NOT SO FINE & HEALTHY

The Ague

In promoting emigration to Upper Canada, a recuring theme of British government propaganda was the colony's *"salubrious and healthy climate"*. That claim was, however, misleading at best. As noted by John Mactaggart (1791-1830), Surveyor and Clerk of Works for Lieutenant Colonel John By (1779-1836) during construction of the Rideau Canal, *"Canada … is not so very fine and healthy as has been reported".*[1]

Few settlers were prepared for the bitter cold of winter or, for that matter, the muggy, enervating heat of midsummer. Prospective immigrants were also seldom warned of the torture that would be visited upon them by clouds of mosquitos and the debilitating disease they carried.

> *Ague /ˈāˌgyo͞o/ noun / archaic / ague, from the Medieval Latin 'acuta', 'sharp fever' / from Middle English agu, ague, / borrowed from Middle French (fievre) aguë, 'acute (fever)'/ malaria.*

One of the first mentions of 'ague' at the Perth settlement appears in a memoire published by Lanark Society Settler John McDonald.

> *I have known a whole family afflicted with the fever successively before it left them …The people live in the midst of a stagnant atmosphere, never rarified by the solar rays, continually inhaling a corrupted air. Fevers and agues are the immediate result*.[2]

In the same year, a history of the Methodist Church in Canada, recalls that pioneer preacher James G. Peal (1779-1822),

> *… went into the swamps and wilds, the region of fever and ague, of the Perth Settlement, to find openings for the Gospel and form a new circuit.*[3]

McDonald, however, was describing a scene in the late summer of 1821 at Lanark Depot on the Clyde River, and the family in question had probably contracted ague as they slept in the open during their trek from Montreal. The account of Methodist circuit rider Peal's mission to Perth was written four decades after the event and may not necessarily reflect the health of the settlement in 1821.

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[1] *Three Years in Canada,* by John Mactaggart (1829).

[2] *Narrative of a Voyage to Quebec and the Journey from Thence to New Lanark in Upper Canada,* by John McDonald (1823). McDonald had arrived in Upper Canada via the 1821 voyage of the *David of London*.

[3] *The History of Methodism in Canada*, by George Frederick Playter (1862). James Peal *"died of exposure"* shortly after his visit to "*the region of fever and ague, of the Perth Settlement*".

By all accounts, over its first decade the Perth Military Settlement was a relatively healthy community and escaped serious visitations of ague fever. It was not until 1824 that its pioneer Presbyterian minister and diarist, Reverend William Bell (1780-1856), who had arrived three years before Peal, first mentions the affliction – and he did so only in passing.

> *The climate, generally speaking, agrees well with British constitutions, and many of the inhabitants live to a great age. Cases of fever and ague sometimes occur but they are, in most instances, among those who obstinately persist in using stagnant water during the hot season of the year. Those who take the trouble of digging a well, which in general may be easily done, obtain excellent water, which may be safely used, if not taken in too great quantities when a person is overheated.*[4]

By the following year (1825) however, 'the ague' had well and truly made itself at home in the village and was the cause of widespread suffering.

> *Up to this time the settlement had been remarkably healthy, but during the summer, cases of fever and ague began to appear. The summer had been dry and hot, yet few were sick in the country; but in the village, few families escaped without having one; two, or more sick. This was supposed to be occasioned by laying dry the millpond, close by the village, in hot weather.*[5]

> *Three of my family were laid up for some time; Ebenezer* [1814-1909] *for two months; William* [1806-1844]*, then a clerk with Mr. Morris*[6]*, for three months, and Mrs. Bell*[7] *for a still longer period. Hers was the worst case of all. It was painful even to witness the distress to which she was subjected every second day. But relief came at last; and it was a relief to us all as well as to her.*[8]

As is apparent from Bell's mention of digging wells and draining a mill pond, in the 1820s there was little understanding of what ague was and how it was transmitted. Sometimes called 'lake fever' or 'swamp fever' or 'intermittent fever', and later known to be malaria, conventional wisdom blamed ague on marsh miasma, or effluvia arising from stagnant water or marshy ground, fostered by hot summers, and spread by dampness on the night air.

