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Water Quality in Upper Tonawanda Creek*

*By: Bernard A. Marcus  
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THE ROCHESTER COMMITTEE FOR SCIENTIFIC INFORMATION  
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Water Pollution

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by  
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Summary

A section of Tonawanda Creek south of Attica, New York, was found to be significantly contaminated with fecal coliform bacteria in an investigation conducted in the spring of 1971 and reported here for the first time. It is shown that the creek is being polluted with fecal matter either from streamside farms or homes or both. This section of the creek was selected for impoundment by a dam by the Erie-Niagara Basin Regional Water Resources Planning Board. Information previously available on the chemistry of the creek and its aquatic insect community indicates that the water quality is still high. Any plans for the creek ought to start with provisions for controlling the fecal pollution to conserve water quality.

Background

Tonawanda Creek is the major stream to drain the Erie-Niagara basin in Genesee County. The stream originates in the low hills of Wyoming County near North Java and flows north past the two small settlements of Johnsonburg and Varysburg and past Attica to Batavia where it heads west to empty into the Niagara River.

The stream is said to be locally polluted at Attica where the prison and village discharge inadequately treated wastes and at Batavia where the waters receive both some enrichment from the city and toxic wastes from the National Lead Company (1, 2).

In Wyoming County the banks of the creek are generally forested near the source with dairy farmland further downstream. The section near the Erie-Genesee County line is in the Tonawanda Game Management Area and the Department of Environmental Conservation has proposed that additional acreage within the flood plain be reserved for recreation.

In general, the stream in Wyoming County is in an undeveloped area and until 1969 was sparsely studied. Interest in the stream was aroused in 1969 when the Erie-Niagara Basin Regional Water Resources Planning Board proposed the construction of a multi-purpose dam on the upper section of the Tonawanda Creek at Sierks, roughly 3 miles south of the village of Attica (Fig. 1, ds) (3). The Project calls for an earthen dam with concrete spillway and a resulting reservoir to be used for flood control, outdoor recreation, water supply, improvement of water quality, irrigation, fish and wildlife enhancement, stream flow augmentation, and is presently pending further

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investigation by the Corps of Engineers. An Environmental Impact Statement has not been written yet. The proposal is, of course, opposed by those who object to damming.

The upper reaches of the stream support trout (1, 2) and both mayfly and stonefly larvae (4) which means that dissolved oxygen is high and the water relatively clean since these are sensitive species and their disappearance from a stream is an indication of pollution. In the summer of 1971 dissolved oxygen concentration was at least 5 ppm (4).

Neither nitrates (2.2 ppm) nor phosphates (0.45 ppm) are considered excessively high in upper Tonawanda Creek (4). Nitrates are higher than phosphates. In farm areas fertilizer run-off is often responsible for high nitrate levels in water, but this is a dairy farm area, and animal pollution may add to the nitrate level.

The portion of Tonawanda Creek in Wyoming County has an A classification (5), which means among other things that it is useable for swimming, and State guidelines for safe swimming allow up to 2,400 coliform organisms per 100 ml. of water (6). Total coliform count is theoretically always higher than fecal coliform count. This study was undertaken to see if the stream meets its assigned A classification.

#### Coliform Bacteria in Upper Tonawanda Creek

Water was sampled between February 15 and May 7, 1971 at two sites labelled B and C on the map in Figure 1. Site B is at the bridge in Varysburg where US Route 20A crosses the creek, and C is one and one-half miles north of B. Site B is above the proposed dam, Site C is in the area to be impounded and the proposed location of the dam is marked Site D, ds. Techniques from Standard Methods Edition 12, Part VII were used with elevated temperatures and EC media. These techniques are definitive for coliform bacteria of fecal origin.

Table 1. Count of Coliform Bacteria in the Water of Upper Tonawanda Creek.

