

THE MIRROR

The University of Western Ontario
Student History Journal

Volume 9

March 1989



**Helpless:
The 1951 Ontario Polio Outbreak -
The Neil Young Case**

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Polio is the worst cold there is.¹
Neil Young, age 5.

There is a town in north Ontario
With dream comfort memory to spare
And in my mind I still need a place to go
All my changes were there

Blue, blue windows behind the stars
Yellow moon on the rise
Big birds flying across the sky
Throwing shadows on our eyes

Leave us helpless, helpless, helpless
Baby can you hear me now
The chains are locked and tied across the door
Baby sing with me somehow...²

"Helpless"
Neil Young, age 24.

Introduction

From the perspective of the late 1980's, the disease known as poliomyelitis seems little but a distant, though somehow fearful memory. To those born after the mid 1950's, polio has not been a major problem since the development and testing of the Polio Vaccine in 1954-55 by Dr. James Salk.³ For those born prior to this time, polio was a much feared word, often calling forth images not unlike those of the plague during the Middle Ages.⁴

In Canada, there were frequent epidemics of poliomyelitis through the first half of the 20th century; the greatest of which occurred in 1937.⁵ There was a fairly concentrated outbreak of polio in Ontario during the late summer and fall of 1951 -- the traditional "polio season"⁶ -- which is of interest for several reasons. For the province of Ontario this was the last of the major outbreaks (it was not an epidemic in the true sense of the word, as compared to the major epidemic of 1937 to which the 1951 statistics often refer).⁷ There was an outbreak in 1952 which, on a national scale, was more serious than in 1951, particularly in Saskatchewan,⁸ but in Ontario it was less severe than 1951.⁹ A further, and perhaps more personal factor in this author's interest in the 1951 Ontario outbreak, is that it involved a respected and successful Canadian musician.¹⁰ During the "polio season" of 1951, Neil Young was but five years of age, just short of his sixth birthday on November 12, 1951. Living in the small village of Omemee, west of Peterborough, he became its first victim of polio. His father, the well-known writer Scott Young,¹¹ wrote a biography of his son in 1984. Neil and Me, was primarily concerned with Neil's musical career. However, as this was a biography written by the subject's father, a more personal perspective was possible. Shortly after Neil returned from the hospital to recover from the polio attack, his father

wrote a short narrative describing the events through which Neil and the Young family lived.¹² This narrative sat in Scott Young's files from 1951 until it was finally published, in its entirety, in Neil and Me.

Neil Young's specific case was not, in itself, remarkable, but its documentation gives a valuable account of one case, upon which can be focused some of the larger events of this particular outbreak. Thus, the structure of this essay will be as follows: I) some background about the poliomyelitis disease itself, and how it was perceived in 1951; II) The Neil Young Case, divided into three main sections: (i) Infection, (ii) Diagnosis, and (iii) Treatment; each section discussing the management of the disease as experienced by Neil Young; and III) Prevention, where the theories and ideas of the time regarding the spread and prevention of polio will be briefly discussed. In this manner, a comprehensive understanding can be obtained of the nature, human effects, and attitudes regarding polio as experienced in Ontario in 1951.

I The Polio Disease Itself: Background

By 1951, poliomyelitis was recognized as being a virus belonging to three distinct types: "Brunhilde" (Type I), "Lansing" (Type II), and "Leon" (Type III), all of which are among the smallest known, measuring between 10 and 30 mu. These viruses can live in the human alimentary canal for long periods of time, and have been found in sewage during epidemic periods. The major means of infection is, thus, through the contamination of hands by fecal matter and resulting contact with food and the mouth.¹³ Water in pools, ponds or other areas where swimming is common can be directly contaminated from the same carriers. From this understanding of how the disease spreads, one might suppose that improved public health practices would prevent

epidemics from occurring. With a disease such as polio, which is common among children between about 4 and 16 years of age,¹⁴ there is a complicating factor which results in "the least hygienic countries [having] less paralytic poliomyelitis than their up-to-date counterparts." It was understood that a possible explanation for this disconcerting fact, was that newly born infants in poorer countries were more likely to be exposed to the virus at an age when immunity could be safely built up during the first months of life. In countries such as Canada, which pride themselves on their high standards of public health, chances of such early exposure and the resultant build-up of natural immunity is lessened, with the result that the first exposure is delayed, leaving a young child vulnerable to a serious attack with little defence.¹⁵ The only effective strategy against polio epidemics was to develop a means to give immunity to large numbers of people before they were exposed to the virus. Over the years such exposure was increasingly delayed and more older people were infected.¹⁶ A discussion of some of the preventive methods which were studied and often attempted, prior to the Salk Vaccine, will be included later in this paper.