> *The Tay marsh … especially vilified on account of the widespread assumption that diseases like fever and ague spread from these wetlands and stagnant waters.*[9]

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[4] *Hints to Emigrants, Letter III,* by Rev. William Bell (1824).

[5] *Diary of Reverend William Bell*, Queens University.

[6] William Morris (1786-1858), Perth's first merchant.

[7] Mary Black-Bell (1773-1861).

[8] *Diary of Reverend William Bell*, Queens University.

[9] *The First Tay Canal, 1830-1850,* by Larry Turner (1984).

It was not until 1897 that Dr. Ronald Ross (1857-1932), an officer of the British colonial Indian Medical Service, demonstrated that the malaria parasite could be transmitted by mosquitos. So, while the miasma of the swamps may not have been to blame, the standing water of those swamps was in fact the source, representing massive nurseries for the anopheles mosquito *[anopheles quadrimaculatus]*[10].

> *Malaria / from Italian mal'aria, from mala aria / liberally 'bad air', from mala 'bad' + aria 'air' / Probably first used by Italian physician Francisco Torti (1658-1741).*

Malaria spreads when a female anopheles mosquito becomes infected with the disease after biting an infected person, and the infected mosquito then bites a noninfected person. The malaria parasites enter that person's bloodstream and travel to the liver. When the parasites mature, they leave the liver, infect the red blood cells and are re-transmitted through the bite of another mosquito.

Malaria is typically a tropical disease, and one might imagine that an Upper Canada winter would break this cycle. But the culprit was the plasmodium vivax[11] malaria variety that adapted to hibernate in the liver. Some of its sporozoites followed the normal malaria cycle each summer, while others spent the winter in host livers, emerging to infect a new crop of mosquitos the following spring.

Probably originating in the great apes, modern humans were already carrying the malaria parasite before they left Africa. The disease began impacting human survival in the Neolithic period about 10,000 years ago. Workers building the Egyptian pyramids (2550-2490 BC) consumed large amounts of garlic as a presumed defense against malaria. By the 4th century BC, malaria was widely recognized in ancient Greece. A widespread disease with symptoms matching malaria is mentioned in Chinese documents dating from 300-200 BC. An especially deadly strain affected Rome and its environs through various epochs and may have contributed to the fall of the Roman Empire.

Malaria spread into northern Europe in the middle ages. Historical records, show that 'the ague' or 'intermittent fever' caused high levels of mortality in the British marshlands and fens from the 15th to the 19th century. Writing at the turn of the 17th century, William Shakespeare mentions it in eight of his plays. Oliver Cromwell (1599-1658) died of it.

> *As late as 1850-1860 up to 30% of the patients treated in certain hospitals in England were cases of ague … in the 1870's the garrison of Tilbury Fort* [on the Thames River, below London] *was changed every six months, because of the prevalence of ague thereabouts"*.[12]

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[10] In the 19th century southern Ontario was home to the Anopheles and Culex mosquito species, but only the Anopheles species transmitted malaria. A third species, Aedes, arrived in the area in the 20th century.

[11] A less severe cousin of *Plasmodium falciparum*, which is typically found in Sub-Saharan Africa.

[12] *Malaria In The 18th & 19th Century*, by A. Murray Fallis (1984) - *Canadian Bulletin of Medical History*.

The Americas, however, were malaria free in antiquity. The disease is not mentioned in the 'medical books'[13] of the Mayans or Aztecs and only appeared in the 16th century, with the arrival of Europeans and their African slaves. It spread rapidly and by the time of the American Revolution was common as far north as Massachusetts. When the United Empire Loyalists fled further north into the Maritime Colonies and Upper Canada following the Revolutionary War the parasites that caused malaria came with them in their blood.[14]

In the early years of the 1790s loyalist Stephen Burritt (1759-1844) and his entire family were incapacitated at their pioneer farm on the Rideau River at Burritt's Rapids. They lay *"helpless for three days without fire or food* [until] *Indians passing by … ministered to their needs and saved their lives"*.[15] From 1793, at Newark (Niagara-on-the-Lake), Elizabeth Simcoe (1762-1850), wife of Upper Canada Lieutenant Governor John Graves Simcoe (1752-1806), and her children suffered recurrent attacks of ague. A visitor to Newark in the late 1790s, observed that *"there is not a single house without a case of ague and in some the whole family is ill"*.[16] Over the following decades increased immigration from Britain compounded the problem, as did the War of 1812 when British troops who had served in tropical posts like India and the West Indies arrived in significant numbers.

