Straws in the Wind: Early Epidemics of Poliomyelitis in Johannesburg, 1918-1945

by

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I declare that STRAWS IN THE WIND: EARLY EPIDEMICS OF POLIOMYELITIS IN JOHANNESBURG 1918-1945 is my own work and that all the sources I have used or quoted have been indicated and acknowledged by means of complete references.

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Mrs M M WADE **DATE**

Abstract

This thesis offers a detailed account of early polio epidemics (between 1918 and 1945) in Johannesburg, where the disease was particularly severe. At this time, little was known about the poliovirus, and such limited understanding affected the public health and medical initiatives taken during this period. These actions are highlighted in the thesis, along with the responses of the media and lay public to the disease. The effect of war on the management of the disease is also examined, as it siphoned off vital medical personnel and jeopardised disease control. It also lent an emotional overlay to the way the disease was perceived, as 'battle' rhetoric became the parlance used against polio, which was personified as the 'enemy' of innocent children who were disabled at the whim of the virus. The epidemic of 1944-1945 was the first to be systematically investigated, by Dr James Gear as part of his groundbreaking polio research; he later became part of an international team of researchers who contributed to the development of a prophylactic vaccine within a decade of this epidemic.

KEY TERMS: social history, medical history, history of disease, epidemics in South Africa, poliomyelitis, early 20th-century medical science, public health in Johannesburg, Sister Elizabeth Kenny, Dr James Gear

Acknowledgments

Thanks are due to so many people who have assisted me with this thesis. Elizabeth van Heyningen first suggested the topic, about which I was initially very uncertain. I remember the children afflicted with polio who were at school with me, one or two each year, some on crutches and calipers, one boy had a severely withered arm. As children we never viewed them as disabled or different – these thoughts came later. I remember that sometimes my mother sent me off to school with a clove of garlic on a piece of string around my neck; I know now that this must have happened during one of Johannesburg's polio epidemics in the 1950s. I later discovered that the garlic was meant to keep germs at bay.

After my initial somewhat uninspired reactions and as my research progressed, I was increasingly overwhelmed by the depth of the topic and the enormous courage of those who survived the disease. This thesis is dedicated to those who shared their stories with me and to the thousands who are still marked by this terrifying disease.

I have been fortunate enough to have two very patient and capable historians as supervisors, and their untiring encouragement and commitment has helped me to overcome my rather slow and plodding work methods. Nicholas Southey spent many hours correcting my chapters, advising me and answering the stream of e-mails I sent him. Elizabeth van Heyningen rescued me from becoming bogged down in a myriad of

sources by helping with ways in which to approach them; she also patiently explained the intricacies of the computer and the often incomprehensible Excel to me.

During many years as a student at the University of South Africa (Unisa), members of the History Department have been a source of inspiration to me and have encouraged me to do research work.

My sincere thanks to Wieland Bettzieche for so generously sharing his work on polio with me. I would like to thank the dedicated team of librarians in various sections of the Unisa library, particularly those in the archives, the interlibrary loans section, the audio-visual section and the History subject librarian, Mary-Lynn Suttie. Thanks are also due to the curators of the Adler Medical History Museum and Museum Africa, the librarians at the Local Government Library, Johannesburg and the staff of the Central Archives in Pretoria. I would also like to thank Professor B. Schoub for allowing me to use the library at the National Institute of Communicable Diseases.

My friends so generously allowed me time with my books, while my husband, Ken, and my sons, Matthew and Graham, demonstrated their patience and tolerance in numerous ways, and warmly supported me while I indulged in my passion for history. I cannot thank them enough.

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BMA	British Medical Association
MJSA	*Medical Journal of South Africa*
MOH	Medical Officer of Health
NFIP	National Foundation for Infantile Paralysis
SAIMR	South African Institute for Medical Research
SAMC	South African Medical Corps
SAMJ	*South African Medical Journal*
TMHC	Transvaal Memorial Hospital for Children

Chapter One

Introduction

1.1 'There is so much dread and fear and helplessness in the word polio.'[1]

This sentence encapsulates what so many parents felt during the polio era during the first half of the twentieth century and many doctors felt the same way.[2] Polio was equated with the great plague of the Middle Ages, but its victims 'were not among the poor and unclean of the inner cities', as had been true of most infectious diseases, but 'often the vigorous and healthy' were attacked and 'those who had comfortable homes and good care'.[3] 'You hope things are going to get better but deep down you know they never will.'[4]

This thesis traces the appearance of polio in Johannesburg from the first recognised epidemic in 1918 until a second major outbreak of the disease in 1944-1945.

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1 C. J. Rutty, 'The Middle Class Plague: Canada and the Polio Years', draft copy provided by the author, 20 Apr. 2004, p. 1.

2 Interview with Dr X (name withheld at his request), 22 Nov. 2002, in which he describes the sense of foreboding experienced by many doctors during an epidemic.

3 Rutty, 'The Middle-Class Plague', p. 2.

4 C. Webster, Post-Polio Network, RSA, interviewed 16 Nov. 2003.

The work focuses on the impact of these two war-time epidemics, both epidemiologically and socially. The course of each epidemic is examined by reviewing available statistics and the manifest problems they imposed on medical and health authorities, both locally and within higher echelons of power, and the response of the Johannesburg community to the disease during both epidemics is explored. The treatments available to polio patients at a time when the disease was regarded as 'a mystery'[5] and any new proposal of help was grasped at like 'straws in the wind' are also discussed.[6]

While the period between the wars in South Africa was epidemic free, endemic cases continued at increasing rates. Health authorities appeared not to be concerned. Such cases seldom resulted in paralysis and endemic polio was regarded as a mild disease traceable to ancient times. Health authorities became complacent about polio, concentrating on other health issues, and were ill prepared for the second polio epidemic in 1944. Fortunately, important technological aids such as the 'iron lung' and the electronic microscope had become available from the 1930s, as had a wider literature on

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5 Report of the discussions on poliomyelitis at meetings of the Witwatersrand and Pretoria branches of the British Medical Association (BMA),*The Medical Journal of South Africa* (*MJSA*), vol. 13, no. 14 (Sep. 1918), p. 243.

6 B.F. Sampson, 'A Suggested New Treatment of Poliomyelitis', *South African Medical Journal* (*SAMJ*), vol. 18 (23 Dec. 1944), p. 421. Dr Sampson was commenting on a new treatment proposing the use of oxygen in the treatment of paralysis caused by polio: 'But where does all this get us? Even assuming it to be true, what benefit in treatment could be derived therefrom? The answer is that we are not in so good a position in this disease as to be able to disregard straws in the wind.'

the experiences of epidemic polio in other countries. A new treatment approach to muscle spasm and paralysed limbs appeared in the late 1930s, developed by an Australian bush nurse, Sister Elizabeth Kenny. South Africa was offered the opportunity of including this method in its polio policy for the second epidemic.