Poliomyelitis is, in general, a disease of the nerve connections to muscles, and it is usually manifested in the anterior horn cell of the spinal cord.¹⁷ About half of all those infected with the poliomyelitis virus -- all three distinct forms of the virus can cause the disease¹⁸ -- show some evidence of paralysis or measurable loss of muscle power in specific areas of the body. The remainder, if properly treated, show no permanent effects of the disease and recover completely.¹⁹

The disease can be divided into two main stages, the minor illness and the major illness, with the latter being further divided into paralytic and non-paralytic types. Space here limits description of each stage to a

brief outline. The minor illness is found to occur in some "40 per cent of the paralytic cases a few days before the major illness begins," usually lasts between 24 and 48 hours," and consists of non-specific symptoms such as fever, sore throat, headache, anorexia, vomiting, constipation, and muscle and abdominal pain."²⁰ In many, if not most polio cases, the disease is arrested at the minor stage, and these are referred to as abortive cases. If the immune system cannot stave off the virus at the minor stage, the disease enters the major illness stage, where spinal or meningeal symptoms develop -- these being pains in the spine, trunk, or limbs, with accompanying stiff neck. The major illness onset is usually quite sudden or abrupt, often with some variation in symptoms, yet it does not necessarily lead to paralysis. "Non-paralytic major illness" is the name given to such cases. A diagnosis of the non-paralytic case, however, cannot be made with certainty, as the symptoms at the beginning of the major illness seem to bear little relationship to the onset of slight or severe paralysis during the course of the disease.²¹ The most serious manifestation of poliomyelitis is the bulbar type, when there is paralysis or disruption in the muscles which control breathing, blood pressure control, and/or paralysis of the palate, pharynx or larynx from which swallowing is disturbed. It is in the bulbar cases that there are serious life threatening dangers, and major demands placed on the medical profession in managing such cases.²²

With this brief background on the disease itself, it would be useful to concentrate upon the Neil Young case, in which one can see how such cases were managed during the 1951 Ontario outbreak.

II The Neil Young Case:

1) Infection:

The "polio season" of 1951 began in July

when 227 cases were reported across Canada, 161 among residents of Ontario. During August, 761 cases were reported in the country at large, with 561 in Ontario. The numbers peaked in September with 973 national cases and 659 in Ontario.²³ In total, for 1951, there were 2,568 national cases, 1,701 of those affecting Ontarians. Across the country 162 people died from poliomyelitis (bulbar type), a rate of 1.2 per 100,000. While in Ontario 101 people succumbed, for a death rate of 2.2 per 100,000. The majority of the fatalities were male and children under 15 years of age and male. Nationally, of the total deaths (115 male, 47 female), there were 39 males and 17 females under 15 who died from polio, while in Ontario, 76 males and 25 females were killed by the virus. Of those, 26 males and 7 females were under 15 years of age.²⁴ A further statistic shows that of the total number of national cases reported during the "polio season", an average of about 45% developed paralytic symptoms.

Within the county of Peterborough, Ontario, in which the village of Omemee lies, there were a total of seven deaths attributed to acute poliomyelitis (3 males and 4 females).²⁶ Statistics regarding the total number of cases in each county have not been found, although they are available for the city of Toronto where they were usually reported in newspapers on a daily basis during the "polio season."²⁷ The Public Health Department had reported, by Saturday, August 25, 1951, that there had been 156 cases of polio in Toronto, adding that 6 new cases had been reported over the previous 24 hours and that this was the smallest number of cases to develop over such a period since the start of the week. This article, reporting the Public Health Department information, appeared in the Globe and Mail, under the headline "Father of 2 First to Die of Polio in North York". Small articles relating information about new cases, total number of cases, deaths, as well as specific details, could be found almost daily

and usually on the same page. As well, these articles presented statistics about previous outbreaks or epidemics. In the August 25 article it was noted that by this date in 1949, 117 cases had been reported, while in 1937 some 160 cases were known in Toronto.²⁸

By the start of Labour Day weekend on Friday, August 31, the total number of reported cases in Toronto was 197, with 8 deaths (compared to 127 cases and 3 deaths in 1949; 263 cases and 11 deaths in 1937).²⁹ At the same time, Omemee, Ontario was about to have its first case.

On the afternoon of August 30, 1951, Neil Young and his father were swimming in the Pigeon River, the local swimming hole. The fear of polio was very much in the mind of Scott Young:

In Omemee, as elsewhere in Canada, the headlines every day gave the statistics, usually using the phrase "infantile paralysis" because the killer disease most often struck the young.... People that August stayed away from fairs and exhibitions and were urged to avoid mingling in crowds anywhere. In cities the ultra-cautious walked instead of taking streetcars, and kept their distance from everyone else. City or country, the fearful woke in the night wondering if that back pain was the polio back pain, or that sore throat was the polio sore throat. There was, however, no polio in Omemee as the summer wore on into early September....³⁰

About seven hours later, around 1:00 a.m., five-year old Neil began to groan in his sleep. His father was reading and heard the sound, as if Neil was mumbling to himself. Scott Young quietly walked over to Neil's bedroom and found him "squinched" down to the

middle of his bed and awake. When Scott tried to tuck the covers around his neck, Neil said "with a sort of protesting whine, 'Hey!' -- 'What's the matter?' -- 'My back hurts.'" His father touched Neil's forehead and noticed that it "seemed a little too hot." His back pain appeared to be in his right shoulder blade. He had not remembered falling or banging his back during the day. Mr. Young then stood by his son's bed for a moment: "As parents know, we all live with the word polio for months every year. I got an aspirin and some water and he moved very gingerly when he sat up to take the pill, but he took it."³¹ Neil then slept quietly for the rest of the night.