The extent to which the arrival of malaria in Upper Canada impacted the First Nations is not entirely clear. John Mactaggart claimed that, in the 1820s, along the Rideau Canal, "*The Indians are never troubled with anything of the sort".* Others, however, reported that "*it spread to the native population too, facilitated perhaps by the movement of loyalist Six Nation Indians that Captain Joseph Brant* [1743-1807] *brought to the region around Brantford".*[17]

The malarial summer of 1825, when the Bell family at the Perth Settlement were bedridden for three months and more, was followed by an even worse fever season in 1826.

> *During the summer we suffered much from fever and ague. Whole families, in some cases, were laid up at once; and most families had some sick, one or more. Not one of my family escaped. So discouraged were some that they talked of selling out and leaving the place. It is a vexing disorder though it seldom proves fatal. When it continues months, which it sometimes does, it leaves the suffering in a very debilitated state.*
>
> *In the autumn I was much employed visiting the sick, who were at this time more than ordinarily numerous. At the communion, in September, many were absent from sickness, and some were taken ill in the church and had to leave it. In the evening I was taken ill myself, passed a restless night, and was worse in the morning. Every day I became worse till Thursday when my disorder turned to fever and ague.*

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[13] A variety of indigenous Nahuja and Novohispanic written works survived the conquest and later colonial periods that describe aspects of the Aztec system and practice of medicine.

[14] Of the estimated 50,000 Loyalists who fled, about 5,000 came to Upper Canada (Ontario).

[15] *Malaria In The 18th & 19th Century*, by A. Murray Fallis (1984) - *Canadian Bulletin of Medical History*.

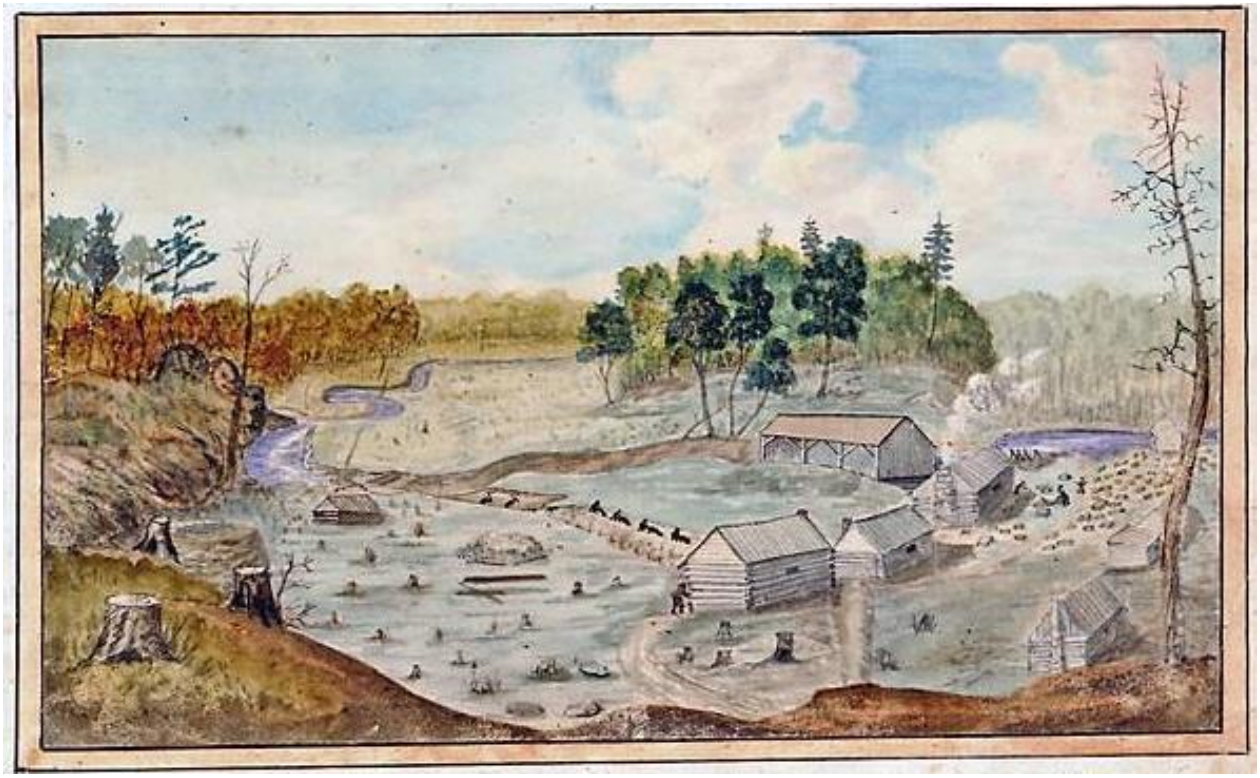
[16] *Travels Through the States of North America & the Provinces of Upper & Lower Canada During the Years 1795, 1796, 1797.,* by Isaac Weld Jr. (1774-1856).