Disease has a way of structuring the interactions between the medical profession and the lay public, as well as 'acting as a window'[7] on medical care, public health and government in that particular community.[8] This will be the main focus of this thesis. Johannesburg was the city hardest hit by epidemic polio, recording the highest case incidence, over any other in the country, during the periods under discussion.[9] Despite no Medical Officer of Health (MOH) reports during the Second World War,[10] numerous

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7 N. Rogers, *Dirt and Disease: Polio before FDR* (New Brunswick: Rutgers University Press, 1990), p. 244.

8. C. Rosenberg, *Explaining Epidemics and Other Studies in the History of Medicine* (New York: Cambridge University Press, 1992), p. 279.

9 An official breakdown of polio in each major city is only available from records after the 1948 epidemic. The overall number of polio cases was highest in Johannesburg, but not necessarily on a month-to-month basis.

10 The *MJSA* gives information on the 1918 epidemic. The journal changed to the *South African Medical Journal* (*SAMJ*), details of articles on the 1944-1945 epidemic are listed in Chapter Six of this thesis; *Public Health* articles were used for epidemic figures and commentaries on 1944-1945 epidemic.

memoranda between the MOH and the Department of Health in Pretoria[11] offer information. Various medical journals, reports and press articles focus on the epidemic in Johannesburg, enabling one to follow social and political ideas, as well as 'medical assumptions and attitudes' raised.[12]

Polio proved to be an extremely complex disease to understand; 'capricious in its incidence'[13] and terrifying in its impact, especially on the young. The dramatic and sudden attack of 'The Crippler'[14] left many children damaged for life, to the horror of parents and neighbours. A cure for polio has never been found and, during the period under discussion, it was never clear exactly how the disease spread, although evidence

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11 Central Archives Depot, Pretoria: Department of Public Health (GES), Box files 533-536; 2919.

12 R. Porter, *Patients and Practitioners: Lay Perceptions of Medicine in Pre-Industrial Society* (Cambridge: Cambridge Press, 1985), p. 3.

13 Medical Research Council, 'Breathing Machines and their Treatment', Report of the Respirators (Poliomyelitis Committee) *Special Report Series*, no. 237 (London: His Majesty's Stationery Office, 1939), p. 59.

14 M. Shell, *Polio and its Aftermath: The Paralysis of Culture* (Cambridge, Mass.: Harvard University Press, 2005), p. 304. The shadow of polio was portrayed in a documentary called 'The Crippler' also known as 'The Daily Battle', put out by the National Foundation for Infantile Paralysis in the United States of America.

suggested that the virus was 'excreted in the stool and passed through hand-to-hand or hand-to-mouth contact'.[15]

Howard Phillips has pointed out that South African historians have been reluctant to include discussions of disease in general histories, possibly because they believe this requires 'extensive specialised knowledge' or they 'have been wary of attributing too much weight to the "disease factor" in history'.[16] This thesis hopes to strike a balance between the two. Chapter Two offers an outline of poliomyelitis[17] as it is understood today. A brief outline of the epidemiology of polio until the early 1900s indicates the level of understanding of polio at the time of the first South African polio epidemic in 1918. The two early epidemics, 1918 and 1944-1945, will be discussed in Chapters Three and Six respectively. Lay reactions to the epidemics are handled in Chapters Four and Seven, while Chapter Five offers a contextual examination of the inter-war period, a time which witnessed changes in both public health policies and in medical science. Cripple care was increasingly promoted during this time and medicine witnessed the development of new areas of specialisation such as orthopaedic surgery and paediatrics. Dr J.H.S. Gear, a key player in South African polio research, began his investigations into the

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15 J. S. Smith, *Patenting the Sun Polio and Salk Vaccine* (New York: William Morrow and Company, INC., 1990), p. 36.

16 Phillips, *'Black October: The Influence of the Spanish Influenza Epidemic of 1918 on South Africa'* (Pretoria: The Government Printer, 1990), p. xv.

17 The name will be shortened to 'polio', its more common usage, unless used within the context of medical reports and quotations.

disease during the Second World War, which eventually earned him the title of 'Father of communicable diseases, vaccinology and immunology' in South Africa.[18] Gear's earliest research into polio is discussed in Chapter Eight.

Over the past two decades, important South African published works on medical history have focussed mainly on the political and economic issues raised by disease or the way in which state strategies such as segregation and apartheid dictated the quality of health service.[19] The seminal work by Phillips on the 1918 Spanish influenza epidemic in South Africa, which is rich in social detail, emphasises industrial and economic forces in the context of segregation.[20] Quoting George Rosen, a renowned medical historian, Phillips points out:

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[18] Prof. B. Schoub, lecture at the opening of the Poliomyelitis Research Foundation Training Centre, 27 Nov. 2006.

[19] Examples of such works are: S. Marks and N. Andersson, 'Issues in the Political Economy of Health in Southern Africa', *Journal of Southern African Studies*, vol. 13, no. 2 (Jan. 1987), pp. 177-186; S. Marks and N. Andersson, 'Typhus and Social Control: South Africa, 1917-1950', in R. MacLeod and M. Lewis (eds), *Disease, Empire and Medicine: Perspectives on Western Medicine and the Experience of European Expansion* (London: Routledge, 1988), pp. 257-283; R.M. Packard, *White Plague, Black Labour: Tuberculosis and the Political Economy of Health and Disease in South Africa* (Pietermaritzburg: James Curry Publishers, 1983); M.W. Swanson, 'The Sanitation Syndrome: Bubonic Plague and Urban Native Policy in the Cape Colony, 1900-1909', *Journal of African History*, vol. 18 (1977), pp. 387-411.

[20] H. Phillips, *'Black October'*, p. xv; H. Phillips, 'The Local State and Public Health Reform in South Africa: Bloemfontein and the Consequences of the Spanish 'Flu Epidemic of 1918', *Journal*

> The social history of disease, even endemic disease, can reveal much about the composition and workings of past societies, for not only is disease "related causally to the social and economic situation of the members of a given population, but the health care received also reflects the structure of a society, particularly its stratification and class divisions".[21]

To an extent, polio differed from this mould. The polio epidemics did not cause any significant disruption to the economy, nor could blacks in Johannesburg be blamed in any way for transmitting the disease. Polio was transmitted by white children; they infected each other. The polio epidemics engendered enormous disquiet, anxiety and fear within the infected communities and a sense of apprehension throughout the Union in case the disease spread. Contrary to the high death rate of other diseases, it was polio's ability to maim that made it 'the most feared disease of childhood'.[22] It earned the names of 'the crippler';[23] 'the pestilence';[24] 'an unmitigated evil';[25] 'the mystery disease';[26] 'the

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of Southern African Studies, vol. 13, no. 2 (Jan. 1987), pp. 210-233; H. Phillips, '"Black October": Cape Town and the Spanish Influenza Epidemic of 1918', in C. C. Saunders (ed.), *Studies in the History of Cape Town*, vol. 1 (University of Cape Town, 1979).

