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URANIUM IN THE GLEN WILD AREA WOODRIDGE, NEW YORK, 7.5-MINUTE QUADRANGLE

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ABSTRACT

Uranium occurrences at five localities in a sequence of alternating channel sands and mudstones of the Upper Devonian Catskill Formation are described. The largest occurrence known, at Gibber Egg Company, is about 200 ft long and, in places, more than 1 ft thick. The calcium-uranium silicate uranophane has been identified at one locality, and secondary copper minerals have been identified at three other localities. Chemical U_3O_8 assays as high as 9980 ppm are recorded.

INTRODUCTION

The Glen Wild area is in the south-central portion of the Woodridge, New York, 7.5 minute quadrangle (Figs. 1 and 2). Access to the area is from N. Y. route 17, a major highway. The nearest town is Monticello, the county seat of Sullivan County, 5 mi west of Glen Wild. Catskill-Sullivan International Airport, 11 mi to the west, offers regularly scheduled passenger service.

Uranium in the Glen Wild area has been known since the early 1950s. Katz and Bernstein, consultants to the Thunder Rock Mining Co., a local operation, now defunct, did some detailed work in the area of Fowlwood Brook and identified several mineralized zones. They also undertook a general road reconnaissance of the larger area, with limited results. Between 1955 and 1957 the U.S. Atomic Energy Commission was involved in several reconnaissance investigations around Glen Wild and identified three additional anomalous localities within a 4-sq-mi area (USAEC and USGS, 1969).

Field work for the present report was undertaken as part of the NURE program for the Scranton 2° quadrangle. At the time of the field examination, results of the quadrangle Hydrogeochemical and Stream Sediment Reconnaissance were unavailable. Aerial radiometric data for the area were available but are of little value because of thick soil and dense vegetation. Ground investigations utilized both a hand-held scintillometer (Mt. Sopris SC-132) and a gamma-ray spectrometer (Geometrics GR-400A).

REGIONAL GEOLOGY

The uraniferous horizons of the Glen Wild area are part of the Upper Devonian Catskill Formation of New York and Pennsylvania. Catskill rocks have been described as representing a series of coalescing, prograding deltas and fluvial systems having a source to the east or southeast and thinning to the west. Maximum recorded thickness for the Catskill Formation is 14,000 ft, measured near Lehigh Gap in Pennsylvania (Glaeser, 1974). Source rocks for this pile of sediments have been described as primarily metamorphic, with minor carbonate and reworked clastic material (Way, 1972). Several distinct sediment input centers for these deltas have been reported (Sevon and others, 1978). The exact position of the Glen Wild rocks in this deltaic framework is uncertain.