[17] *Malaria In The 18th & 19th Century*, by A. Murray Fallis (1984) - *Canadian Bulletin of Medical History*.

After the remittent fever was formed, I had the attack only every second day. On my well day, as it is called, I felt weak but had no sickness, and this fortunately was on Sabbath, so that I preached without much difficulty. On Monday I was sick all day, and able to attend to nothing. After suffering about a fortnight, I got better, and continued so about a month, when I had a new attack ...[18]

As Bell observed, although the ague of Upper Canada did not usually kill its victims, attacks were brutal, recurrent, long lasting and debilitating. Of his experience constructing the Rideau Canal, Mactaggart wrote that,

The fever and ague of Canada are different, I am told, from those of other countries: they generally come on with an attack of bilious fever, dreadful vomiting, pains in the back and loins, general debility, loss of appetite, so that one cannot even take tea, a thing that can be endured by the stomach in England when nothing else can be suffered.



Rideau Canal Construction Camp at Upper Brewer's 1829, by Thomas Burrows (1829)
(Courtesy of Archives of Ontario)

After being in this state for eight or ten days, the yellow jaundice is likely to ensue, and then fits of trembling—these come on some time in the afternoon, mostly, with all. For two or three hours before they arrive, we feel so cold that nothing will warm us; the greatest heat that can be applied is perfectly unfelt; the skin gets dry, and then the shaking begins. Our very bones ache, teeth chatter, and the ribs are sore, continuing thus in great agony for about an hour and a half; we then commonly have a vomit, the trembling ends, and a profuse sweat ensues, which lasts for two hours longer.

[18] *Diary of Reverend William Bell*, Queens University.

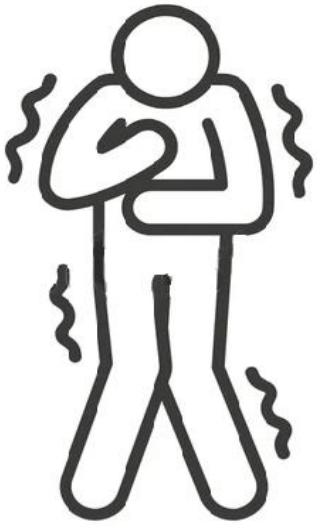
This over, we find the malady has run one of its rounds and start out of the bed in a feeble state, sometimes unable to stand, and entirely dependent on our friends (if we have any) to lift us on to some seat or other. Those who have had it once, will most likely have a touch of it every year. [19]

The high fever also usually caused hallucinations. Reverend Bell recalled that on one occasion,

During the fever … I was insensible for some hours, and suffered dreadfully, in imagination, from a struggle with certain invisible beings that crushed me to the earth.[20]

The worst fever season at Perth was probably the unusually hot summer of 1828 when malaria threated the very survival of the settlement. Bell recorded in his diary that,

In August, when the weather was very hot, the settlement became very sickly … Sickness, during harvest, prevailed to such an extent, that on some farms, the crop rotted on the ground for want of hands to cut it down. Most of our immigrant population were greatly discouraged, and not a few of them talked of returning to their native land … The prospect for the settlement was now very discouraging. Hundreds were suffering from fever and ague, with little hope of improvement.



