in this area of Interior Alaska. Tertiary rocks apparently underlie much of the area between the major faults of the Tintina Fault Zone and may extend to the northeast along the Preacher Creek valley. Vegetative and soil cover is nearly continuous and continuity of coal beds within this area is unknown. Movement on the Tintina Fault has resulted in structural complications, however intense deformation may likely be limited to relatively narrow zones along the principle faults. Presently, it is unclear how much movement has occurred on the Tintina Fault Zone since the Tertiary coals were deposited.

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