

Mycolens is a new section in *IMA Fungus* introduced for historical or topical commentaries and observations of potential interest to a wide range of mycologists, but which fall outside the scope of other sections of the journal.

Memorials to the Great Famine

When I was an undergraduate student, potato blight was just a plant pathogen, an exemplar of the importance of fungi, and a symbol of the struggles to understand the microbial world. In the nineteenth century when the blight took hold, there were serious consideration of whether the disease was caused by electricity. Pasteur's Germ Theory had not yet been published. The Reverend Miles Joseph Berkeley achieved notoriety and then fame with his outrageous claim that the so-called potato murrain was caused by a fungus, then called *Botrytis infestans* (now *Phytophthora*). The human dimension did not cross my mind until I read Andrea Barrett's poignant novella *Ship Fever*, which told the story of Irish immigrants processed at a typhus quarantine station on Grosse Île in the St. Lawrence River. This story, written by an American, taught me something about Canadian history that no one had mentioned in school, augmenting the misery of starvation

already caused by potato blight with a brutal bacterial disease. Desperate Irish families who could afford the price of passage were crammed onto ships that were then overrun by typhus, or ship fever. These vessels became known as ghost ships, or if everyone died and they sank into the ocean, coffin ships. The dead were tossed overboard, the ill were torn away from their families for indefinite quarantine on Grosse Île, and the apparently healthy were allowed to continue on to Quebec City. From there, they dispersed widely across Canada and New England, often never to see their families again. Quebec City, now one of North America's jewels, then had slums full of rats, disease and poverty.

In 2006, a joint meeting of the Canadian and American Phytopathological Societies and the Mycological Society of America was held in Quebec City, and one conference excursion was a boat trip up the St. Lawrence to Grosse Île. For the first

time in my career, I sidestepped the MSA foray and joined a tourist excursion instead. Most of the passengers were delegates from the meeting but strangers to me and few knew what kind of place they were about to visit. They expected a picnic and perhaps a beach. It was a long ninety minutes on choppy water, passing some of the oldest potato fields in North America atop the bluffs on the river's north shore. The cottage covered holiday islands slid behind us as the river broadened, the recreational sail boats seeming to melt into the shoreline. Like a cold shadow, Grosse Île slowly emerged from the horizon (Fig. 1A, B), a stone monument rising above the western point like a lighthouse without a light (Fig. 1C).

Our boat pulled up to the dock, and to the surprise of many, we were met by nurses and doctors in 19th century attire. They led us into a long shed beside the dock, told us that we were in a quarantine station and that we must answer their questions and be



Fig. 1. Grosse Île in the St. Lawrence River, Québec, Canada. A. First view from the west. B. The dock and receiving station. C. The Celtic Cross.



Fig. 2. Grosse Île: Welcome to Canada. A. The shower. B. Substitute clothing in the waiting room. C. Autoclave for contaminated clothing.

examined by a doctor before being allowed to continue our tour of the island. “Did you experience fever on the boat?” the doctor asked me. “Do you have any open sores?” He gently lifted my chin with one hand, felt my throat with the other, searching for swollen thyroids. It was a simulation, of course, of what would have happened to us 150 years ago. We entered the park, but not before we passed harsh showers where we would have been stripped and roughly cleansed (Fig. 2A), and sacks that would have replaced our contaminated clothing (Fig. 2B). Our clothes would have been sterilized in the huge autoclaves, larger than any I have ever seen in a lab (Fig. 2C). During our examination and first day on the island, our ship would have been fumigated using vapours of boiling sulphur generated by a custom built steam ship.

An open bus brought us to the small village at one end of the island. Across from the pretty white church were long, low barns that were once an anthrax quarantine facility for cattle, operated by the Canadian Department of Agriculture in the mid twentieth century. Beyond that was the sole remaining typhus hospital, a long, white building parallel to the shore. Thousands of patients passed through this hospital and the nearby medical buildings that no longer stand. The hospital is almost empty now, a quiet and lonely place. Messages scratched into walls by patients, initials, dates, counting the days, are covered by plexiglass to prevent modern visitors from adding their own graffiti (Fig. 3B). In one room, the windows are covered with red film, giving the interior a bloody glow (Fig. 3A), which protected the extremely sensitive eyes of severely afflicted typhus patients from the harsh sunlight. It was a short walk from the hospital to bank of the river. The current is

strong and the south shore distant enough that swimmers should have been deterred, but many drowned attempting to escape.