21 Phillips, 'Black October', p. xv.

22 D.J. Wilson, *Living with Polio: The Epidemic and its Survivors* (Chicago: The University of Chicago Press, 2005), p. 1.

23 T. Gould, *A Summer Plague: Polio and its Survivors* (New Haven: Yale University Press, 1995), p. xi.

dread disease';[27] 'a periodic scourge';[28] 'a kind of V2 of illness';[29] 'a grim terror more menacing, more sinister than death itself';[30] and 'the last of the childhood plagues'.[31] Polio could leave a child crippled, worthless, reliant on others and the state, and stigmatised for life.[32] Some parents have admitted that, with hindsight, death might have

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24. P. J. Paul, *A History of Poliomyelitis* (New Haven and London: Yale University Press, 1971), p. xiii.

25 *Ibid.*, p. xiv.

26 *The Star*, 4 Dec. 1944.

27 Bruno, R.L, *The Polio Paradox: Uncovering the Hidden History of Polio to Understand and Treat "Post-Polio Syndrome" and Chronic Fatigue* (New York: Warner Books, 2002), p. 65.

28 R. Debré *et al.*, *Poliomyelitis: WHO Monograph Series no. 26* (Geneva: World Health Organisation, 1955), p. 10.

29 *The Star*, 7 Dec. 1944.

30 C.J. Rutty, '"Do Something! Do Anything!", Poliomyelitis in Canada 1927-1962' (PhD thesis, University of Toronto, 1995), p. 3.

31 J.C. Ross, 'A History of Poliomyelitis in New Zealand' (MA thesis, University of Canterbury, 1993), p. 105.

32 J.H. Smith, '"Fear, Frustration and the Will to Overcome": A Social History of Poliomyelitis in Western Australia' (PhD thesis, Edith Cowan University, 1997), p. 419; B. Michel, *Footnote to a Dream: Memories of a Musician's Journey through Adversity* (Johannesburg: B. Michel, 2002), p. 6.

been preferable to the resulting lifetime of disability, physical limitations and disadvantage, but that is not how the majority of survivors felt. Many fought their disabilities with determination and courage, often entering the mainstream workplace and excelling in their careers.[33] 'We just had to get on with it!'[34]

When it was suggested that I should consider doing my thesis on polio, I clearly recall my reaction – 'that's about cripples'. Such a response is notable, for it encapsulates the prejudice and misunderstanding which disabled people face, but it is not totally incorrect. Polio presents a history of disability which is contrary to the value society places on physical ability and perfection. 'Society devalues and discriminates against those who do not conform to the physical norm.'[35] This is arguably one reason why the polio epidemics have enjoyed so little attention in South Africa.[36] The human element is

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33 Works covering family members' experiences and survivors' accounts of polio are: F. Davis, *Passage through Crisis: Polio Victims and their Families* (New York: The Bobbs-Merrill Company Inc., 1991); P. Cockburn, *The Broken Boy* (London: Jonathan Cape, 2005); E. Foster, *It Can't Happen to Me* (Cape Town: Timmins, 1959); J. Opie, *Over my Dead Body* (London: Methuen, 1957); Wilson, *Living with Polio.*

34 E. Harrington, interview, 20 Aug. 2003.

35 J. Morris, *Pride against Prejudice: Transforming Attitudes to Disability* (London: The Women's Press, 1991), p. 43.

36 W.K. Bettzieche, 'Polio, People and Apartheid: The South African Poliomyelitis Epidemics of the 1940s and 1950s with Special Reference to the Cape Peninsula' (BA Honours thesis, University of Cape Town, 1998). This is a pioneering work on polio in South Africa.

central to the study of disease yet 'rarely has there been mention of the patient in medical history'[37] and, one might add, especially the disabled patient.

It has been difficult to collect first-hand accounts from polio survivors. In South Africa, most seem reluctant to write down their stories. While some have been prepared to speak about their experiences, their testimony is not without difficulty for the historian. Oral testimony can be unreliable; memories are fragile and 'subject to the vicissitudes of time'.[38] Where trauma, pain or anxiety is concerned, recall tends to be even more selective and incomplete than usual.[39] Memory can be distorted by 'the imaginative and philosophical framework' of the individual, which can result in digressions or the suppression of memories. Interviewees have pointed out that the stoicism of the 1940s and 1950s (and indeed earlier), reflected in such statements as 'boys don't cry' or 'keep a stiff upper lip', did affect memory. Even the act of interviewing places pressure on the individual; questioning can intrude on aspects of life that many would rather forget or, because of the trauma involved, have forgotten. 'I found it difficult at times to carry on writing because one memory would set in motion others, deep in my subconscious; I had

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37 G. Liebenberg, 'Disease and Disability: Poliomyelitis, Rehabilitation and Social Reform for Disabled Persons in New Brunswick, 1941-1955' (MA thesis, University of New Brunswick, 1994), p. 111.

38 J. Stark, 'The Task of Testimony', *History and Memory*, vol. 1, no. 2 (Spring/Summer, 1999), pp. 37-59.

39 Smith, 'Fear, Frustration and the Will to Overcome'. This thesis had a covering letter offering psychological help should the recollections result in unmanageable anguish.

to come face to face with the pain again, as an adult – experiences which, at times, had been too much for me to cope with as a youngster'.[40]

The way in which information is collected can influence the integrity of the source. Here the historian's role as editor comes into play; historians sift as they listen, selecting what seems to be relevant to the research.[41] There is, however, a certain 'universal experience' of polio, and I have had to resort to using testimonies other than those of survivors from Johannesburg in order to illustrate certain claims in this work.

1.2 A Brief Historiography of Polio

The historiography of polio is largely based on the experience of the disease in the United States of America (USA), although several works on polio epidemics in other countries are available.[42] J.R. Paul's book is fundamental to any study of the history of polio and

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40 Interview with R. Steynberg, 22 Nov. 2004. He also provided a written account.

41. An appeal was made to the *North East Tribune* (August 2002), a local paper in Johannesburg, requesting information from polio survivors and their family or friends. There were more than 40 telephonic responses, but only two were prepared to write an account of their experiences, while the rest were recorded as notes in point form.

42 A.B. Cross, 'The Solomon Island Tragedy: A Tale Of Epidemic Poliomyelitis', *Medical History*, vol. 21 (1977), pp. 137-155; A.M. Killalea, 'The Great Scourge: The Tasmanian Infantile Paralysis Epidemic 1937-38' (MA thesis, University of Tasmania, 1994); Ross, 'History of Poliomyelitis in New Zealand'; C.J. Rutty, '"A Grim Terror More Menacing, More Sinister than

covers the story from the perspective of one of the principal researchers.[43] He was also an important contributor at polio conferences which began in 1948 and helped to disseminate knowledge of the disease. Paul knew and corresponded with many of the prominent people linked with polio research, such as South Africa's James H.S. Gear, with whom he worked on joint research projects.[44] Paul's writing is clear and objective.