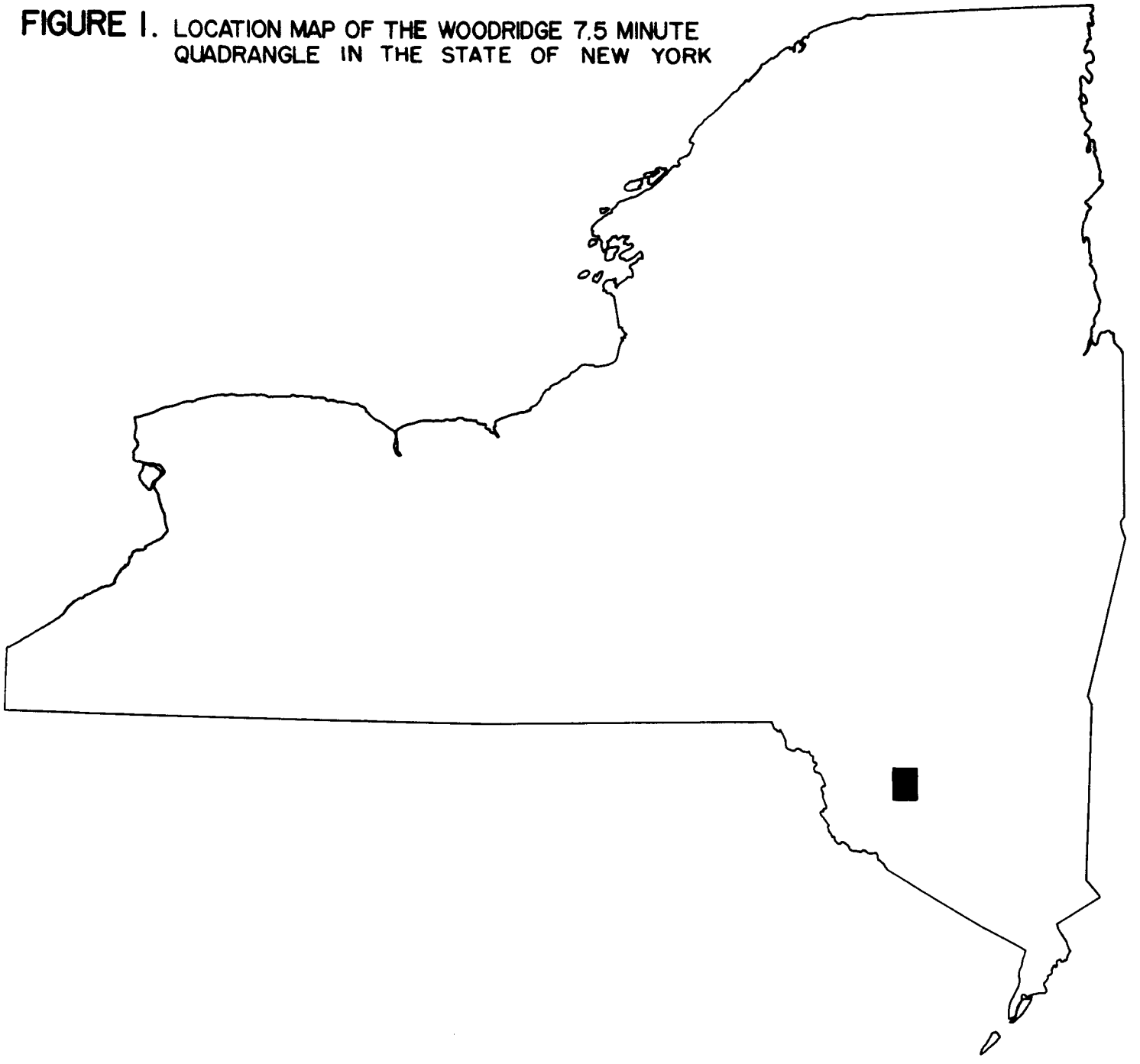
URANIUM OCCURRENCES

Each uranium occurrence locality is shown in Figure 2 and is described below.

LOCALITY 1

This site is on the property of the Gibber Egg Co., Thompsonville, New York. The rocks here form a repeating, fining-upward sequence of gray sandstone

FIGURE 1. LOCATION MAP OF THE WOODRIDGE 7.5 MINUTE QUADRANGLE IN THE STATE OF NEW YORK



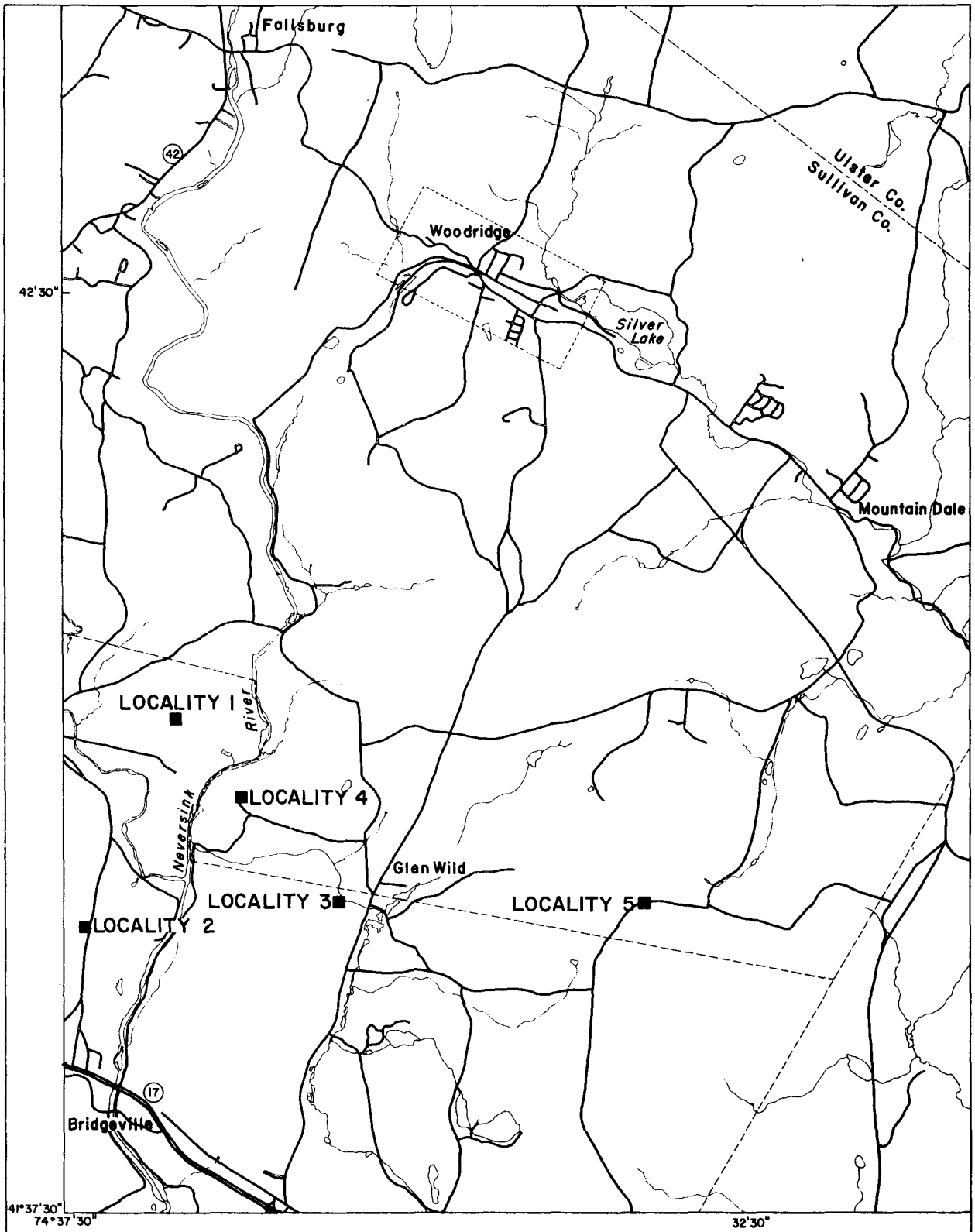


Figure 2. Part of Woodridge, N.Y., 7.5 Minute Quadrangle, Showing Localities

and red mudstone. At least six distinct cycles have been observed (Fig. 3). Differential weathering has caused a series of ledges, or small cliffs, to develop on the hillside above the Neversink River.