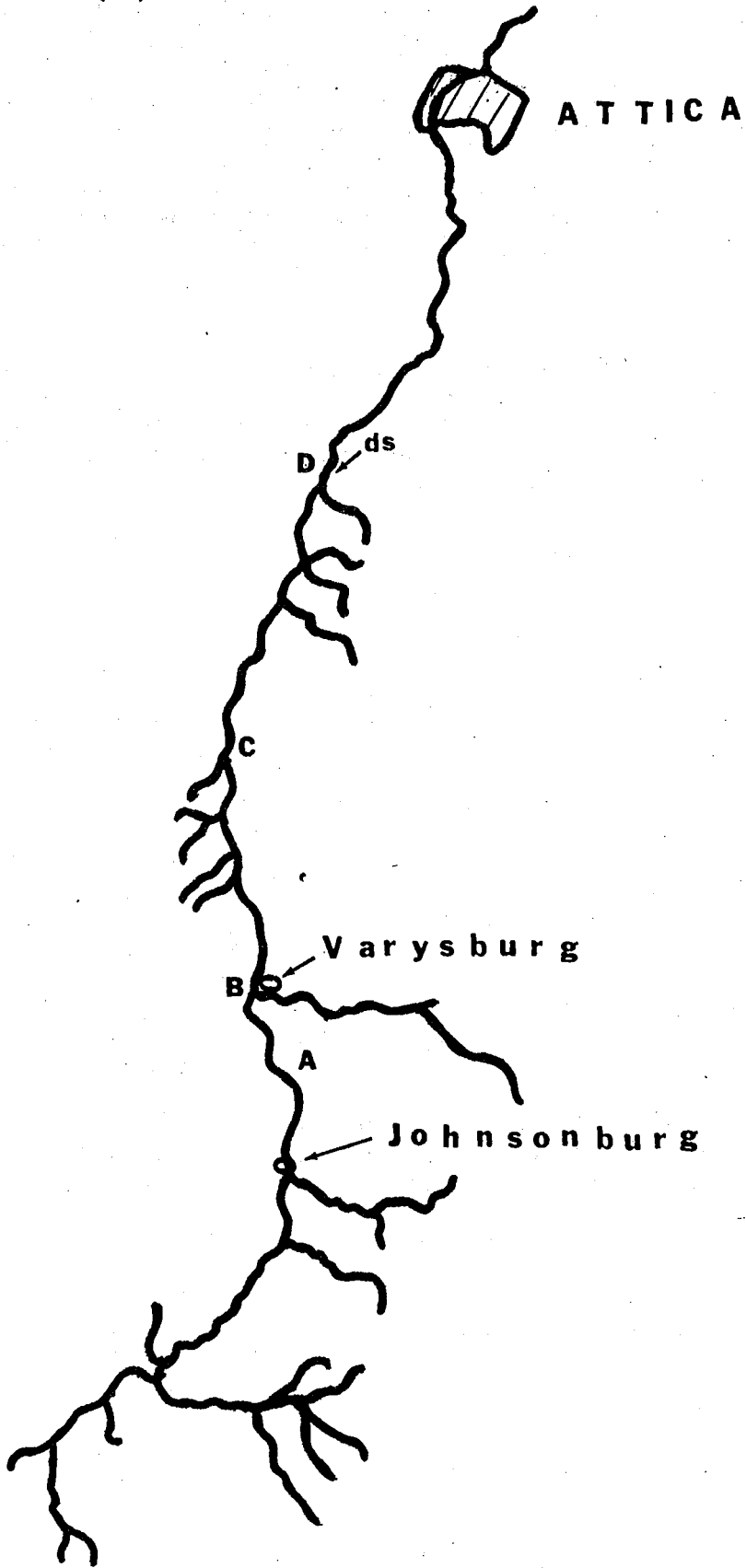
Collection Date, 1971	Water Temp. °C	Number of samples in each class*					All samples	Percent of samples that had MPN greater than 2,400
		MPN** 2,000	MPN 3,500	MPN 10,000	MPN 16,000	MPN 24,000		
<u>Site B</u>								
2/15 - 3/14	0		2	1	1	4	8	100
3/15 - 4/14	0-6	1	1	1	1	4	8	88
4/15 - 5/14	7-11		1		1	4	6	100
<u>Site C</u>								
2/15 - 3/14	0		1	1	1	5	8	100
3/15 - 4/14	0-6	1	1		1	5	8	88
4/15 - 5/14	7-11				1	5	6	100

\* Samples were classified by the content of coliform bacteria.