Paul frames his history within comparative medical knowledge from the earliest period of polio and ties in the various goals and philosophies which influenced differing approaches to polio. This gives insight into understanding aspects such as its nomenclature and how the medical approach has changed, developing according to the intellectual and technological boundaries over time. Gear raised this point:

Death Itself": Physicians, Poliomyelitis and the Popular Press in Early 20th-Century Ontario' (MA thesis, University of Western Ontario, 1990); Smith, 'Fear, Frustration, and the Will to Overcome'; F. Wallace, 'The Impact of the Cork Polio-Epidemic on Voluntary Provision for the Handicapped' (MA thesis, University College Cork, 1994).

43 T. Gould, *A Summer Plague*, p. 326.

44 J.R. Paul, *History of Poliomyelitis* (New Haven and London, 1971), p. 269. Gear was part of the committee which, in 1955, coined the term 'poliovirus', which has since been universally adopted. Paul co-wrote the article with Gear and H. von Magnus: 'A Recent Definition of the Poliomyelitis Virus', *Virology*, vol. 1 (1955), pp. 185-189. Paul confirms that Gear was part of a group which tried to determine whether antibody patterns elsewhere conformed to those of the lower socioeconomic groups as first studied in Baltimore: Paul, *History of Poliomyelitis*, p. 359. Paul and Gear formed part of the WHO Expert Committee in Rome in 1953 and the 1958 Expert Committee in Geneva, *ibid.*, p. 421.

> I have noted that advances in Medicine result from advances in technique. Sometimes the technique is new, as in the case of the electron microscopy. At other times, an old technique has been refined and applied with greater understanding. Whichever way the advances were made, they depended, in the end, on technical skill and knowledge.[45]

The war-time epidemics were very much tied into the sparse knowledge of the day. Paul shows how polio has been constantly reinterpreted, a process which he believes would continue for many years. He contrasts the stoical nineteenth century – which regarded paralysis during infancy as inevitable for some children – with the later, contemporary understanding that viewed polio with dismay and fear and follows the ambitious jockeying for position and recognition, which were so much part of the race to find an effective prophylactic. Contrasted to this high-profile approach is the altruism of the earlier epidemiological research of polio. In the early 1900s, through painstaking observation and recording of local epidemics, Swedish doctors presented a picture of the disease so accurate that later researchers built on these findings.[46] Paul's purpose in writing the book is to document

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[45] J.H.S Gear, 'Some Highlights of Medical Technology in Southern Africa', Presidential Address: The first South African Scientific Congress of the Society of Medical Laboratory Technologists of South Africa, *The S.A. Journal of Medical Laboratory Technology*, vol. 14, no. 3 (1968), p. 15.

[46] Gear returned to the observations of these early works in his research in the mid 1940s.

> [t]he frequent, almost agonizing, efforts by individual scientists to achieve something which they felt would contribute to knowledge … the determination in the face of frustrating delays and frequent backtracking; the almost frantic attempts to do anything about paralytic poliomyelitis … methods of trial and error' – [which] lead to the eventual control of the disease, with many casualties on the way.[47]

Even after the vaccine was in use, Paul warned that the fight against polio was not over. 'The road will lead uphill for many years to come',[48] as is evident today, since polio is still experienced in certain countries of the world mainly due to inadequate vaccination.[49] Currently there are over 460 polio cases in the world, over 370 in Nigeria alone. A recent outbreak in Namibia claimed seven lives.[50] Nigeria, India, Afghanistan and Pakistan are the four remaining countries where endemic polio is still found, but only in specific parts

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47 Paul, *History of Poliomyelitis*, p. xiv.

48 *Ibid.*, p. 469.

49 The following offer enlightened histories of the virus: A.B. Sabin, 'Oral Poliovirus Vaccine: History of its Development and Use' and A.B. Sabin, 'Current Challenge to Eliminate Poliomyelitis from the World', *Journal of Infectious Diseases*, vol. 151 (1985), pp. 57-64; D.M. Horstmann, 'The Poliomyelitis Story: A Scientific Hegira', *Yale Journal of Biology and Medicine*, vol. 58 (1985), pp. 79-90.

50 *The Star*, 13 June 2006.

in each country. Continuing outbreaks of polio, such as the recent occurrence in Namibia, are the result of imported cases from any of these four areas.[51]

Two other excellent histories of polio are Naomi Rogers's *Dirt and Disease*[52] and Tony Gould's *A Summer Plague*.[53] Rogers's focus on the 1916 New York epidemic draws attention to the complexities and ironies of polio history. She emphasises that, in order to understand polio, it is necessary 'to place each epidemic and ensuing drama' within the context of the medical and scientific understanding of the early twentieth century. By the early 1900s, diagnostic tests, sera and vaccines were available to fight most infectious diseases, but not polio. 'Polio proved confusing and intractable to all known bacteriological, epidemiological and therapeutic measures of the day';[54] polio in fact 'highlighted the limitations of scientific solutions'[55] and contradicted all given pictures of epidemic disease for many years to come.[56] Rogers expands on the sense of

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51 Prof. B. Schoub, lecture at the opening of the Poliomyelitis Research Foundation Training Centre, 27 Nov. 2006.

52 N. Rogers, *Dirt and Disease: Polio before FDR* (New Brunswick, Rutgers University Press, 1992).

53 T. Gould. *A Summer Plague: Polio and Its Survivors* (Yale: University Press, 1995).

54 Rogers, *Dirt and Disease*, p. 19.

55 *Ibid.*, p. 6.

56 *Ibid.*, p. 164.

inadequacy experienced throughout the 1916 epidemic and examines the responses to the epidemic within various social groups.

Central to her argument is the way the disease shifted to the upper classes. Health officials and the lay public blamed the poor and immigrants for polio, believing that germs did not spread randomly.[57] Insects were also blamed for transmission, especially flies. This policy of assigning responsibility for an epidemic and expecting 'the authority of the new scientific medicine and germ theory of disease' to conquer it, Rogers believes, was part of contemporary confidence which had been boosted by the successes of bacteriology.[58] Concomitant to the emergence of a powerful ideology of motherhood during the early twentieth century,[59] mothers were singled out as guardians 'of the family's spiritual and physical health',[60] but the irony of this early understanding of polio was that clean homes failed to protect the well-off child, while poorer children were able to build immunity to polio because of their more unsanitary environment. Rogers's analysis of the tensions within a society, driven by fear and ignorance, offers useful insights which can be tested against other polio epidemics, such as the 1918 epidemic in

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57 *Ibid.*, p. 29.

58 *Ibid.*, p. 31.

59 For an excellent exposé on this subject, see D. Dwork, *War is Good for Babies and Other Young Children: A History of the Infant Welfare Movement in England 1898-1918* (London: Tavistock Publications, 1987).