The sickness however was not confined to our neighbourhood; but over all the continent of North America, it was the sickliest season I had ever heard of. One day … on coming home very sick, [I] *found all my family sick and in bed. The next two months scarcely any of us was a day well.*

But we were no worse than our neighbours, if that was any consolation. Though there were some sick in every house, all around us, I was seldom well enough to visit any of them. As soon as the hot season was nearly over, I began the annual visiting of my congregation at their own houses. It was like visiting a hospital. In the Scotch Line I travelled and visited 10 miles and found only one family all well. In some houses there was scarcely anyone who could stand [or] *well enough to attend on the rest.*

… I went to Mr. Lee's in Bathurst where I found the whole family sick, and Mr. Lee's life almost despaired of … On returning by the mill, I missed the road and got to a hut where a little girl tried to tell me the way. From an adjoining room I was told to open the door, and there found on a humble couch the man and his wife shaking with ague … only the man could speak … At Col. Powell's there are ten persons all sick … what a distressing time.

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[19] *Three Years in Canada,* by John Mactaggart (1829). Mactaggart's description is a firsthand account, he had contracted ague/malaria himself -- as did Colonel By.

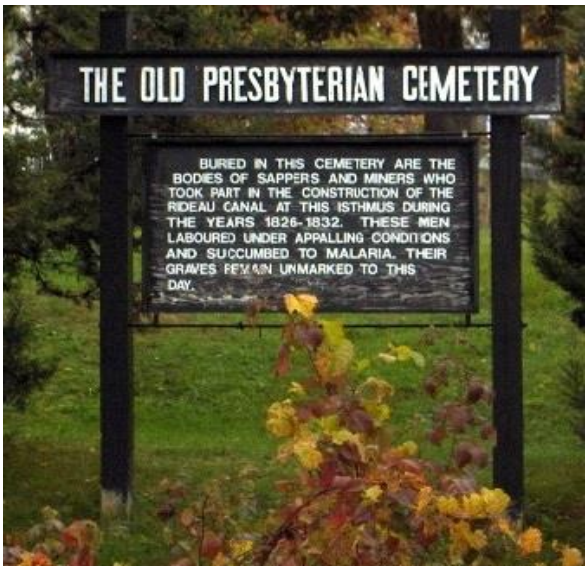
[20] *Diary of Reverend William Bell*, Queens University.

Next day both Mrs. Bell and I were confined to bed. This was the commencement of a long and serious sickness to both, not soon to be forgotten.[21]

Nearby, among the work gangs of the Rideau Canal, the situation was equally grave. John Mactaggart later recalled that,

In the summer of 1828, the sickness in Upper Canada raged like a plague, all along the banks of the lakes, nothing but languid fevers; and at the Rideau Canal few could work with fever and ague. At Jones' Falls and Kingston Mills, no one was able to carry a draught of water to a friend. Doctors and all were laid down together. And people take a long time to recover amid these hot swamps; it is not two or three weeks ill, and then up and well again, but so many months.

The malaria of this dreadful place was the chief cause, in my opinion, for putting a stop to the progress of the public works in the warm weather of 1828; hundreds of labourers and mechanics were laid down with sickness, many of whom never rose again.[22]



Sappers' & Miners' Cemetery, Newboro, Ontario
(findagrave.com)

Although ague was not usually fatal, when malaria does kill, it most often does so in the form of 'blackwater fever'. The infection causes red blood cells to burst into the bloodstream (hemolysis), releasing hemoglobin directly in the blood vessels and into the urine. Signaled by intermittent passage of dark red to black urine, 'blackwater', leads to severe anemia, kidney failure and death.

Historian Ken W. Watson concluded that malaria was *"the single largest cause of death during the construction of the canal"*[23]. He estimated that, over the five-year construction period (1827-1832), between 375 and 600 worker deaths were ague related, although some proportion of those were probably ill with other diseases before contracting malaria.[24]

Having no understanding of the cause, treatments for ague in the early 19th century were as varied as they were ineffective -- sassafras buds, strawberry leaves and roots, calomel, rhubarb, castor oil, cayenne pepper or the bark of dogwood, poplar, or cherry trees. Some relief might be had from a hot fire during periods of chills and wrapping the sufferer in a wet sheet during times of fever. Even the casting of spells was resorted to by a few.