On the other end of the island are short hiking trails. We bought sandwiches and treats in the café that now occupies the basement of one of the original hotels. The first, second and third class hotels still stand. The first class hotel was used by doctors and public officials but seems spartan to our modern eyes. There is a small gift shop and museum, displaying a log book listing the names of the thousands of immigrants who passed through the quarantine station. Like a transparent version of Washington DC’s Vietnam War Memorial, a wall of panels borders one side of a small grass field, the names of the nearly five thousand victims buried there etched into the glass (Fig. 3C).

At the end of the island, the stone monument first seen from the boat reveals itself as a Celtic cross, one of the largest in the world. It was erected by the *Ancient Order of Hibernians in America* half a century after the typhus epidemic peaked. One side of the base lists priests who ministered the sick, becoming ill and dying from typhus themselves. The other faces present messages in three languages. Two, in French and English, convey the same thought: “Sacred to the memory of thousands, who, to preserve the faith, suffered hunger and exile, in 1847-48, and stricken with fever, ended here their sorrowful pilgrimage.”

The other inscription is in Gaelic, which the guilty English may not have been able to read, and expresses a different sentiment: “Children of the Gael died in their thousands on this island having fled from the laws of the foreign tyrants and an artificial famine in the years 1847-48. God’s loyal blessing upon them. Let this

monument be a token to their name and honour from the Gaels of America. God save Ireland”.

This is famine. It is something different from a diagram of a life cycle in a text-book.

Two weeks later, I was on the opposite side of the world, waiting for the Wingfields to arrive at a ferry terminal on North Stradbroke Island, in Moreton Bay near Brisbane, Australia. Bored, I crossed the parking lot to what looked like a park. Beneath the trees were gravestones, and in a display on the edge, brochures describing the Dunwich Historical Cemetery (Fig. 4A). Unexpectedly, I was standing on another quarantine island, with Irish typhus victims buried in a lawn in front of me.

One month after that, I was in Ireland itself. In Dublin, history stares at you, the faces of leaders and martyrs of rebellions and revolutions on statues and painted, Warhol-like, in windows. There was some mention of the famine and the potential sustainability of a diet of potatoes, buttermilk and cabbage, on our tourist rambles through the city. We left Dublin disappointed that we had not found the U2 wall, but unaware that we had missed something else. We took our unforgettable walking tour of the Ring of Kerry, and on the final day, with the morning sun lighting up the land with its astonishing emerald green, we stumbled upon the Sugrena Famine Cemetery, outside Cahirciveen (Fig. 4B). This desolate but beautiful graveyard, built in sight of the sea, is the final resting place for thousands who were unable to escape the famine and search for a better life.

The Irish diaspora had profound social effects on America and other parts of the western world. St Patrick’s Day celebrations, four leaf clovers, leprechauns, green beer and



Fig. 3. Grosse Île hospital and memorials. A. The red room for patients sensitive to light. B. Graffiti left by patient. C. The memorial wall in front of the unmarked graveyard. D. The Gaelic inscription at the base of the Celtic cross.