60 Rogers, *Dirt and Disease*, p. 15.

Johannesburg. [61] Scientists and laymen alike attempted to direct medical research, driven by a shared sense of fear and frustration. Although the influence of popular heroes, such as Franklin D. Roosevelt, who had contracted polio in1929, was too far removed from the South African situation to be meaningful to the ordinary person locally, Rogers regards his influence in the USA as significant. He helped to recast the image of polio and disability by removing the stigma[62] – although some polio survivors would disagree – and played an important role in setting up the National Foundation for Infantile Paralysis (NFIP), developed in 1934 to raise money for the needs of polio patients across the USA and which contributed to polio research with substantial funding.[63]

Whereas Rogers's study does not offer the patients' perspective, Gould makes a point of including the 'experience of the polio patient, the actual sufferer', in his account. 'It's not just a question of "background" … but of insisting on the centrality of the polio experience' as 'the testimony of witnesses give resonance to the history'.[64] His narrative attempts to weave together the various strands of the polio story – scientific, clinical, political and experiential aspects – 'which have in the past been treated separately, if at

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61 *Ibid.*, p. 7.

62 Rogers, *Dirt and Disease*, pp. 1-3.

63 *Ibid.*, p. 166.

64 Gould, *A Summer Plague*, p. xiii.

all'.[65] Such focal points have influenced the structure of this work; the political aspect is touched on only briefly.

By making use of British material, Gould offsets the strong influence of the USA on polio history. In this context, the early South African epidemics deserve attention, as the 1944-1945 epidemic in South Africa offered Gear an entirely fresh field of research, and contributed to his pioneering insights. Gould does not focus on one epidemic, as Rogers does, and so his story is not as rich in analysis as her narrative, but it does include important new material, such as information about post-polio syndrome.

In the 1970s, it became apparent that the polio story had yet another twist to it. Certain polio survivors, often those who had been least affected by the disease, found that thirty or forty years after the initial attack 'their lives [were] cast into jeopardy by alarming symptoms of fatigue and new muscular weakness, suffered without warning.[66] Known as 'Post-Polio Syndrome', the 'Late Effects of Polio' or 'Post-Polio Sequelae', the condition still has not been totally recognised by some in the medical world. The effect of this ailment on polio survivors, however, has been dramatic. The functional deterioration experienced by many 'polios'[67] is a serious medical problem, while the cause has been the subject of considerable speculation and debate. Whatever the reason,

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65 *Ibid.*, p. xii.

66 *Ibid.*, p. xii.

67 A term used by polo survivors: 'a name that merged their identity with their disease': Smith, *Patenting the Sun*, p. 38.

when fatigue and pain become debilitating, survivors once again face medical ignorance and disability. Many had suppressed the memory of their illness, but world-wide support groups encouraged them to become more open to discussion. Gould has used these testimonies to offer a unique aspect of the polio story. It was due in part to the post-polio syndrome that those who participated in this thesis were prepared to share their stories.[68]

> You don't "conquer" or "overcome" polio in any meaningful sense, you merely adapt to the limitations it imposes and – if you're fortunate – discover resources within yourself you might not otherwise have found.[69]

There are several significant academic works on polio which have guided this thesis. Christopher Rutty's PhD thesis offers a narrative history of polio in Canada from 1927 to 1962. He integrates the Canadian experience within current historiography and shows how the USA's 'scientific and publicity war on polio' influenced the Canadian response to epidemics. He explores certain factors fundamental to this response, especially polio's 'terrifying nature and high visibility, public expectations for action and protection, the profound frustrations associated with the scientific and medical

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[68] I found myself playing 'go-between' for the South African Post-Polio Network, as many who replied to my notice in the North East Chronicle thought that I might be able to help them with information on the condition. I pay homage to 'Hans', an organ builder of note in the country, who died within months of our conversation, 'from respiratory complications resulting from his childhood encounter with the poliovirus', according to C. Webster, 20 Nov. 2003.

[69] Gould, *A Summer Plague*, p. xvi. Other publications which offer polio testimonials are Wilson, *Living with Polio* and Shell, *Polio and its Aftermath*.

understanding of the disease, diagnosis, prevention, control, treatment and after-care'.[70] Canada's experience of polio is important as it offered a broader understanding of the disease. This is also true of the Gear investigations into the transmission of the virus during the 1944-1945 South African epidemic, which contributed to the international understanding of polio. The Canadian government, closely connected to its provincial and federal health departments, set a new precedent in the management of polio.[71] Strongly influenced by key individuals and the growing needs created by the epidemics, free and unconditional public health care was provided, special hospitals were built with convalescent facilities, physiotherapy and after-care for polio sufferers.[72] The South African government subsidised the South African Institute for Medical Research (SAIMR), but not for polio research. State involvement into research on the disease was delayed until the 1950s.

Rutty raises an important point about the relationship of polio to other diseases. Despite the fact that other infectious diseases such as measles, chicken-pox, whooping cough and scarlet fever had higher case numbers, polio became the focal point of expensive, world-wide research. He points out that, in such diseases, epidemics were rare and more invisible and that the illnesses were more transitory. Death could result but it was more likely that a full recovery left little subsequent evidence of the disease.

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70 Rutty, 'Do Something! Do Anything!', p. ii.

71 *Ibid.*, p. 5 and p. 7.

72 *Ibid.*, p. 381.

Diphtheria, which came under control as polio was becoming a major threat, could leave emotional scars but not visible ones. Polio was ongoing, often associated in the public mind with a yearly summer season, and was therefore deserving of the attention it received from medical science.[73]

Jean C. Ross' scholarly work 'A History of Poliomyelitis in New Zealand' is direct and to the point. She examines the problem of quarantine measures which in New Zealand, were 'extraordinarily wide in their scope' and affected everyone. The country's population was small enough to make such measures nationwide; all schools were closed during an epidemic. Although these measures proved useless in stopping the spread of polio, the public, the medical profession and the health authorities never questioned them. A certain race or class was not blamed for spreading the virus, as was experienced in the USA or, to a lesser degree, in South Africa. 'To the general public polio was yet another of the hazards of infancy which could blight their child's life forever.'[74] By 1947, however, due to a clearer understanding of the epidemiology of polio, isolation only applied to the infected individuals and immediate contacts. 'The health authorities were faced with the difficult task of persuading the general public that what had been absolutely essential five years before was now not necessary.'[75] In similar vein Johannesburg health officials wavered in their polio policy which bewildered parents.

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[73] *Ibid.*, p. 383.

[74] *Ibid.*, p. 101.

[75] *Ibid.*, p. 102.