The sandstone is medium- to coarse-grained, poorly sorted, and displays well-developed trough crossbedding. Quartz-pebble layers 2-4 in. thick are common. The red mudstone is generally structureless except where there are siltier shale horizons. Contacts between the mudstone and sandstone are erosional.

The highest radiometric values are associated with the channel horizons (Figs. 4 and 5, Table 1). The radiometrically anomalous, coarse, conglomeratic sandstone has been traced 220 ft along a ledge. Organic material consists of plant debris and finely disseminated material. Uranophane, a secondary calcium-uranium silicate, forms powdery yellow coatings on sand grains and pebbles and forms thin seams on the surface of the outcrop. No copper minerals have yet been identified at this locality.

Beneath the channeled horizon there is a second uraniferous zone at the contact between the red mudstone and the gray sandstone (Figs. 3 and 4). Anomalous radiometric readings from this horizon have been traced for 700 ft along the outcrop.

Details of samples collected at this and other localities are given in Appendix 1.

LOCALITY 2

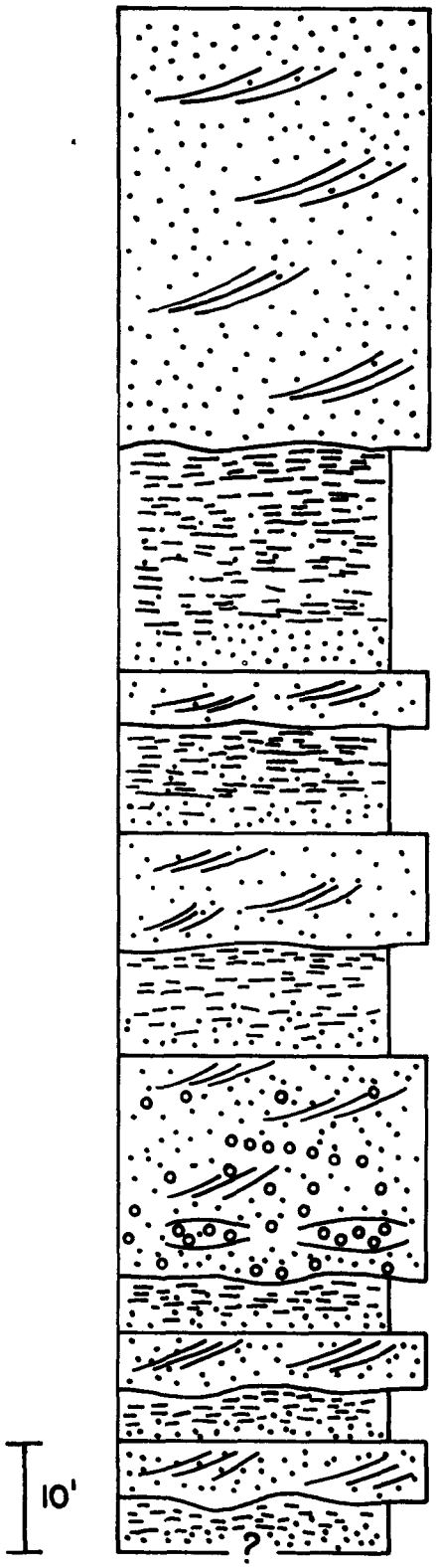
This is a small quarry on the west side of Heiden Road, in the town of Thompson, New York. A 25-ft-thick section of sandstone is exposed. The sandstone is medium- to coarse-grained, well crossbedded, and contains pebble horizons and conglomerate lenses. The color grades from red to greenish gray, and color bands appear to cut across bedding. One conglomerate lens, 5 ft long and 18 in. high, gives radiometric readings greater than 1000 cps and has local spot readings to 5000 cps. Malachite is visible in several places along the quarry face, usually along bedding surfaces and fractures. Organic matter has not been positively identified in hand samples.

LOCALITY 3

This site is in the gorge of Fowlwood Brook, on the property of Zucker's Glen Wild Hotel. The gorge exposes a 150-ft section of sandstone, siltstone, and mudstone, in cycles similar to those at Locality 1. The sandstone is medium- to coarse-grained, poorly sorted, and well crossbedded. Lenses of more-conglomeratic material and scour features suggest a series of braided stream channels. The sandstones at this locality are generally reddish. Gray, reduced zones are developed in some of the conglomerate.

The highest radiometric values are associated with the conglomerate lenses and channel fillings. Organic debris and secondary copper minerals are common at these places also. Figure 6 shows a generalized view of the radiometrically

FIGURE 3. Approximate Stratigraphic Section
Locality I – Woodridge Quadrangle



GRAY, CROSSBEDDED SS.

RED, FINE SS. AND MDST.

