

Tracing an Outbreak by Alan F. Rumrill

During recent weeks, people around the world have become familiar with the terms “contact tracing” and “community transmission” in connection with the coronavirus pandemic. Contact tracing is the procedure used to identify people who may have come into contact with an infected person and then collecting additional information about that contact. Community transmission is the process by which an infectious disease spreads through a large group of people in a general way, so that the source of the infection in specific cases is not known. These are just two of the numerous processes that the medical community and state governments are using or monitoring in their attempt to learn about and slow the spread of the virus.



New dam at Woodward Pond, constructed during improvements to the city water system

Sixty years ago the City of Keene was using similar procedures in an attempt to discover the source and slow the advance of an infectious disease that was spreading, and spreading fear, through the community. During the last weeks of 1959 six-year-old Tim Hockett of Keene suddenly spiked a fever, vomited and suffered a bloody nose. His concerned parents took him to Elliot Community Hospital where he was admitted for testing and observation. Within a few days more than a dozen other people suffering similar

symptoms were admitted to the hospital, where they were all placed in an isolated wing at the facility.

Testing determined that they had all contracted typhoid fever.

Typhoid fever is not a virus like COVID-19, but is a bacterial infection caused by *Salmonella* bacteria. Symptoms, in addition to those experienced by Tim Hockett, generally include severe intestinal inflammation. Typhoid is spread through contaminated food and water or through close contact with an infected person. The disease is highly infectious and can be fatal. Sixteen people eventually tested positive in Keene.

Medical professionals immediately went to work to try to track the source of the typhoid in the city. The victims did not live near each other, purchased their food at different locations, and did not have close social connections. The most obvious explanation was the Keene water supply, but why did so few people get sick in a city of more than 20,000 residents, and why did only some members of individual households become ill?

In a *Keene Sentinel* article published on December 2, entitled “Current Tests Seek Typhoid Fever Carrier,” Keene City Board of Health chairman, Dr. Thomas Lacey, reported that the water had been tested and was now safe, but there was evidence that it had been

contaminated for a brief period. The city needed to determine the source of the outbreak to ensure that it did not happen again. A U.S. Public Health Specialist from Atlanta was called in to assist. Lacey suggested that the contamination of the water probably occurred near the source of the city's supply in the town of Roxbury.

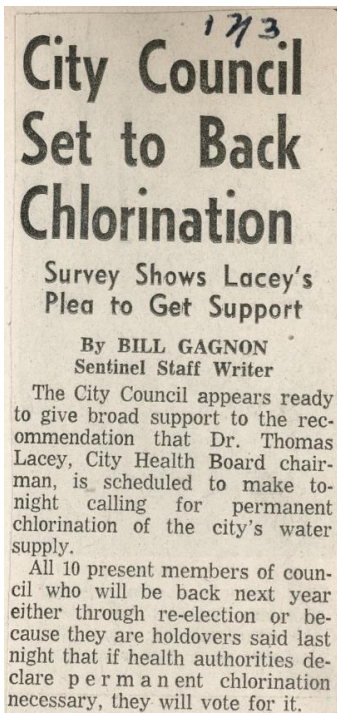
The water lines and reservoirs were checked from Keene back into the woods of Roxbury. There, near a pond that served as one of the city's water reservoirs, investigators found a small logging encampment. Two men and a woman were living there in a temporary logging camp as the men cleared trees for the city. They had prepared a latrine for their waste, but heavy rains in late October had overwhelmed their system. Some fecal matter washed into a nearby creek and from there made its way into the city reservoir. One of the loggers proved to be a typhoid carrier and the source of the contamination. The city had water filters in place to screen for contamination of this nature but, unfortunately, the system had been cleaned just before the heavy rains of October. This process impacted the system just enough to allow the typhoid pathogens to get through the system and into the water pipes of Keene residents.

It was clear that little of the typhoid bacteria made it into Keene homes, based on the small percentage of the population that became ill. One of the 16 victims, an older man with pre-existing medical conditions, died after contracting typhoid. The others recovered and went home, but some suffered recurring symptoms for years, and at least one developed a strong distaste for drinking water. The city approved \$67,000 in settlements to be paid to the typhoid victims.

Within days of the discovery of typhoid, the city approved the installation of a temporary chlorination system for the city's water. The community had been discussing the possible use of chlorine in the water for a few years, but this experience resulted in immediate response. The *Sentinel* reported on December 4 that a system had been delivered and would probably be installed by the end of the day. The city council soon approved a permanent system as well. The Keene outbreak was used in a regional case study to show the necessity of adding chlorine to public water systems.

Today medical professionals and government officials are working diligently to track and slow the spread of COVID-19. Keene found itself in a similar situation two generations ago when typhoid entered its water system.

The city's self-appointed "medical detective" was able to quickly trace the source of the contagion and the city took steps to ensure the safety of its drinking water supplies. Author James A. Rousmaniere, in his book *Water Connections*, indicates that "typhoid has never again gotten into a public water source in the United States" since those scary weeks in Keene 60 years ago.



[Keene Sentinel article on water chlorination, 1959](#)