By the morning of August 31, Neil awoke not wanting breakfast, and with his back still in pain. His father took his temperature and found it to be 100 F. He was given some honey to fight acidosis, a tendency he had which complicated his illness.³² "Downstairs I told Rassy [Neil's mother] his symptoms and his temperature. Neither of us said the word we both were thinking, because so often before we'd been scared by false alarms."³³

The family doctor, Dr. Bill Eagle, was called and he came to the house about noon that day. The doctor performed some tests on Neil which showed that he could not touch his chin to his chest, and when his knees were bent up to his chest he cried out in pain. He was also given a penicillin injection, "which the British found useful in polio although they are not sure why."³⁴ The doctor suspected polio based upon these symptoms, but would return later that afternoon, after his office hours, to do some more tests.

By 4:00 p.m., Dr. Earle returned to the Young home and found that Neil had worsened. Although his reflexes appeared to be good, "when he got up to go to the bathroom he moved like a mechanical man, jerkily, holding his head in a tense position. And when he was

back in bed he cried out when his head or neck was touched, and also when his legs were bent too far." The symptoms were clear to the doctor, but he needed to be positive and suggested two alternatives to Neil's parents: "either we can take him into Peterborough and do a lumbar puncture to confirm it, or you can take him into Toronto. If you take him to Toronto they'll do a lumbar puncture there." To decide between the two cities, Dr. Earle was forced to look at the darkest side scenario: "There's only one iron lung in Peterborough and it's in use. The chances are good that he won't need one, but if you're taking him any place you may as well take him where there are a lot of iron lungs."³⁵

Neil's symptoms did not suggest his case was of the bulbar type as his respiratory tract seemed unaffected. However, it was clear that he was suffering from the major illness, the question remaining whether he experienced weakness or paralysis, and if the latter occurred, would it be permanent or would he recover completely. Still, there were many variations in the progress of the virus and as such, one could never be absolutely certain in one's diagnosis. The lumbar puncture, the doctor mentioned, was basically a spinal tap where the spinal fluid was tested for the presence of white blood cells, and was a common practice in suspected polio cases, although its necessity and accuracy have since been questioned.³⁶

By about 6:00 p.m., the Young family had decided to make the trip to the Hospital for Sick Children in Toronto. Dr. Earle phoned ahead to the hospital and before they left he gave the family some disinfectant. He also gave Neil a surgical mask and further suggested that after arriving at the hospital, the car should be whisked out. The family, Neil's parents and older brother Bob, could not stay overnight in Toronto, however, for they were quarantined and after leaving Neil in the care of the hospital they had to quickly return to Omeme to prevent spreading

the virus to others:

I can't remember much about that week [while waiting to find out how Neil was progressing]. I was the only one of the family allowed out of our yard, and only to buy groceries. The white quarantine sign greeted me every time I returned to the house. We got used to it. Or rather we got so that we could keep our minds blank, or almost blank, trying to ignore the lifetimes of fear of the words on the sign, "Poliomyelitis. Infantile paralysis."³⁷

ii) Diagnosis

The Young family drove the ninety miles to Toronto through a thunderstorm. Neil, laying quietly on the backseat with his surgical mask on, watched the lightning flashes and held onto his new toy locomotive without playing with it very much. Being the Friday night of the Labour Day long weekend, there was "a lot of traffic to buck." They pulled up to the Hospital for Sick Children at about 8:30 p.m.³⁸

The procedure Neil went through upon arriving at the hospital was typical among the suspected polio cases admitted, and the management of such cases was very important to minimize the possibility of permanent paralysis and the grave dangers should bulbar symptoms develop. In the majority of cases where non-paralytic and weakness effects were evident, the main emphasis was on keeping the patient as quiet and still as possible and, following the critical stage, therapy was important.³⁹

The nurse on duty could not find any notice regarding Dr. Earle's calling ahead about Neil.

"What is it that's the matter?" she asked.

"'Polio,' I said.

"The two women standing there moved swiftly, sidelong, away from me. The nurse said quickly. 'Bring him in.'"⁴⁰ When Scott Young spoke the word "polio", for what was the first time, the very sound of the word evoked the dread, fear and helplessness he was suppressing along with the formerly unspoken word.