Ross raises the important issue of viral enteric infections and infant mortality as a screen to early polio figures.[76] Studies showed that where there was a high infant mortality rate, polio, in its endemic form, was hidden by other infectious illnesses such as endemic diarrhoeal diseases. 'It is not until the infant mortality rate drops below 75 per 1000 that polio begins to manifest itself within a few years.' In New Zealand, infant mortality figures began dropping around 1906; this was followed by the first polio epidemic in the country in 1916. Similarly Australia, England, Wales, the USA and Italy showed a marked drop in infant mortality rates by the early1920s, with a concomitant rise in polio epidemics within a few years.[77] The link between the infant mortality rate and polio in Johannesburg is explored in Chapter Five.

Although Ross believes that the fear engendered by polio was out of all proportion to its actual impact, the appearance of the disease in epidemic form during the early twentieth century was significant:

> When it was thought to be rare or unknown, it was common; when it seemed common it was rare … at a time when infectious diseases were being overcome with disinfectants, sewers, good food and clean water, polio could not be controlled. It made a mockery of every public health measure and advance in the standard of living.[78]

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[76] *Ibid*, p. 3.

[77] *Ibid.*, pp. 111-113.

[78] *Ibid.*, p. 103.

Although the South African polio epidemics are mentioned in several general historical accounts,[79] the only scholarly work on polio in South Africa is Wieland. K. Bettzieche's 'Polio, People and Apartheid'.[80] His focus is on the 1944-1945 and 1948 epidemics, the establishment of the Poliomyelitis Research Foundation and the polio vaccine campaigns during the 1950s, with a focus on the Cape Peninsula. His main sources are J.H.S. Gear's *The History of the Poliomyelitis Research Foundation*, Malan Marais's *In Quest of Health*, Roger's *Dirt and Disease* and Rosenberg's *Explaining Epidemics*. Unfortunately Bettzieche has neglected to list sources diligently, especially with regard to his brief handling of the epidemics in the 1940s, and it is difficult to verify pertinent aspects of his arguments. He attempts to explore 'the reasons for the marked differences in polio's prevalence in South Africa's racial groups',[81] hoping that the polio

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79 H. Rudolph, *Johannesburg, One Hundred Years* (Melville: Chris Van Rensburg Publications, 1986), p.159, which has three paragraphs on the Poliomyelitis Research Institute and the development of the polio vaccine; Reader's Digest, *South Africa's Yesterdays* (Cape Town: The Reader's Digest Association South Africa, 1981), p. 55, which offers a photograph of the first iron lung built in South Africa; P. Schirmer, *The Concise Illustrated South African Encyclopaedia* (Johannesburg: Central News Agency, 1980), p. 133, which gives a definition of the disease and mentions the dates of the epidemics 'prior to vaccine's discovery'; *The Standard Encyclopaedia of South Africa*, vol. 8 (Cape Town: Nationale Boekhandel, 1973), p. 644.

80 Bettzieche, 'Polio, People and Apartheid'.

81 *Ibid.*, p. 26.

epidemics might ‘illuminate the political, ideological, cultural and social situation of society at the time’.[82] He concludes:

> Polio highlighted early patterns of disease and discrimination in the prevention and treatment which ran along the lines demarcated by apartheid. The differences in provision of health services according to race foreshadowed the segregation of health services in the 1960s and 1970s.[83]

This thesis did not endeavour to pursue any discriminatory pattern in the handling of polio along racial lines, as the statistics for all ‘non-white’ groups during the early epidemics were too inadequate and unreliable to be able to make any convincing argument. In his socio-political view of polio in the Cape Peninsula and its impact on blacks and whites, Bettzieche admits that Cape records show a lack of ‘depth and of detail, especially in regard to “racial divisions”’. He finds this to be ‘a degrading and discriminating device which expresses the general lack of interest in detail in races other than white at the time’.[84] War-time conditions, however, hampered effective gathering of white statistics, for various reasons which will be discussed; it can be assumed that black statistics were also affected by these conditions. Scientists suspected that the poliovirus

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82 *Ibid.*, p. 8.

83 *Ibid.*, p. 101.

84 *Ibid*, p. 23.

affected people living in poor conditions to a lesser degree.[85] Ironically, polio was the one infectious disease from which blacks appeared initially protected by their living conditions, but this pattern changed during the 1950s when they succumbed to polio in greater numbers.

Although he does not go into any detail, Bettzieche regards 1944 as the point where polio shifted 'from sporadic appearance to epidemic proportions'.[86] 'Never before had incidences been so high and widespread as during this epidemic, nor had the mortality rate in the past been comparable with that of this epidemic.'[87] This thesis, however, argues that there is sufficient material available on polio in 1918 – despite the paucity of statistics – to build up a reasonable account of the epidemic along social and medical lines.[88] A cursory examination of available figures even suggests that the 1918

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85 J.L. Braudo, 'Clinical Manifestations of Fifty Cases of Acute Poliomyelitis Seen at the Children's Hospital, Johannesburg During the 1948 Epidemic With Special Reference to the Management in the Acute Phase and the Phenomenon of Spasm (MD thesis, University of the Witwatersrand, 1956), p. 3. In 1949 Sabin discussed this in his paper 'Epidemiologic Patterns of Poliomyelitis in different parts of the World'.

86 Bettzieche, 'Polio, People and Apartheid' , p. 8.

87 *Ibid.*, p. 24.

88 J.W. Scott Millar, 'Poliomyelitis in Johannesburg', *Public Health*, vol. 13 (May 1949), p.144. Scott Millar believes that because of insufficient details, a close examination of the 1918 epidemic would be misleading. This applies to a scientific examination of the epidemic and not a historical one.

epidemic was more severe, with a higher mortality rate than the later epidemic in 1944-1945. Early epidemics in other countries followed a similar trend of high mortality rates. As more epidemics occurred, case numbers increased, but there were a greater number of paralysed cases and older age-groups becoming infected, while mortality rates dropped.

Later progress in polio research in South Africa is firmly based on the 1944-1945 epidemic and, although the 1918 epidemic did not play a direct role in this research, it deserves more than the cursory mention it has received to date. As no detailed account of these epidemics exists, such an investigation is long overdue.

Chapter Two

The Guided Missile:[1] The Epidemiology of Poliomyelitis

2.1 Polio diagnosis

During the latter part of the nineteenth century, polio changed from an unremarkable disease into one of the most feared diseases of all time. The virus was internationally endemic and seldom caused death, but in its epidemic form polio was lethal. R.L. Bruno has likened the poliovirus to a guided missile which has a specific task: it targets only motor neuron cells in the brain and spinal cord which are responsible for the transmission of the nerve impulses to various muscles.[2] If these cells are destroyed, the paralysis in affected limbs can be permanent.