GRAY, CROSSBEDDED SS.

RED, FINE SS. AND MDST.

GRAY, CROSSBEDDED SS.

RED, FINE SS. AND MDST.

GRAY, COARSE, CROSSBEDDED SS. AND CGL.

CGL. CHANNELS ↔ *URANIFEROUS HORIZON*

RED, FINE SS. AND MDST.

GRAY, COARSE CROSSBEDDED SS. — *URANIFEROUS HORIZON*

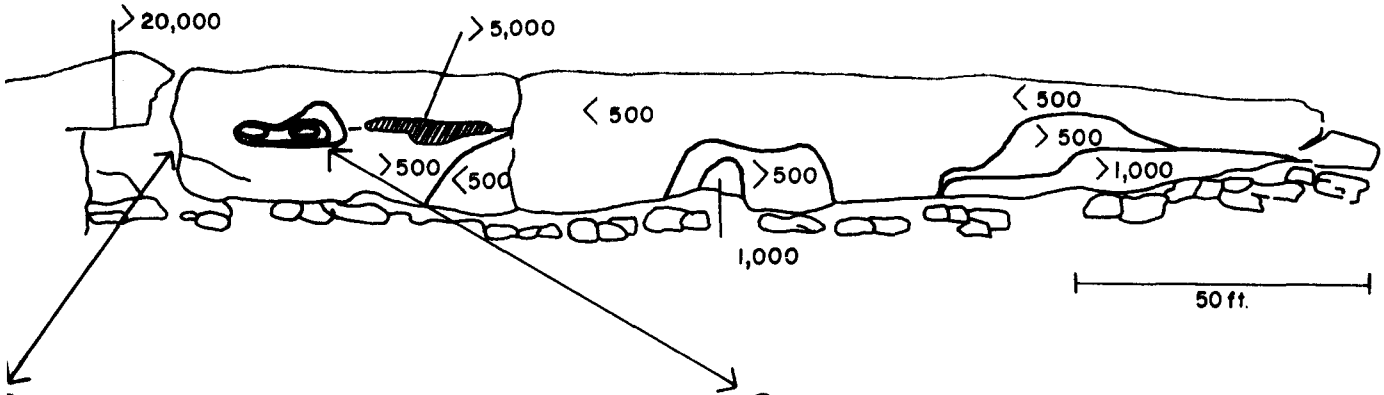
RED, FINE SS. AND MDST.

GRAY, COARSE CROSSBEDDED SS.

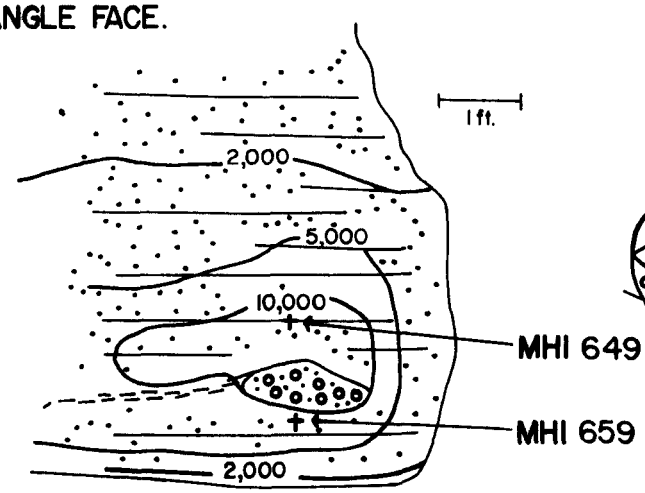
RED, FINE SS. AND MDST.

FIGURE 4. Channels at Gibber's Farm, Locality 1

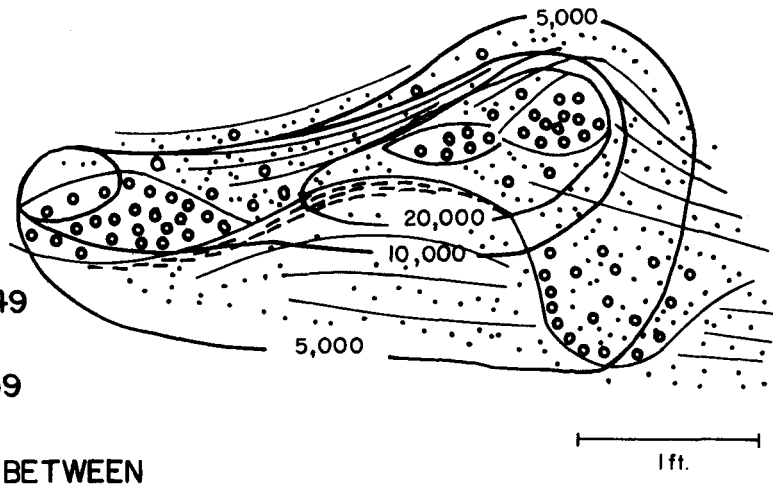
A. IDEALIZED SKETCH OF THE CLIFF FACE WITH CHANNEL CONGLOMERATE, LOCALITY 1. RADIOMETRIC CONTOURS ARE OF SCINTILLOMETER READINGS (CPS.)