Then when the women cringed away from me in the modern hospital in a city wet and fresh from rain, with cars zipping over the black pavement outside and the lights of taverns flickering on and off in promised pleasure, it was like a scene from the Middle Ages when a man spoke the name of the plague.⁴¹

Neil was very stiff and in pain as his father carried him in from the car with his new locomotive clutched tightly in his hands. Paperwork was forsaken and Neil was placed in a waiting wheelchair and pushed by his father who followed the nurse into a small room. Scott Young picked Neil up and placed him on a high rubber-tired table. The nurse quickly donned a surgical mask before approaching Neil. The admitting doctor then gave Neil some tests for pain and stiffness and prepared him for the lumbar puncture. Neil would not allow the doctor to give him any sedative and so the procedure was that much more painful. The doctor came out of the room with the sample of spinal fluid and hurried away. Scott Young went back into the room to try and calm his son down. "He said he wished Dr. Bill was here. 'Dr. Bill wouldn't stick a needle in me.' he said, although Dr. Bill often had given him shots in the past. 'I want to go to sleep,' he moaned, over and over again." They waited together for about fifteen minutes, after which the doctor returned with the results. "He walked in, took a deep breath, and said, 'The test is positive. That means he has the disease.'"⁴²

iii) Treatment

Specific treatments for patients such as Neil, at his stage of the illness, were not available in the sense that one might expect. Those that were administered were mainly symptomatic in target, and consisted of mild analgesics, quinine containing compounds and salicylates. Hot fomentations were useful in relieving muscle pain.⁴³

In Neil's case, after the positive lumbar test result, arrangements were made to have him immediately admitted and taken to an isolation ward. The paperwork, forsaken when they arrived, could not be left entirely, so it was at this point when it had to be done. Neil's medical history was taken -- "a series of questions including such items as: Was he breast-fed or bottle-fed? What was his formula as a baby? Was condensed milk used or whole milk? When did he walk? Talk? Get his first tooth?"⁴⁴ -- while his family was being informed that he would have to be put in isolation for seven days. This period of waiting time was crucial, during which it was determined how far the virus was going to progress and how much damage it could cause before the patient's immune system staved off the attack. It was also a period, the meningitic phase of the major illness, that often varied in length from case to case, frequently lasting but a single day, or sometimes as long as two weeks. This period, before paralysis developed, varied so much,

that the course of events as regards to paralysis sometimes appears to remain uncertain during the early part of the meningitic stage. For a time, there may seem to be what Sabin calls an armed truce between the virus and cell, and during this period the disease hovers between the allowing of complete recovery and the causing of a disastrous paralysis in a way that is highly disconcerting to the physician.⁴⁵

If the virus was stopped before muscle nerve damage was done, and only muscle tissue was damaged, then the patient would recover with only some or no weakness; muscle tissue can repair itself, while nerve cells cannot, and any damage inflicted upon them is permanent.⁴⁶

Scott Young was told that therapy would be necessary should paralysis or weakness develop during the seven days of isolation. If not he could be sent home. However, he was also told that "as long as Neil had a temperature there was danger of paralysis, and that weakness had developed as long as six months after the first signs of the disease. He said that we'd have to spend the next seven days waiting. By that time, the temperature usually was gone," and the waiting began in earnest "as Neil was wheeled off by a masked nurse from the isolation ward."

On the drive home that night, we tried to reassure ourselves with the fact that the speed with which the diseases had been diagnosed was a good sign, and that he had the best possible chance of coming out of this whole. After all, we argued to ourselves, some victims of polio die in a few hours. Others have paralysis almost from the beginning. I suppose the thought occurred to all of us that we had been exposed to the disease as much as anyone ever could be, if it was contagious. Only Bob mentioned it, and that briefly. "I hope Neil is all right," he said. "I hope we don't get it."⁴⁷

The first night of isolation was quite rough for Neil, the nurse informing his family that "he had spent a bad night, in considerable pain, and that he had a temperature. She would not tell us what temperature."⁴⁸

In Toronto, the September 1 Globe and Mail ran a short article on page two with the headline: "9 Polio Cases Bring Total to 206." As Neil was being cared for in Toronto, it would be safe to assume that he was included in the nine newest cases. The same article also noted that the total number of deaths in the city during this "polio season" had reached 8. Past statistics were given to this date: in 1949, 130 cases and 4 deaths; and in 1937, 294 cases and 11 deaths. Of the nine new cases there were four men over 25, and five boys and girls ages 4-19. Among the nine, five showed no paralysis, two had weakness, and two had paralysis.⁴⁹

"The next day the report was better."⁵⁰

The Monday, September 3, Globe and Mail ran an article with the headline "Constable Dies of Polio." His name was John Hobday, age 29, who was on duty at the Canadian National Exhibition in Toronto when he was stricken. He was admitted to Riverdale Isolation Hospital where, twelve hours later, he died.⁵¹

"We talked to the doctor on Wednesday and he assured us that Neil was coming along fairly well. That was the fifth day."⁵²

"16 Polio Cases Here in 4 Days," was the headline on page 5 of the Wednesday, September 5, edition of the Globe and Mail. The Public Health Department was encouraged to see that the rate of new cases had fallen from the previous weekend: 16 new cases reported between Saturday, September 1, through Tuesday, September 4, compared to 20 new cases reported during an equal period the weekend before. By September 5, 1951 there had been 222 cases and 9 deaths reported in Toronto (357 cases and 14 deaths by the same date in 1937). Of the new cases, 11 experienced no paralysis, and two showed weakness; 11 involved children under 14 years of age, two involved women over 20, while three were men over 20.⁵³

"On the sixth day we got a phone call from the hospital.