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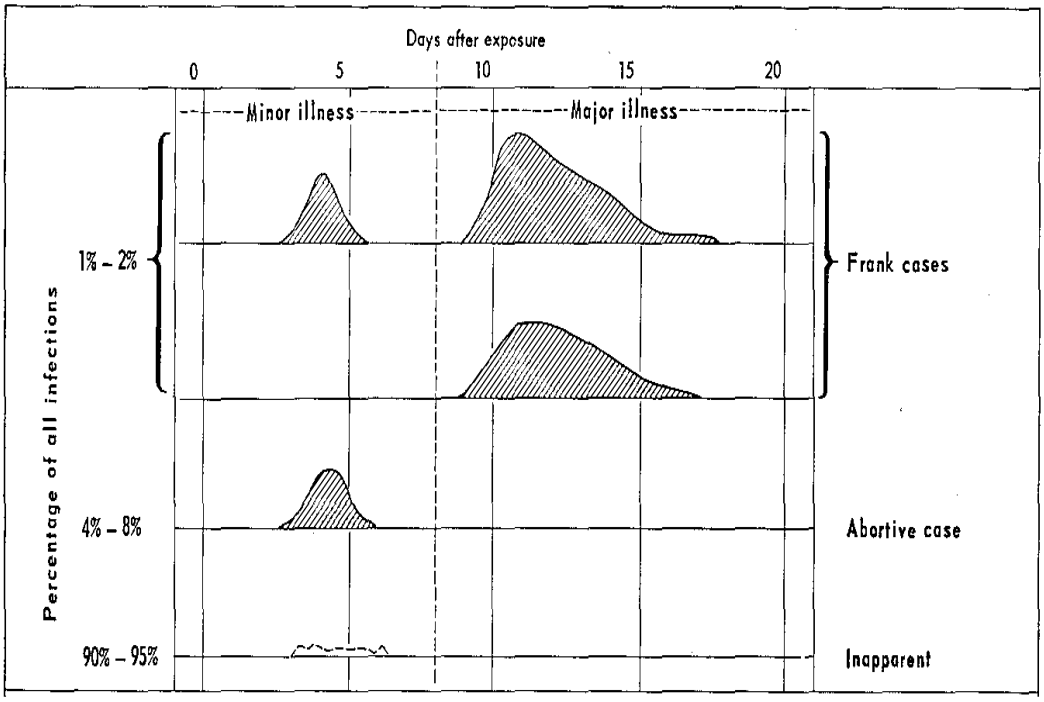
1 R.L. Bruno, *The Polio Paradox: Uncovering the Hidden History of Polio to Understand and Treat "Post-Polio Syndrome" and Chronic Fatigue* (New York: Warner Books, 2002), p. 20. The poliovirus is one of the smallest viruses. About 17 000 poliovirus particles would cover a punctuation mark.

2 J.H.S. Gear, *The History of the Poliomyelitis Research Foundation* (Johannesburg: Poliomyelitis Research Foundation, 1996), p. 1.

Table 2.1



Schematic diagram of the clinical and subclinical forms of poliomyelitis

Source: Debré, *Poliomyelitis*, p. 17.

From Table 2.1 above, one can see in diagnostic terms that polio infections can be severe, mild or inapparent. Paralytic polio is a major illness, in which weakness or paralysis of one or more muscles develops. Non-paralytic polio is also a major illness because of central nervous system (CNS)[3] involvement, but paralysis does not occur. Abortive polio is a brief, systemic illness, often limited to one or more of the following

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[3] P. J. Paul, *A History of Poliomyelitis* (New Haven and London: Yale University Press, 1971), p. 3. The CNS includes the anatomical structures of the brain, brain stem, medulla and spinal chord.

symptoms: sore throat, headache, vomiting and fever, but clinical or laboratory signs pointing to CNS involvement fail to develop. Abortive polio is therefore usually only diagnosed during an epidemic when doctors are on the alert for the disease. Because the symptoms of other childhood diseases are similar to polio, an epidemic can also be a period of heightened misdiagnosis. A critical feature of polio is the inapparent infection, which is the most common (90-95 per cent) and occurs in individuals who sustain silent or subclinical infection, presenting no symptoms, and who, as a result of this experience, develop antibodies to the infecting strain of the virus.[4] These healthy carriers are by far the most numerous and uncontrolled, as their symptom-free infection escapes detection and they can act as 'a huge human reservoir' for the spread of the disease.[5]

The above diagram shows how, following a few days of flu-like symptoms, the disease can abort. After an incubation period of a week or more, the patient can suddenly become paralysed or the advent of the disease can be biphasic: following a few days of ill-health, symptoms can disappear and the patient seems to recover only to be struck down with paralysis. The ratio of paralytic to inapparent infections is difficult to measure but could be in the region of 1:200. It is clear that if the mild or abortive cases and the inapparent infections are included in any epidemiological survey, then the polio attack rates approach those of a highly contagious disease, giving quite a different picture from

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4 R. Debré, et al., *Poliomyelitis*, WHO Monograph Series, no. 26 (Geneva: World Health Organization, 1955), pp. 14-15.

5 *Ibid.*, p. 14.

that gained from the analysis of the paralytic cases alone.[6] This means that polio was much more widespread in South African society than was realised in the first half of the twentieth century.

2.2 The Pathogenesis of Polio

This includes the origin of the disease, the way in which the poliovirus enters or leaves the human body, how a person becomes infected and then contaminates the immediate environment.

The virus is transmitted through person-to-person contact and enters via the mouth. Food, contaminated hands, towels and nappies, utensils and, to a lesser degree, droplets in the air introduce the virus into the alimentary canal which includes the mouth, stomach and the entire intestinal tract.[7] The virus multiplies in the spongy tissue of the tonsils and surrounding lymph nodes and moves down to the small intestine where it enters Peyer's patches, miniature cave-like lymph nodes in the wall of the intestine. Here further multiplication of the virus takes place. The overabundance of poliovirus in the tonsils spilling back into the throat mixes with saliva and contributes to the spread of

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6 *Ibid.*, p. 16.

7 *Ibid.*, p. 16.

infection.[8] Large amounts of poliovirus in the small intestine are also passed out with the intestinal contents, infecting sewage systems in the region. This does not necessarily mean that sewage systems are the usual avenue of infection; 'it means essentially that here is evidence that the community is infected'.[9]

The alimentary tract and oropharynx (mouth and throat), although the first sites to be attacked, might also be called 'the first line of defence', as the virus seems to be stopped here in the majority of infections, doing no appreciable damage, save a slight swelling of these structures.[10] After an incubation period of two to five days, the body's automatic reaction occurs in the cells and specific antibodies are produced. Provided these defences are adequate, the virus can be destroyed at this stage, and the individual can enjoy lasting immunity from future infections of that particular poliovirus.

If the virus is not stopped by the body's immune system and millions of poliovirus particles spill into the bloodstream from the lymph nodes and the intestine, the infection is carried to the brain and spinal cord, where neurons of the brain stem and motor neurons of the anterior horn of grey matter are targeted. More distinctive symptoms emerge, such as a stiff neck and back, high fever and varying sites and degrees of muscle weakness. Once inside individual neurons, the poliovirus blocks production of

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8 Bruno, *Polio Paradox*, pp. 23-27.