B. RADIOMETRIC CONTOURS ON RIGHT ANGLE FACE.



C. DETAIL OF ZONE OF HIGHEST RADIOMETRIC VALUES.



D. RADIOMETRIC CONTOURS AT THE CONTACT BETWEEN THE GRAY SANDSTONE AND RED MUDSTONE

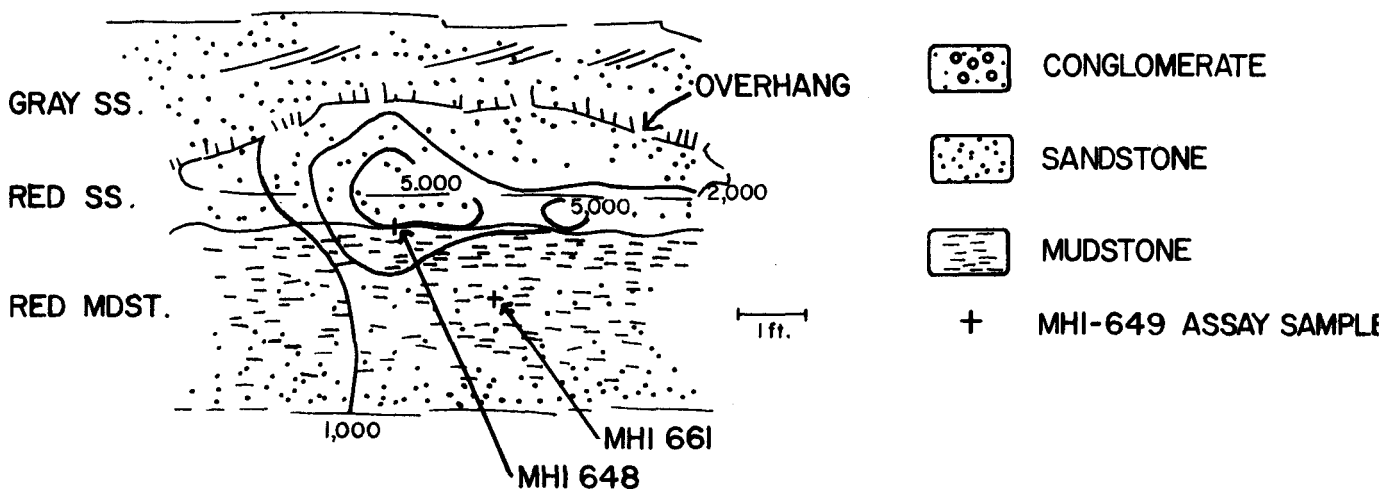


FIGURE 5.

LOCATION OF GAMMA RAY SPECTROMETER STATIONS AND CHEMICAL ASSAY SAMPLES IN THE MAIN CHANNEL ZONE AT LOCALITY I. (SEE CROSS-SECTION C, FIGURE 4.)