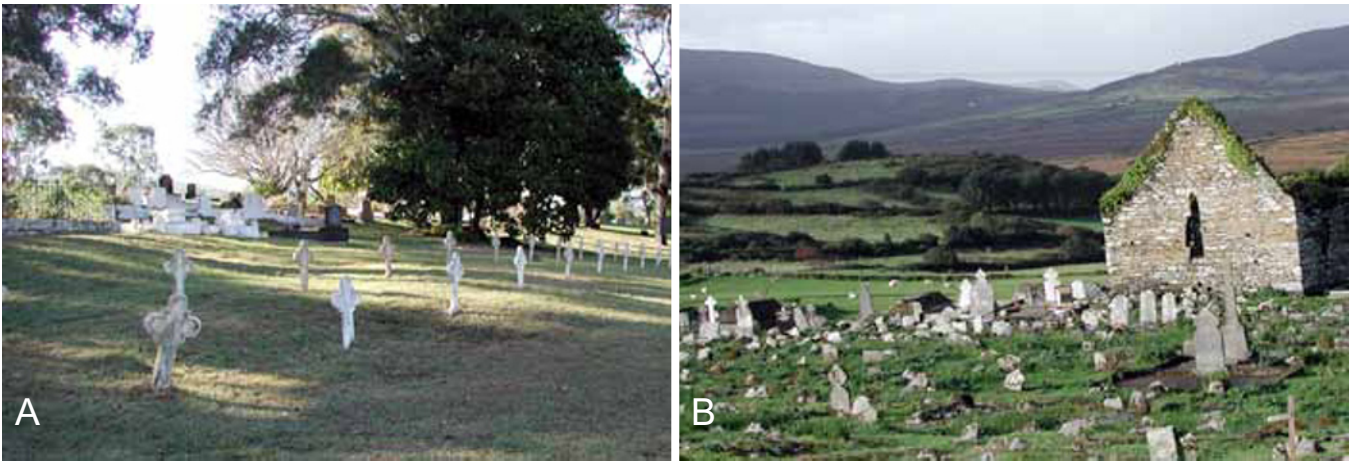


Fig. 4. A. Dunwich Historical Cemetery, Moreton Bay, Australia. B. Sugrena Famine Cemetery, County Kerry, Ireland.



Fig. 5. Famine memorials. A. Dublin, Ireland (*Caitlin Todd*). B. Toronto, Canada (*Benson Kua*). C. Boston, USA. D. Murrisk, Ireland (*Bruce Hall*). E. New York City, USA (*Quinn Eggertson*). B, D from Wikipedia, Creative Commons Licence 2.

green rivers, these clichés all obscure the dark past. After my unplanned exposure in 2006 to the international fingerprints of the Great Famine, I learned about the famous famine memorial near the waterfront in Dublin (Fig. 5A). The image of starving, destitute families is echoed in memorials around the globe, including Toronto (Fig. 5B) and Boston (Fig. 5C). The Irish National Famine Monument is in Murrisk, County Mayo, a stark depiction of a three-masted ghost ship, skeletons of lost souls hanging from its side (Fig. 5D). For the New York City monument, a famine era stone cottage was transported and placed on a mound of Irish limestone, and planted with a meadow representing the Irish flora (Fig. 5E). Liverpool, Philadelphia, Melbourne... there is a long list of memorials I've not yet visited, and you can search them out for yourselves in Wikipedia or with Google. If you visit them yourselves, please send me a photo.

We now know, of course, that *Phytophthora infestans* is no longer considered a true fungus by our modern eyes but that doesn't really matter. The pathogen persists,

still plaguing farmers, home gardeners, and quarantine officials as new races and mating types hop across oceans and spread, turning tomato and potato plants to black, putrid masses. It no longer contributes to famines, but famine continues, a seemingly endless procession of starving people in a world that actually has enough food. Famine is never just about plant pathogens. It is an unfortunate confluence of microbial virulence with climate, geography, poverty, politics but often also greed and war.

Acknowledgements

My thanks to my colleagues Caitlin Todd and Quinn Eggertson, who visited the famine memorials in Dublin and New York and provided photographs for this essay. André Lévesque and Allison Walker kindly provided comments on the draft manuscript. The mysterious Irish passion for potatoes has been patiently explained to me many times by Charlene Hogan, who clarified my recollections about some of these journeys.

Recommended reading

Apart from the novella noted in the text, it is hard to beat the historical review of the Potato Murrein, the first chapter of Large (1940). A modern genomic perspective on *Phytophthora infestans* lineages involved in the Great Famine was recently published by Yoshida *et al.* (2013).

Large EC (1940) *The Advance of the Fungi*. London: Jonanthan Cape.

Yoshida K, Schuenemann VJ, Cano LM, Pais M, Mishra B, Sharma R, Lanz C, Martin FN, Kamoun S, Krause J, Thines M, Weigel D, Burbano HA (2013) The rise and fall of the *Phytophthora infestans* lineage that triggered the Irish potato famine. *eLife* 2: e00731. DOI: 10.7554/eLife.00731

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