"Mr. Young?" the nurse said. "I'm glad to say that you can come and take Neil home with you now."⁵⁴

As Scott Young received the good news, the nightmare was ending, but the number of cases increased, although by this point the rate was decreasing. By September 6, six new cases were reported, bringing the total to 228 in the city (in 1937, 357 cases had been reported). Of this group, four had no paralysis, while one had some weakness. Five were boys and girls between 10 and 14 years of age, and one case was a man in his early twenties.⁵⁵ The following day, five new cases emerged for a running total of 233 (385 in 1937), with only one case experiencing paralysis.⁵⁶ An article of September 8 described the trend, "Polio Total Drops From 50 to 31 for Past Week," while the week of August 24 had a total of 55 new cases. The total number of cases stood at 237 (401 in 1937), with four new cases and one death reported on September 8, a 25 year old man, bringing total number of deaths to 10. In the province of Ontario as a whole, 859 cases had been reported, with 27 deaths (894 cases and 54 deaths in 1949; 153 cases and 54 deaths in 1950). In 552 of the cases, the victims experienced no paralysis. During the preceding week 106 cases surfaced with 3 deaths.⁵⁷

Scott Young wrote his short narrative about his son's case after Neil had been home for two or three days "and was in bed downstairs, very weak. All of us spent a lot of time in there with him, talking. Remember, he was only five years old then and his scope of experience was narrow. 'Polio is the worst cold there is,' he confided to me one day."

"The first thing he said when we picked him up at the hospital was 'I didn't die, did I?'"⁵⁸

III Prevention

During the years immediately prior to the breakthrough of the Salk Polio Vaccine, there were attempts to develop a means of preventing polio through different means: medically through inoculation, and also through improved public health measures. A series of articles from The Canadian Medical Association Journal and the Canadian Journal of Public Health, between 1951 and 1954, reveal just how poliomyelitis was viewed in Canada and how it was thought it could be prevented. A brief summary of some of the relevant papers in these journals would thus be of interest.

The December 1951 issue of The Canadian Medical Association Journal (hereafter C.A.M.J.) ran an article (one of a series) entitled "Studies on Poliomyelitis in Ontario," which dealt primarily with the recovery of Cocksackie viruses from cases of polio. The Cocksackie virus was thought to be responsible for causing a "poliomyelitis-like" illness, and was extracted from the stool of patients suffering from (#1) typical paralytic poliomyelitis, (#2) spinal paralytic, and (#3) bulbar forms of poliomyelitis, as well as (#4) clinical non-paralytic poliomyelitis. The study found that: of 10 children with #1, the polio virus was recovered in all, while the Cocksackie virus was recovered in three cases; both viruses were extracted from cases with #2 and #3; of the 11 studied cases of the #4 type, none excreted the polio virus, while five contained the Cocksackie virus. The isolated Cocksackie virus was injected into suckling mice to determine its effects as well as if they developed an antibody to the virus. The study concluded with the suggestion that many of the reported cases of non-paralytic polio in the 1950 Toronto outbreak were actually infected with Cocksackie virus.⁵⁹

A statement in the July 1952 Canadian Journal of Public Health (hereafter C.J.P.H.), issued by the United States Public Health

Service, discussed a concern that some medical procedures were increasing the risk of people getting poliomyelitis. The statement addressed the issue succinctly:

There is no definite evidence that an increase in the number of cases of poliomyelitis has occurred as a result of injections of vaccines, drugs, and other medicinal agents. There is evidence that injections for the prevention of diphtheria, whooping cough and possibly tetanus, when given during an epidemic of poliomyelitis, may, on rare occasions, localize the paralysis in the infected arm or leg.⁶⁰

The statement further emphasized that diseases such as diphtheria, whooping cough and tetanus, present far greater hazard than polio, if left unchecked. Also, the immunization of infants under six months, as well as adults, against such diseases was encouraged as the risk of polio in these age groups was significantly lower than others, even during an epidemic.

"Recent Progress in the Study of Immunization Against Poliomyelitis" was the title of an August 1952 article in C.M.A.J., which recognized, in the light of annual increases in the incidence of polio, that "since public health measures fail to limit the spread of this disease, it would appear that the only hope in future control lies in vaccination, or passive protection by immune serum." This article discussed studies with monkeys and if and how they develop immunity to the disease under specific circumstances. There is also discussion of the hope of finding in nature a mutant form of one of the polio viruses, or the development of one in the lab, that does not cause the disease (at least not the paralytic type), yet retains antigenicity. However, at this time, the immediate effort lay in using the sera of

normal adults who have built up a natural immunity to the polio virus. It was found that the polio antibody could be concentrated in the gamma globulin fraction of blood plasma, and the antibody content of the immune serum could be concentrated with a minimum of inert protein. "Antibody has a powerful neutralizing action on virus in the test tube, and a similar effect can be shown in the living animal."⁶¹