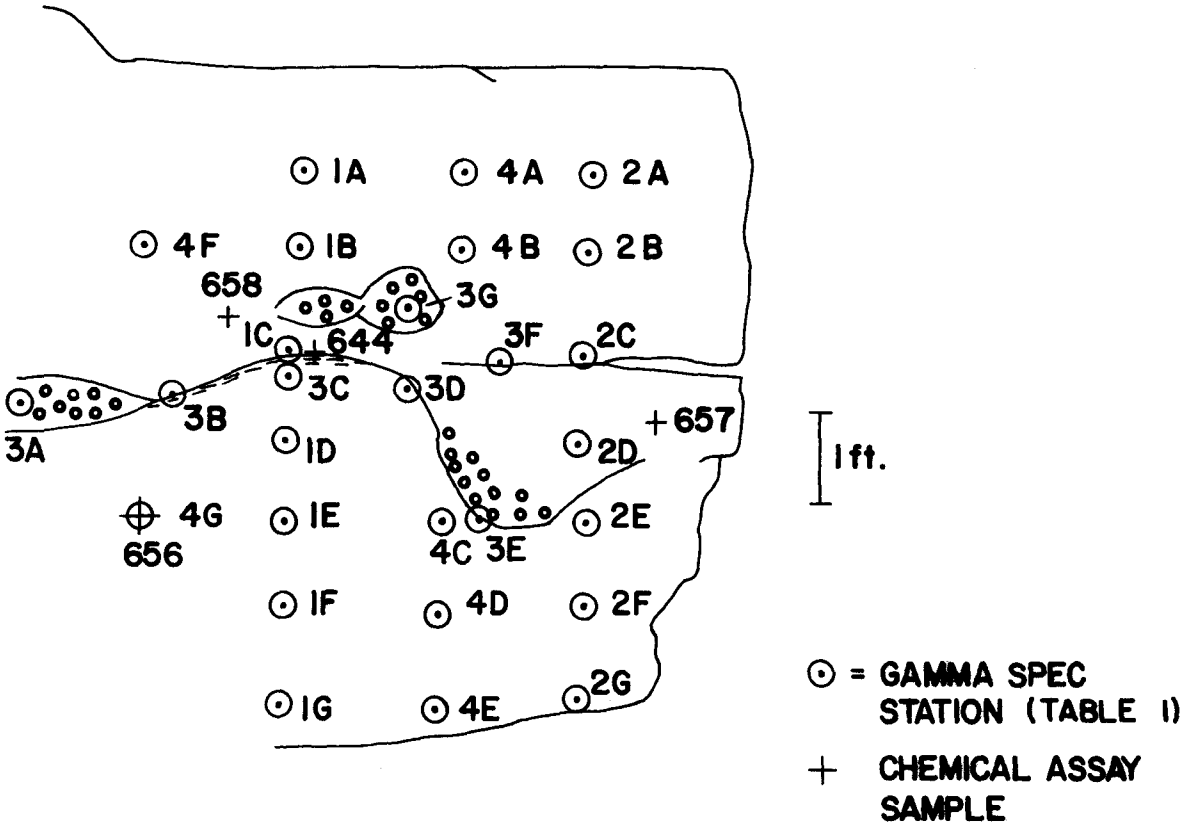
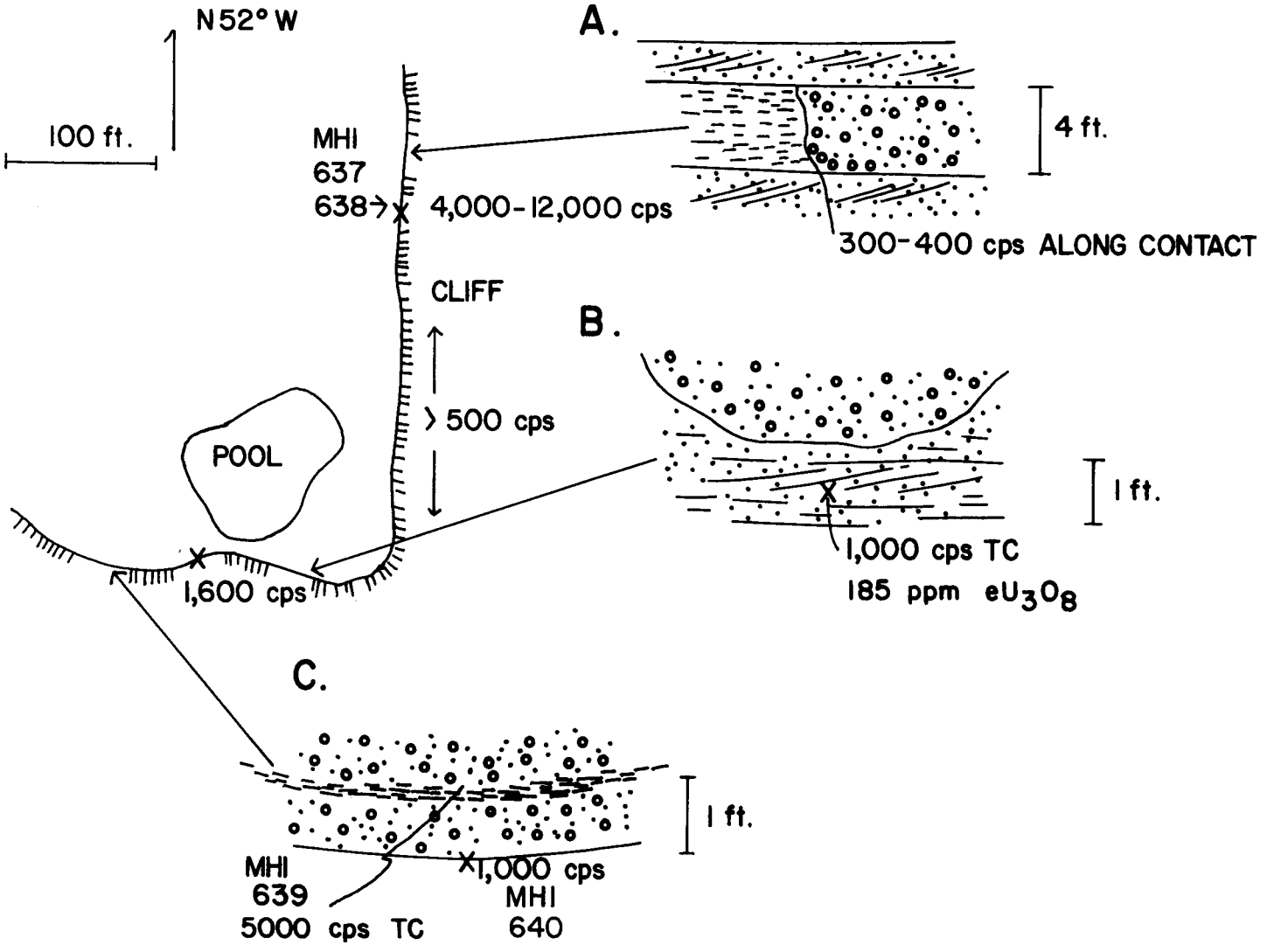


TABLE 1. RESULTS OF A GAMMA-RAY-SPECTROMETER SURVEY ACROSS THE MAIN CHANNEL ZONE AT LOCALITY 1. (SEE FIG. 5 FOR READING LOCATIONS. RESULTS ARE IN COUNTS PER SECOND, EXCEPT AS NOTED.)