[21] Ibid.

[22] Ibid.

[23] *Malaria – A Rideau Mythconception*, by Ken W. Watson, *Rideau Reflections*, Winter/Spring 2007.

[24] Workers were also prone to diseases such as gastrointestinal complaints, tuberculosis, dysentery, smallpox, venereal disease, rheumatism, pleurisy, influenza, etc.

Doctors usually bled a patient, their 'go-to' treatment when no proven remedy was at hand. Dr. John Rolph (1793-1870), who ran a medical school at Port Talbot, believed that frightening a patient would shock the malaria out of them. Reverend John Wesley (1703-1791)[25] recommended placing a plaster of treacle and soot on each wrist. In 1829 the Brockville Gazette published the following *"remedy for the fever and ague"*,

> *Take equal quantities of the inside and outside bark of Fir Balsam and Yellow Birch – boil them down to a very strong decoction, or tea. Give to a grown person two table spoonfuls in the same quantity of wine, just before eating, three times a day; to a young person in proportion – say to a child five years old, ¾ of a table spoonful, with as much wine. It will probably at first produce sickness at the stomach and vomiting. Such are its effects sometimes – but it will cure.*[26]

There were also any number of patent medicines guaranteed to cure the affliction but, needless to say, none of these remedies actually cured or even eased an ague attack.

Yet, an effective treatment for ague had been known since the 1630s when the first shipments of bark from the Peruvian cinchona tree arrived in Spain and Rome. The bark, or more precisely the quinine that it contained, had been found effective against malaria, even though several centuries would still pass before the actual cause of the disease was known.[27] 'Jesuits' Bark', as it was often called, was dried, ground into a fine powder, mixed in a liquid (commonly wine or tea) and consumed.

In 1820 the active ingredient was extracted from the bark and purified as quinine (quinoline alkaloid). In powder or tablet form it replaced the bark itself as the standard treatment for malaria[28]. Quinine did not become readily available at Perth, however, until the summer of 1826.

> *Till the introduction of quinine, it* [ague] *had baffled all medical skill that could be procured. But in the latter part of the summer, it began to be used, and seldom failed to afford relief.*[29]

[25] Reverend John Wesley, remembered as the principal founder of Methodism, considered medical advice to be part of his pastoral responsibility.

[26] *Brockville Gazette*, June 29 and December 4, 1829, as quoted in *Montague – A social History of an Irish Ontario Township 1783-1980*, by Glenn J. Lockwood (1980).

[27] The first successful use of a chemical compound to treat an infectious disease.

[28] Isolated and named by Pierre Joseph Pelletier (1788-1842) and Joseph Bienaimé Caventou (1799-1877). Quinine was not synthesized until 1944 by Robert B. Woodward (1817-1949).

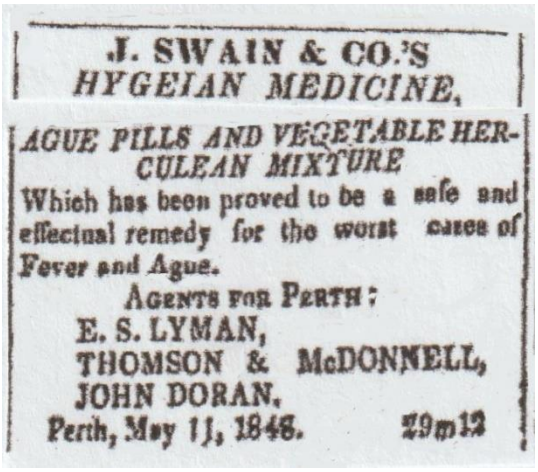
[29] *Diary of Reverend William Bell*, Queens University, summer 1826.

In the course of visiting my congregation this fall, the pain of my long and disagreeable journeys was increased by my weak state, and a new attack of fever and ague, which lasted about ten days. It was at last removed by the use of quinine, which had now come into general use, being found to be the only effectual remedy.[30]

Because Peru was the sole source, however, quinine was extremely expensive and beyond the purse of most ague sufferers, including the struggling settlers at Perth.