The September 1, 1951 editions of the Toronto Star and Globe and Mail both carried articles about a test of the gamma globulin serum in Provo, Utah, where there was an epidemic with 50 cases reported out of a population of 82,000. In the test, 12,000 volunteers were to receive a serum designed to prevent paralysis from developing in polio.⁶²

An editorial in the April 1953 issue of C.M.A.J. outlined the current status of gamma globulin in Canada. Up until this time, the effectiveness of gamma globulin injections was encouraging in lessening the numbers of paralytic cases, as well as their severity. However, the specifics of just how much protection was supplied by the blood fraction remained to be determined, as did the logistics of its manufacture and supply to the general population. Such problems highlight the limited supply of the serum as well as its undetermined effectiveness. "In Canada, the estimated production will be totally inadequate so far as any broad program for its use in poliomyelitis is concerned...."⁶³

Further relevant articles appeared which can only be mentioned here. "The Role of Immunization Procedures in the Precipitation of Paralytic Poliomyelitis," in the February 1953 issue of the C.M.A.J., dealt with the problem of polio infection through the immunization of other diseases.⁶⁴ "Studies on Poliomyelitis on Ontario," in the May 1953 issue of C.M.A.J., like the earlier article of the same title, looked at the Coxsackie virus

link with polio during the 1951 outbreak and its implication in causing some of the polio illnesses in Toronto.⁶⁵ "Recent Advances in the Diagnosis and Prevention of Poliomyelitis," in the March 1953 edition of C.J.P.H., further discussed the state of research and progress in using gamma globulin, although its precise role was not yet clear.⁶⁶ "The Status of Gamma Globulin," in the August 1953 C.J.P.H., emphasized the serum's value, yet noted that its protection against polio was limited and lasted only from four to six weeks. As well, its production was quite impractical, but for lack of a better alternative production of larger quantities would continue for use during the 1954 "polio season."⁶⁷

An editorial, "Prevention of Poliomyelitis," in the May 1954 C.M.A.J., concisely summarized the current wisdom on the subject just prior to the Salk breakthrough. In fact, Salk's research is discussed in the article, but at the time its long term success had yet to be demonstrated. The public health aspect of prevention was emphasized in the editorial, noting that since the route or spread of the virus was known -- "Human faeces are probably the most important source of the virus, and the mouth is usually the portal of entry" -- the value of quarantine was essential, as a recent study had demonstrated:

Agerholm thinks that epidemics could be reduced by the control of movement of contacts; she points out that in a recent epidemic 12 out of 49 cases could have been prevented by quarantine measures and that strict nursing technique by a contact nurse could have prevented six more. Agerholm suggests that quarantine (15 days for an individual and 30 days for a group) should include all who have been in contact with a patient for four days prior to the onset of the disease. These quarantine rules

should be strict and should include "no contact with other persons, no use of public transport, restaurants or shops." She suggests that such strict quarantine is difficult, but those to be quarantined most strictly should include shopworkers, teachers, pupils and all foodhandlers.⁶⁸

Conclusion

In Ontario, the last of the major polio scares occurred during the late summer and early fall of 1951. It was the last of a long line of such nightmares as experienced by children such as Neil Young and their families -- nightmares not unlike those suffered during periods of plague in the Middle Ages. The study of Neil Young's case, through his biography written by his father, in the context of the general situation of the 1951 Ontario outbreak and the extent of the knowledge of the disease at the time, affords a valuable case study of just how poliomyelitis was viewed and experienced during a time when there was no protection against its potential ravages -- an experience somewhat distant to those who grew up following the development of the Salk vaccine.

Endnotes

1 Scott Young, Neil and Me, (Toronto: McClelland and Stewart, 1984), 36.

2 Neil Young, "Helpless", published in Neil Young Complete Music Volume II (1969-1973), (New York: Warner Bros. Publications, 1975), 15, by Cotillion Music Inc. & Broken Arrow Music; the song was originally recorded on the Crosby, Stills, Nash & Young album Deja vu (Warner Bros. Records, #SD 7200, 1970).

3 See H.E. Ripper (ed.), Information for Physicians on the Salk Poliomyelitis Vaccine (New York: National Foundation for Infantile Paralysis, July, 1955); and T. Francis Jr. et. al (eds.), Evaluation of the 1954 Field Trial of Poliomyelitis Vaccine Final Report (Ann Arbor: National Foundation for Infantile Paralysis, April, 1957). A recent episode of the Public Broadcasting Systems' science series Nova, entitle "Can You Still Get Polio", broadcast locally on April 5, 1988, examined the present controversy surrounding the number of cases which are being caused by the live orally administered polio vaccine developed by A. Sabin, which supplanted the Salk Vaccine, and which utilized a killed virus that was injected. It seems that some 10 cases of polio are diagnosed per year in the United States caused directly by the live oral vaccine. In Canada the Salk Killed Vaccine is used more often, if not exclusively, although since my research dealt with 1951, I didn't consult current resources. It would make an interesting study to go into the conflict between the two vaccines as well as the modern public health issues.