No.	TC*	K	U	Th	eU_3O_8 (ppm)
1A	1800	64	64	1	190
1B	2250	113	117	4	349
1C	6500	234	267	7	804
1D	11000	425	475	13	1430
1E	4500	118	120	3	361
1F	1000	48	36	2	104
1G	1000	35	30	3	84
2A	1800	69	71	2	212
2B	2500	99	107	4	318
2C	5000	454	512	13	1544
2D	10000	497	582	12	1761
2E	2500	177	193	5	581
2F	950	43	43	2	126
2G	950	36	34	2	98
3A	16000	620	723	22	2172
3B	12500	526	610	18	1834
3C	20000	1111	1313	48	3928
3D	14500	674	756	23	2272
3E	4700	160	189	5	568
3F	11000	616	731	20	2201
3G	20000	1205	1355	43	4070
4A	2000	80	85	3	253
4B	3000	168	175	5	526
4C	4250	174	197	5	593
4D	1300	50	43	2	126
4E	1000	39	36	2	105
4F	2000	79	75	2	225
4G	5000	218	236	2	717
**BG	117	9.5	2	1.6	---

* Gross counts by scintillometer, all others by gamma spectrometer.
** Averaged background.

FIGURE 6. RADIOMETRICS AND SAMPLE LOCATIONS FOR CHANNELED SANDSTONE AT LOCALITY 3 .



anomalous section of the gorge and sketches of three channel features. Figure 6c depicts one channel where the highest radiometric values are associated with a dark shaley layer between two conglomerate units.

Locality 3 was examined by Katz and Bernstein. They mentioned several mineralized zones along the gorge where high radiometric readings were associated with channel features and organic debris. Their assay results showed between 0.45 and 1.1% U_3O_8 for selected samples. They also state that three tons of high grade ore were stockpiled, although the present authors have been unable to verify this report.

LOCALITY 4

This site is on the property of Bruce Goodwin of Glen Wild, New York. Here, a low ledge of coarse, poorly sorted sandstone and conglomerate crops out over a distance of approximately 200 ft. Radiometric values along this ledge are consistently above the regional background of 110 cps, and locally there are readings in excess of 1000 cps. The highest radioactivity is associated with organic debris in a coarse, reddish sandstone. There are no visible copper or uranium minerals. Limited blasting and pitting was carried out by the landowner in the early 1950s. Assays of up to 0.5% U_3O_8 for fresh material have been obtained (USAEC and USGS, 1969).

LOCALITY 5

This site is on the north side of Taylor Road, in the town of Fallsburg, New York. It was discovered during the course of a radiometric road reconnaissance. Bedrock at this site is buried beneath a clayey soil horizon as much as 2 ft thick. This soil layer greatly attenuates radioactivity from the underlying rock. Removal of 8 in. of soil over the strongest anomaly produced a tenfold increase in radiometric response. At other spots the attenuation was less but still significant. Anomalous radiometric response was also found over a roughly linear zone extending several hundred feet northeast and southwest of the road site. The soil cover prevented identification of any structures in the underlying rock.

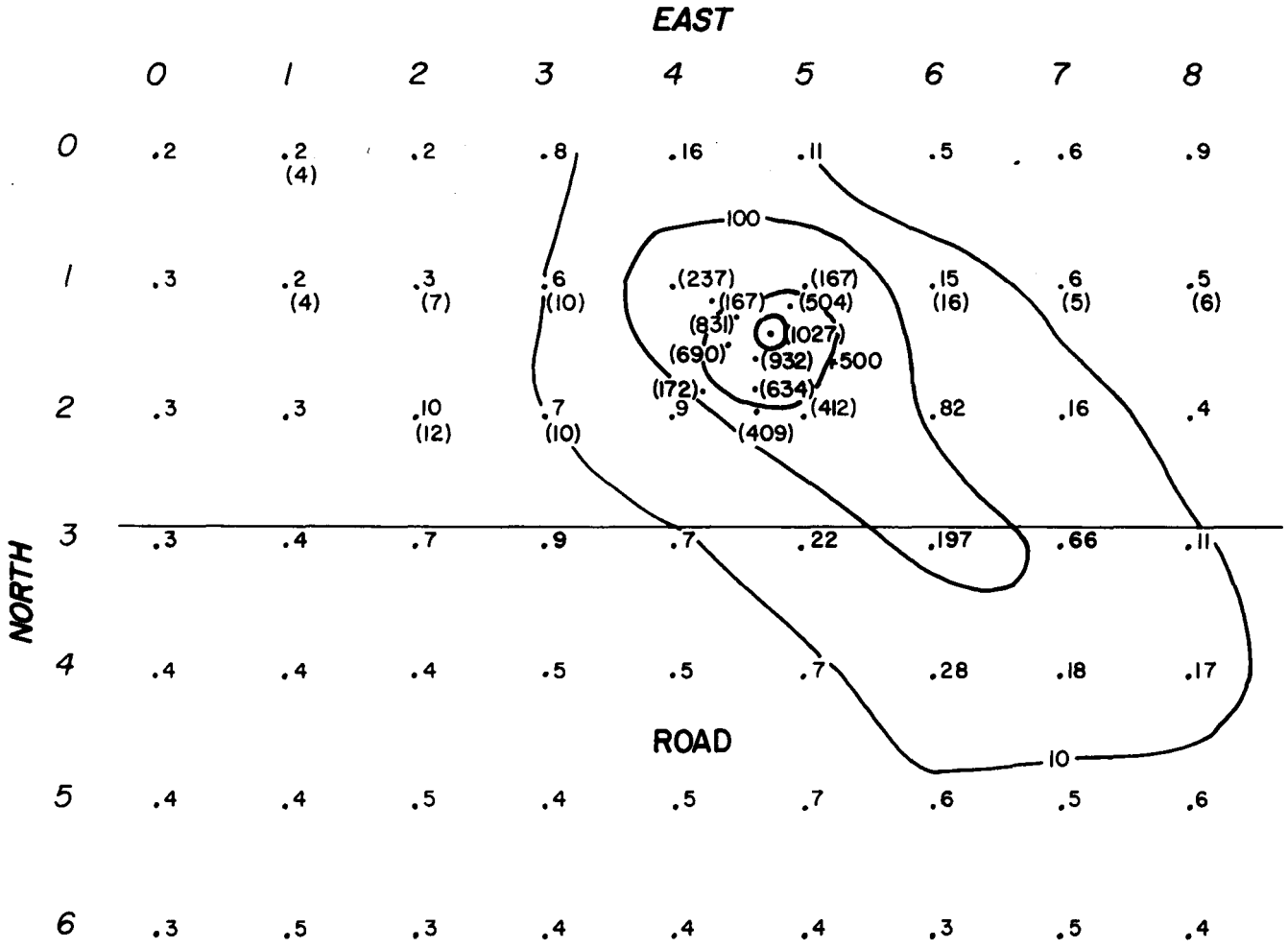
The rock uncovered beside Taylor Road is a coarse-grained, poorly sorted sandstone. The overall color is gray, but hand-sample examination shows small spots of hematitic stain. Organic material, malachite, and possible secondary uranium minerals are visible in some pieces.

