**A Grave Mistake**

**Background**

Arsenic, a naturally occurring chemical element, is currently used primarily in the production of pesticides and wood preservatives. In some areas, levels of arsenic are increasing in ground water because of seepage from hazardous waste sites. In the past, arsenic compounds were used for the treatment of certain diseases. This practice has been discontinued because of an awareness of arsenic’s negative effects and because of the development of safer drugs.

 Throughout the world, arsenic in ground water often comes from natural sources such as bedrock. The highest natural concentrations of arsenic in the United States are found in the Southwest, the Northwest, Alaska, and other areas near geothermal activity. Arsenical pesticide runoff also produces elevated arsenic levels in ground water.

 However, another potential source of ground water contamination by arsenic is cemeteries! From 1880 to about 1910, arsenic was widely used as an embalming fluid. During the American Civil War, a physician developed an embalming fluid that preserved the bodies of thousands of dead soldiers for their long journey home; arsenic was a major ingredient. Because the only alternative was to use ice, this fluid was considered a major advancement and was soon adopted throughout the country. Of course, people in the late 1800s did not recognize the significance of concentrating large amounts of arsenic in a particular area such as a cemetery.

 During this period, people were buried in wooden coffins or metal containers that degraded over time. Arsenic, a basic element, does not degrade. As water moves downward through the soils of cemeteries, it can carry arsenic through the ground water. Therefore, the potential exists for ground water contamination by arsenic in areas near cemeteries where burials were conducted from 1880 to 1910.

Arsenic poisoning may be either acute or chronic. Acute poisoning occurs when a person ingests a large quantity of arsenic at one time. This condition is characterized by vomiting and diarrhea, and may lead to shock, coma, and even death. Chronic poisoning occurs over a longer period of time. Symptoms of chronic poisoning include skin lesions that are noncancerous and tingling, and numbness of the soles and palms that develops into a painful condition called neuritis. With neuritis, reflexes in the extremities may be impaired and even lost. Upon identification and treatment of the condition, the patient generally recovers within months—although recovery is not always complete.

By sampling well water, we can assess changes in ground water quality or quantity. This is accomplished either by drilling wells specifically to secure water quality data or by sampling existing wells (e.g., city wells, individual domestic wells, irrigation wells, and stock wells). Hydrologists need ample sampling sites (wells) when investigating an area's ground water to ensure accurate results.