4 S. Young, 34; the Nova episode also referred to this image, see note 3.

5 Province of Ontario Department of Health, Report on Poliomyelitis in Ontario,

1937 (Toronto: Ontario Gov't, March 1938); this pamphlet contains extensive statistics of the 1937 epidemic, as well as for earlier outbreaks in 1929, and general statistics since 1910 in Ontario. See also Poliomyelitis, Epidemiology Diagnosis Treatment (Toronto Department of Health Ontario, July, 1938) for further details on the 1937 Ontario epidemic. The best single source for primary sources on all literature regarding poliomyelitis, see M. Fishbein and E.M. Salmonsens (eds.) A Bibliography of Infantile Paralysis 1789-1949 (Philadelphia: J.B. Lippincott, 1951), which lists (many with abstracts) all known articles about polio and related topics; 10, 367 references are made through its 739 pages, plus it has a 159 page index, both by author and subject.

6 See note 5, the "polio season" in Ontario traditionally lasted between July and October, with the peak sometime in September.

7 The Globe and Mail, published in Toronto, was consulted for articles between August 25, and September 8, 1951, for primary information on the outbreak. These articles made specific references to the 1937 epidemic. See also "The Incidence of Poliomyelitis in the World in 1950" Epidemiological and Vital Statistics Report, Vol. IV, No. 1, Jan. 1951, 2 and 4, for data on cases of polio in Canada during each year between 1938 and 1950.

8 "World Incidence of Poliomyelitis in 1952" Epidemiological and vital Statistics Report, Vol. VI, No. 4, Apr. 1953, 89; this article also gives a graph on page 88, which charts the total number of polio cases reported in Canada between 1933 and 1952; the totals for 1952 reporting 4,520 cases compared to 2,563 cases in 1951. The report described the situation in Saskatchewan, and the country as a whole in the following manner: "An idea can be formed of the extent of the epidemic observed in Canada in 1952 when it is realized

both in August and in September the number of notifications exceeded the annual totals for the majority of the twenty-eight preceding years. In...Saskatchewan alone...where the greatest number of cases was recorded (1,205, including 447 paretic cases, as against 3,315 for the rest of the country) and the morbidity rate was the highest for any one province (about 31 cases per 100,000 inhabitants), there were more notifications in 1952 than for the whole country during most of the same twenty-eight years." Ontario had 544 total cases in 1952 (180 of them paretic). Manitoba was also hit severely in 1952; for a study see, P. Barsky, "The Management of Poliomyelitis" Canadian Medical Association Journal, 70(May 1954), 517-20.

9 The "World Incidence of Poliomyelitis in 1952" article, on page 89, noted the following about the 1951 Ontario outbreak in contrast to what happened in 1952: "It is interesting to note...that in the province of Ontario, where 60 per cent of the 2,020 cases (provisional figure) reported in 1951 occurred, as well as in the province of Quebec and in Nova Scotia, poliomyelitis distinctly receded as compared with 1951."

10 The author is a major collector of Neil Young's music, which spans a professional period from about 1965, through to the present day, and has, through correspondence with others of equal or greater industry, amassed a very large collection of rare recordings (mostly live) from throughout his long career. See Scott Young's biography, as well as C. Dufrechou, Neil Young (London: Omnibus Press, 1978); J. Rogan, Neil Young, The Definitive Story of his Musical Career (London: Proteus Books, 1982). For the latest information, see the journal of the only authorized Neil Young "fan club", The Neil Young Appreciation Society's Broken Arrow, which is published quarterly, currently 30 issues have been published, originating in Wales; for information write to Alan Jenkins, 2A Llynfi

st., Bridgend, Mid Glamorgan. CF31 1SY, Wales, U.K.

11 Scott Young is perhaps best known from his years as a newspaper columnist.

12 The narrative is presented in chapter three entitled, "Polio Was a Killer and Neil Had It," 30-36, and is framed by two photographs on page 30, and two on page 36.

13 W.R. Russell, Poliomyelitis (London: Edward Arnold Pub., 1956), 1, 2.

14 Government of Canada, Vital Statistics 1951, (Ottawa: Dominion Bureau of Statistics), 246.

15 Russell, 2.

16 M. Singer and P. Rose-Innes, The Recovery From Poliomyelitis, A Study of the Convalescent Phase (London: E. & S. Livingstone Ltd., 1963), 3.

17 Ontario Department of Health Poliomyelitis, Epidemiology Diagnosis Treatment, 3.

18 Russell, 12-3.

19 Ont. Dept. of Health, Polio, 3.

20 Russell, 16-9.

21 Russell, 18-9.

22 Russell, 29-36.

23 Gov't of Canada, Vital Statistics 1951, 453.

24 Vital Statistics, 72, 246, 314.

25 "World Incidence of Poliomyelitis in 1952" Epidem. and Vital Stats. Rept., Vol. VI, No. 4, Apr. 1953, 102.

26 Ontario Government, Report relating to the registration of Births, Marriages and Deaths in the Province of Ontario for the year ending 31st December 1951, (Toronto: Legislative Assembly Sessional Paper No. 51, 1951, 1953), 168-9.

