A family portrait

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Times change but people don't ... the griefs ... and victories of the men and women who were here before us are in fact the maps of our own lives.

Richard Snow[1]

A photograph can set a story in motion. In this photograph there are some observable facts and assumptions, and a story emerges.

The house

The house has the steep pitched roof of a snowy climate; only one chimney can be seen, suggesting there might be a furnace in the cellar. The upper-storey double window is a central projecting bay, hinting at a central hall, and the 2 windows in the right gable suggest 4 bedrooms. There are no power or telephone lines. The front storm porch, supporting the projecting bay, and the outside entrance to the cellar (the winter larder) are functional aspects of the architecture. By now the mechanical fretsaw* has been invented, and you can see Victorian gingerbread scrollwork at the peak and in the brackets supporting the external molding around the base of the veranda roof. Despite these touches, there is no softening latticework or shrubbery, and the house looks bleak perched on its rocky knoll in the spruce forest.

At times in history, architecture was more technically advanced than other disciplines, including medicine.

The mother and children are well dressed, out for a stroll on a spring day down a rocky path with their elegant wicker baby carriage. These are observations. Photographs record a moment in time. What they cannot tell us is what will happen. Within a year, one of the children in the photograph will die of diphtheria.

Diphtheria

There was a diphtheria epidemic in Spain in 1613. It was known as *El Año de los Garrotillos* (the Year of Strangulations).

In 1925, Sinclair Lewis published *Arrowsmith*.[2] There are themes in the book that are as relevant today as they

*The first mechanical fretsaws were produced in the 1860s, and decorative fretwork flourished as a result. Fretwork retained its popularity as an architectural feature into the 20th century.

were in the 1920s: commercialism in medicine, and the importance of the science and the art of medicine, of educating the public, and of timely diagnosis and treatment of disease. Dr Martin Arrowsmith, the central character in the book and a brand-new rural physician, is called at 3:00 AM to see a sick child. The father says, "My little girl, Mary, she has a terrible sore throat."[2] Dr Arrowsmith gets directions, thinks he can be there in 8 minutes, and rushes off in his car; he gets lost and arrives 40 minutes later. The child is 7 or 8 years old; her breathing is laboured; she is not flushed, but her lips and fingertips are blue. Dr Arrowsmith makes a tentative diagnosis of diphtheria and decides that he has no time to confirm the diagnosis with a culture. He has to either do a tracheostomy or get diphtheria antitoxin. He decides on the latter. He can't get the pharmacist on the phone so he drives at breakneck speed to Leopolis, the next town, in 37 minutes; he gets the pharmacist out of bed, gets the antitoxin, and rushes back to the farmhouse. Mary's condition has worsened. He gives her the antitoxin.

Harriette Arnow describes a case of diphtheria in her novel *The Dollmaker*.[3] Gertie Nevels, the heroine of the story, is from the hills of Kentucky. It is the early 1940s and she is taking her infant son, Amos, who has become increasingly ill, to get medical help. She flags down an army car that goes off the road to avoid hitting her. Before they can get the car back on the road, Amos' condition worsens: "His unseeing eyes were rolled back; the whites bulged out of his dark, purplish face, while mucus and saliva dribbled from his blue-lipped swollen mouth."[3] Then, to the startled amazement of the driver, Gertie asks him to hold Amos while she does a tracheostomy. She keeps the incision open with a hairpin and then whittles a tube from a small poplar branch at the roadside and puts the improvised tracheostomy tube in Amos's neck.

Progress

Diphtheria is an ancient, highly infectious disease that was accurately described by Aretaeus 2000 years ago. The French physician Bretonneau gave the first modern clinical description of the disease and provided the name *diphtheria* in 1826.[4] Children who had no natural immunity were susceptible to the disease, especially during the winter. The bacteria would settle in the nasopharynx, where it produced a toxin that destroyed tissue and provoked an inflammatory response. This reaction caused a membrane to form that could extend from the tonsils down to the larynx and cover it. The toxin could also cause myocarditis and neuropathy, but it was the membrane over the larynx that resulted in a mortality rate as high as 50%.[4]

Edwin Klebs, in 1883, observed *Corynebacterium diphtheriae*, and Friedrich Löffler, in 1884, obtained the first pure cultures. In 1894, Emil von Behring developed diphtheria antitoxin. Treating diphtheria immediately with antitoxin reduced the mortality rate to below 15%. Immunization programs for diphtheria began in Canada in the 1930s. The Public Health Agency of Canada notes that diphtheria "was once one of the most common causes of death in Canadian children under the age of 5 .... Thanks to immunization, in the last twenty years less than 5 cases of diphtheria are reported each year in Canada."[5]

The stories

Dr Arrowsmith, in his excitement, loses time getting to his patient, and makes a clinical decision without taking into consideration that diphtheria antitoxin does not neutralize toxin already bound to tissue, and that delaying administration is associated with increased mortality. Nevertheless, he "swiftly, smoothly" gives Mary an intravenous injection of antitoxin and waits expectantly. Mary chokes trying to breathe, and dies. The family responds, "You killed her, with that needle thing! And not even tell us, so we could call the priest."[2] Dr Arrowsmith is filled with remorse at not doing a tracheostomy and briefly considers leaving medicine, but doesn't.

In *The Dollmaker*, Gertie Nevels gains the respect of the army driver and his officer, and they drive her to a hospital in Lexington.

> [The doctor] considered Amos briefly .... let his eyes stop and stay on the wooden pipe. His mouth opened, then closed, opened again as he said to [Gertie] in a slow, seemingly unconcerned voice that he might have used to discuss the weather ... "I believe we'd better use a different kind of tube" .... And ... as he fitted a stethoscope to his ears, "Been sick long?"[3]

The medical lessons safely learned in fiction can be powerful teaching tools. These medical lessons, like other life lessons we learn through stories, are even more meaningful when we know the full literary context.

In my family's story, Abbie, the second child from the left in the photograph, the girl in the pinafore with her hands steadying the baby carriage, died of diphtheria on November 29, 1909, a few weeks after her 9th birthday. A solidly built, warm, well-provisioned home provided no protection. A doctor lived just a few minutes away. He might or might not have had diphtheria antitoxin. He might or might not have been available. The baby in the carriage is my father. He developed diphtheria and survived.

My family is immunized.

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Competing interests
None declared

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