A detailed radiometric survey was carried out over an area of 432 sq ft around the main anomalous zone (Fig. 7). Results show that the surface expression of the anomaly is roughly lenticular.

DISCUSSION

The brief field reconnaissance indicates that the rocks of the Glen Wild area belong to the upland alluvial-fan-and-braided-stream association described

FIGURE 7. RADIOMETRIC SURVEY OF THE MAIN ANOMALOUS ZONE AT LOCALITY 5. CONTOURS ARE OF EQUIVALENT URANIUM (ppm) OBTAINED BY GAMMA-RAY SPECTROMETER. X=SURFACE MEASUREMENT, (X)=MEASUREMENT WITH SOIL REMOVED. GRID INTERVAL=3 FEET.



by Way (1972), which places the region very close to the sediment source. This conclusion is based on the coarseness of the rocks involved and the nature of the sedimentary structures, such as well-developed channels, channel bars, and lenticular sand bodies. The patterns of the large channel features and measurements of paleocurrent directions suggest a northwesterly trend, which is consistent with the accepted trends for the Catskill sediment input systems defined by Sevon and others (1978) for Pennsylvania.

Correlation of the uraniferous horizons is difficult because of a lack of stratigraphic control. However, because the regional dip is less than 5° and most of the uraniferous horizons are at the same elevation, it seems probable that the uranium mineralization is found within a restricted stratigraphic interval.

ORIGIN OF THE ORE

At present the source and mechanism for uranium concentration in the Glen Wild area are unknown. Two possible models are suggested. In both models organic debris is the most likely reductant and fixing agent for the uranium. No features indicative of roll-front type mineralization have been observed in the Glen Wild area.

Diagenetic Model

Uranium ions are adsorbed on the surface of clay particles and carried in the suspended load to be deposited with the red muds. During burial and diagenesis the muds are compacted and liberate water. Under appropriate Eh and pH conditions uranium is released from the clay particles and goes into solution. Water saturated in uranium then migrates through the muds to a conglomeratic channel, which acts as a conduit for ground water, and is carried to a concentrating point.

Syngenetic Model

Uranium-saturated ground waters enter the system from an outside source, presumed to be a metamorphic terrain to the east exposed during Devonian times. The fluids travel most readily through the coarser conglomeratic layers and are stratigraphically bound by the less-permeable red mudstones.

ACKNOWLEDGEMENTS

The writers wish to acknowledge the assistance of Dr. Leon Roe and Mr. Thomas Martin in collecting the data for this report.

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APPENDIX 1. URANIUM VALUES (CHEMICAL)

No.	U_3O_8 (ppm)	Sample Type
LOCALITY 1		
644	2760	Shaley horizon in main channel
647	390	Dark shaley horizon in channeled sandstone
648	540	Erosional contact of red mudstone and gray sandstone
649	71	Coarse sandstone from fracture
650	263	Coarse sandstone for comparison
656	11	
657	678	Coarse sandstone from main channel
658	790	zone for comparison
659	53	Conglomerate from fracture
661	51	Red mudstone for comparison
669	9980	Reddish sandstone float near main channel
LOCALITY 2		
645	3	Gray sandstone with malachite
646	6	Red sandstone
LOCALITY 3		
637	39	Reddish sandstone float
638	880	Reddish sandstone with malachite
639	1530	Gray shaley layer in conglomerate
640	4	Reddish sandstone for comparison
LOCALITY 4		
642	1060	Coarse reddish sandstone with organics
643	3	Coarse reddish sandstone without organics
LOCALITY 5		
641	2880	Coarse reddish sandstone with secondary Cu and U minerals