27 I've used the Toronto Globe and Mail for the statistics of cases as they appeared in the City of Toronto.

28 Globe and Mail, Aug. 25, 1951, 5.

29 Globe and Mail, Aug. 31, 1951, 5. This same article also reported that discussions were being held into delaying the opening of the public schools in Toronto due to the polio outbreak.

30 S. Young, 30.

31 S. Young, 31.

32 Neil Young, when an adult began to suffer from mild epilepsy. Later he was to father two sons, (by two different mothers), who would have Cerebral Palsy. The 1st son, Zeke, would have a relatively mild case, while his younger brother Ben would be seriously afflicted with the disease, so much so that Neil would take some three years away from his musical career in order to afford him full-time care, along with his wife Pegi. Their experiences during this time, 1979-81, are documented in Chapter 19 of Neil and Me, "A Bright Little Boy Named Ben."

33 S. Young, 32.

34 S. Young, 32. "Penicillin...has appeared to be advisable in bulbar cases, particularly when respiratory difficulties associated with the aspiration of liquids or food occurred before the child's admission to the hospital," quoted from J.A. Anderson, "Diagnosis and Treatment of Poliomyelitis in

the Early State" (Third Session, July 13, 1948) in Poliomyelitis, Papers and Discussions Presented at the First International Poliomyelitis Conference (Philadelphia: J.B. Lipincott Co., 1949), 116; however I was able to trace the British reference as Anderson was from Utah.

35 S. Young, 33.

36 Russell, 63. See P. Barsky, "The Management of Poliomyelitis" Canadian Med. Assoc. J., 70 (May 1954), 518, for a discussion of some of the concerns over the use of the lumbar puncture.

37 S. Young, 36.

38 S. Young, 34.

39 Russell, 47-9.

40 S. Young, 34.

41 S. Young, 34.

42 S. Young, 35.

43 Barsky, "The Management of Poliomyelitis", 518.

44 S. Young, 35.

45 Russell, 6-8; the Sabin reference is to his article "Problems in the Natural History of Poliomyelitis" Annals of Internal Medicine, 30 (1949), 40. Sabin later developed the live oral vaccine in the 1960s.

46 Russell, 8-10.

47 S. Young, 35-6.

48 S. young, 36.

49 Globe and Mail, Sept. 1, 1951, 2.

- 50 S. Young, 36.
- 51 Globe and Mail, Sept. 3, 1951, 5.
- 52 S. Young, 36.
- 53 Globe and Mail, Sept. 5, 1951, 5.
- 54 S. Young, 36.
- 55 Globe and Mail, Sept. 6, 1951, 5.
- 56 Globe and Mail, Sept. 7, 1951, 4.
- 57 Globe and Mail, Sept. 8, 1951, 5.

58 S. Young, 36. Neil Young survived his battle with polio without any noticeable effects other than a slight limp evident when he walks. By his sixth birthday he had become somewhat of a celebrity in Omeme as he had survived while another boy in the town didn't. By this time, two months after returning home from the hospital, he was still quite weak and had trouble walking. His father would dress him warmly and let him sit on the front steps. "Kids on their way home from school would stop to talk a while, but when they ran off and he tried to follow he could only take a few steps and sometimes would fall down." The family left Omeme for the winter to stay at a friend's house in Florida, leaving just after Christmas, 1951, and "By the time we got back to Omeme in May [1952] the polio was a distant memory, but he was in shape to resume fishing in the river that ran through the town."

59 N. Silverthorne and others, "Studies on Poliomyelitis in Ontario V" Can. Med. Assoc. J., 65(Dec. 1951), 536-42.

60 A Statement Issued by the Federal Security Agency, United States Public Health Service, "The Relationship Between Inoculations and Poliomyelitis" Canadian Journal of Public Health, 43(July, 1952), 319-

20.

61 A.J. Rhodes, "Recent Progress in the study of Immunization Against Poliomyelitis" Can. Med. Assoc. J., 67(Aug. 1952), 155-7.

62 Toronto Star, Sept. 1, 1951, 3. Globe and Mail, Sept. 1, 1951, 2.

63 Editorial by A.H.N. (unsure of full name), "Gamma Globulin in Poliomyelitis" Can. Med. Assoc. J., 68(Apr. 1953), 390-1.

64 A.J. Rhodes, "The Role of Immunization Procedures in the Precipitation of Paralytic Poliomyelitis" Can. Med. Assoc. J., 68(Feb. 1953), 107-11.

65 A.J. Rhodes and others, "Studies on Poliomyelitis in Ontario VI" Can. Med. Assoc. J., 68(May, 1953), 438-43.

66 A.J. Rhodes, "Recent Advances in the Diagnosis and Prevention of Poliomyelitis" Can. J. Public Health, 44(Mar. 1953), 102-5.

67 (R.D. Defries, ed.), "The Status of Gamma Globulin" Can. J. Public Health, 44(July, 1953), 299-300.

68 Editorial by W.F.T.T. (unsure of full name), "Prevention of Poliomyelitis" Can. Med. Assoc. J., 70(May, 1954), 578-9. The Agerholm reference is to M. Agerholm, Lancet, 2(1953), 287.