It was so scarce that when an ounce could be procured in Montreal it was sent by post and long before it arrived it was all bespoke and even paid for. It was sometimes as high as sixteen dollars an ounce[31]*, but such was the scramble to get it that no one complained of the price.*[32]

Reverend Bell's merchant sons, William Jr. (1806-1844) and John (1806-1849), storekeeper William Morris and, to a lesser extent, Dr. George Hume Reade (1793-1854) procured supplies at Montreal and had them sent to Perth. Many among the poor, however, were still forced to continue seeking relief from sassafras buds, cayenne pepper, dogwood bark and the like.


J. SWAIN & CO.'S
HYGEIAN MEDICINE,

AGUE PILLS AND VEGETABLE HERCULEAN MIXTURE

Which has been proved to be a safe and effectual remedy for the worst cases of Fever and Ague.

AGENTS FOR PERTH:
E. S. LYMAN,
THOMSON & McDONNELL,
JOHN DORAN.

Perth, May 11, 1848. 29m13

The sulphate of Quinine, a preparation from bark, is what the doctors administer for the cure of this wearisome distemper: it seems to be a very potent medicine, but being very dear, poor people are at a loss to procure it.[33]

Over time, however, the quinine supply increased, prices moderated, and the treatment came into wider use.

By the use of quinine, which to most people is a certain remedy, they soon got better. Before the introduction of this remedy, sick people had a dismal prospect, for no other was half so efficacious. At first none had it but the doctors, and they charged 1/6d a grain, but after it was sold in the shops it fell by degrees till, in 1832, it was sold for one penny a grain.[34]

In addition to the high price, there were also side-effects that discouraged some from availing themselves of the wonder drug. The regular use of quinine often caused ringing in the ears, stomach cramps, diarrhea, disorientation, blurred vision, or the loss of color vision.

[30] Ibid.

[31] The purchasing power of $16 in 1827 would be about $400 in 2022.

[32] *Diary of Reverend William Bell*, Queens University.

[33] *Three Years in Canada,* by John Mactaggart (1829).

[34] *Diary of Reverend William Bell*, Queens University.

In 1827 Bell was still suffering recurrent attacks of fever, but the new medicine progressively gained ascendancy over the parasite.

> *Quinine being applied had the desired effect, and I was for a fortnight relieved from this dreadful scourge. But near the end of the month, I had another attack, still more severe than the former. This however was the last attack for some years, the quinine having effected a cure. What a mercy that there is a remedy for such a dreadful disease.*
>
> *My sufferings were great, but quinine, by the blessing of God, in a short time, afforded me relief.* [35]

As transmission of the disease was not understood until 1897, there was never an eradication campaign, but by 1850, for reasons that remain unclear, malaria was disappearing from Ontario.

(Library & Archives Canada)

The extent to which the land had been cleared of forest and swamp, combined with ever wider use of quinine as a prophylactic as it became cheaper, probably played a significant part. More tightly constructed houses, with screened windows and doors, that replaced the first log houses, were less accessible for mosquitos. Expanding agriculture provided more farm animals to serve as a blood source in the place of people. But the mosquitos still swarmed in their multitudes and the full explanation may never be known. As late as the 1880's outbreaks of malaria occurred around Coboconk and Madoc[36] but there were very few cases after 1900.

Today, 500 or more cases of malaria are still diagnosed in Canada each year.[37] These, however, are the result of Canadians travelling to, and immigrants arriving from, endemic areas. A combination of effective treatment, public health practices, and fewer breeding sites for the mosquito vector has seen ague, the curse of the early settlement, confined to the history books.[38]

- ***Ron W. Shaw (2023)***

[35] Ibid

[36] At about the same time there was a major outbreak in the State of Massachusetts.

[37] Worldwide, malaria still kills more than 500,000 people annually. In 2021 the World Health Organization (WHO) recommended the first vaccine against malaria for broader use, RTS,S. Developed by the non-profit PATH Malaria Vaccine Initiative (MVI) and GlaxoSmithKline (GSK), it is also the world's first vaccine against a parasite.

[38] Although global warming may well produce climatic conditions providing for its return.