\*\*MPN is the count per 100 ml of sample by the Most Probable Number method.

Tonawanda Creek is contaminated with coliform bacteria (Table 1). Contamination was of equal dimension at both sites tested and did not vary in degree between February and May. In all but 2 samples there were more than 2,400 fecal coliforms per 100 ml. of water. In 17 of the 44 trials the count was less than 16,000; in the remaining 27 it was 24,000 or higher. Thus in 60% of the trials the coliform concentration was ten times the number recommended for safe swimming. In addition, bacteria multiply more rapidly in warm than in cold water so the counts may be somewhat higher during the summer months. Alternatively, counts in several creeks near Rochester (7,8) are in the millions, so these figures are not characteristic of severe pollution by municipal sewage.

Figure 1. Map of Upper Tonawanda Creek showing locations of sampling areas (B & C) and site of proposed dam (ds).



1 mi.

## Sources of Coliform Bacteria in Tonawanda Creek

These tests were made in an area with several large dairy farms and the cows use the stream for drinking water. It is, therefore, probable that cattle are responsible for at least some of the coliform organisms found. However, the two communities, farm houses, and streamside dwellings may also contribute to pollution. No public sewage treatment is provided in either Varysburg or Johnsonburg. There is a pipe ending at the bank of the creek in a direct line from a house upstream from Johnsonburg and two pipes are clearly observable immediately upstream from Site B in Varysburg. In addition there may be outflow from improperly placed septic tanks. Tests to differentiate between animal and human coliforms will be made next summer.

### Conclusion

When the proposed impoundment of Tonawanda Creek is investigated by the Corps of Engineers, the sources of pollution of creek water reported in this bulletin should be identified. Whether a reservoir is built or the creek is left in its natural condition, steps should be taken to control existing pollution and maintain the quality of the creek at its otherwise high level.

### References

- (1) U.S. Department of the Interior and New York State Department of Health. Water Pollution Problems and Improvement Needs - Lake Ontario and St. Lawrence River Basins. June, 1968
- (2) Genesee/Finger Lakes Regional Planning Board Technical Study Series Report Number 2. Drainage - Regional Inventory and Analysis. 1969
- (3) Erie-Niagara Basin Comprehensive Water Resources Plan; Main Report. Erie-Niagara Basin Regional Water Resources Planning Board, West Seneca, New York. 1969
- (4) B. A. Marcus and F. J. Little, Jr., "A Biological Survey of the Upper Tonawanda Creek Relative to a Proposal of Impoundment", Proceedings of the Rochester (N.Y.) Academy of Science, Vol. 12, No. 3. In review.
- (5) Classifications and Standards of Quality and Purity for Fresh Surface Waters: Lake Erie (east end) - Niagara River Basins. New York State Department of Health, Water Pollution Control Board, Herman E. Hillebee, M.D., Chairman. December, 1954
- (6) Classifications and Standards of Quality and Purity for Waters of New York State. Prepared for Water Resources Commission, R. Stewart Kilborn, Chairman, by N.Y. State Dept. of Health, Hollis Ingraham, Commissioner, November, 1968.
- (7) R.C.S.I. Bulletin #19, "Scottsville Revisited - Sewage Pollution of Oatka Creek", November 1966.
- (8) R.C.S.I. Bulletin #33, "Continued Pollution of Thompson Creek, Densmore Creek and Slater Creek with Undisinfected Sewage", July 1967.