9 Debré, *Poliomyelitis*, p. 19.

10 Rutty, 'Do Something! Do Anything!', p. 28.

vital protein or neurochemicals needed to transmit messages to enable muscle contraction. Muscles become weaker or are paralysed as brain and spinal neurons become less active or stop functioning.[11] These frank paralytic cases occur in about three to four per cent of all polio infections.[12]

There are a number of provoking factors, which, if present, may change an otherwise silent infection into a paralytic attack. These include long, tiring journeys, strenuous exercise, tonsillectomy, (even if performed several months previously), adenoidectomy and operations on the mucous membrane of the mouth, including tooth extraction.[13] Why this happens is not understood; 'it is possibly a matter of timing in this disease'.[14]

Meanwhile, within the body, invaded neurons, which did not die during the acute stage of the disease, become smaller than their original size. Their surviving axons grow again sending out sprouts – 'like extra telephone lines' – to turn 'on' the muscles cut off while the poliovirus was present. Some patients, who were initially paralysed, walked after a few weeks or months, although this process could take up to two years. Post-infection strengthening exercises and physiotherapy can result in the surviving muscle

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[11] Bruno, *Polio Paradox*, pp. 26-28.

[12] Rutty, 'Do Something! Do Anything!, p. 28.

[13] Gear, *Poliomyelitis Research Foundation*, p. 2.

[14] Paul, *Poliomyelitis*, p. 20.

fibres growing up to twice their original size, in order to do more work. In certain cases deformities of varying degrees develop in the affected limbs, which would require surgical procedures to correct.[15]

David Bodian, an American scientist and pathologist responsible for groundbreaking work on polio in the 1940s, claimed that, on average, 96 per cent of the motor neurons of the spinal cord were infected during the average case. Before an individual muscle showed any weakness, 60 percent of the neurons had to be destroyed.[16] If movement returned, those muscles which had been paralysed could operate on as little as 40 per cent of their original motor neurons. More disturbing, however, he revealed that neurons had also been damaged even for those who had experienced 'nonparalytic' polio.[17] This revelation had important repercussions for polio survivors who, years later, could develop the condition known as post-polio syndrome (recognised after 1970). An understanding of the damage caused by the poliovirus is important in the management of the syndrome, although to date many doctors are divided as to the existence of this condition.[18]

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15 Bruno, *Polio Paradox*, pp. 32-33.

16 *Ibid.*, p. 34.

17 *Ibid.*, p. 29.

18 Interview with C. Webster, 16 Nov. 2003.

A major stumbling block in controlling the disease was due to the unusual complexity of the polioviruses compared, for example, with the smallpox or yellow fever virus, where immunity is dependent on protection against a single virus strain. In 1931, Australians Frank MacFarlane Burnet and Jean MacNamara found that there were in fact three poliovirus serotypes, each with its own special autogenic and biological characteristics. This discovery opened the way to the development of an effective vaccine and also explained the occurrence, although rare, of repeated attacks in a person.[19] Usually one type of poliovirus is dominant during an epidemic, although it is not unknown for another type to accompany the main type. The Brunhilde virus,[20] or Type 1, appears to be responsible for almost all polio epidemics, causing leg, arm and sometimes breathing-muscle paralysis. The Type 2 virus, or Lansing, is least likely to cause paralysis and responsible for endemic infections. Type 3 poliovirus (Leon) is the most rare. It can cause leg and arm paralysis, but is most likely to produce so-called 'bulbar' polio, which severely damages the bulb or stem of the brain. This results in difficulties with swallowing, breathing and blood pressure, which can lead to the death. Research has suggested that, during the polio epidemics, most cases were infected with only one type

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[19] Ross, 'Poliomyelitis in New Zealand', p. 5; Paul, *History of Poliomyelitis*, p. 233. This vital discovery lay dormant for years until the 1948 'Typing Project' led to the naming of the three viruses.

[20] Paul, *History of Poliomyelitis,* pp. 232-239. Brunhilde was the name of a chimpanzee which John Hopkins used in a research programme; the chimpanzee is the nearest to man with respect to susceptibility to poliomyelitis.

of poliovirus, probably Type 1. Total immunity only results from infection from all three viruses so that the body can develop antibodies against each type.[21] Within each immunological type, individual strains appear to vary in their virulence, with more aggressive strains giving a higher incidence of frank or 'true' polio per immunising infection.[22]

The poliovirus, like other entero-viruses, is resistant to all known antibiotics or chemotherapy agents. Laboratory disinfectants, such as alcohol, Lysol and 'quaternary ammonium compounds', are ineffective against the virus. The poliovirus is viable at room temperature for days and for many years at freezing point, although ultraviolet light and temperatures of 50 degrees centigrade destroy it.[23]

From this outline of the disease it is clear that one of the most difficult tasks facing doctors in the early part of the twentieth century was to diagnose polio correctly, hopefully before paralysis appeared, but there was no specific diagnostic test to assist

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21 Bruno, *Polio Paradox*, pp. 21-22.

22 J. Trueta, *Handbook of Poliomyelitis* (Oxford: Blackwell Scientific Publications, 1956), p. 10. There are at least fifty variations or strains of the three types: Bruno, *Polio Paradox*, p. 22.

23 Ross, 'Poliomyelitis in New Zealand', p. 6.

them.[24] Symptoms of polio mimicked a variety of other common childhood diseases, as well as other more serious virus diseases of the CNS, such as acute aseptic meningitis and encephalitis. This placed both professional and emotional strain on doctors, who hesitated to diagnose until paralysis appeared.

The lumbar puncture or 'spinal tap' had emerged in the 1880s as a useful tool in diagnosing meningitis. A needle was inserted between the vertebrae and a small amount of spinal fluid was drawn off for microscopic examination for particular cells which could be cultured.[25] This procedure could be most uncomfortable and frightening, especially for small children; the cell count might confirm polio, but the results often arrived after paralysis had set in. Once inside the body, there was no cure for polio nor was there any proven treatment, although an anti-polio serum, prepared from the blood of individuals who had recovered from a polio attack, was used until the 1930s, mainly in an attempt to minimise the severity of the disease.[26]

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[24] Rutty, 'Do Something! Do Anything!', p. 31. Diagnostic tools were available for other diseases from as early as 1910, such as the Schick test for diphtheria, the Widal test for typhoid, the tuberculin test for tuberculosis (TB), and the Wasserman test for syphilis.

[25] *Ibid.*, p. 32.

[26] *Ibid.*, p. 41.

2.3 An Outline of the Understanding of Polio

'This pestilence which walketh in darkness … How does it select its victims and where does it strike them that we might protect them from its murderous and cruelly disabling attack?'[27]

Polio is an old disease with records dating back to ancient Egypt; references to paralysis in the bible might well have been as a result of polio. Before the twentieth century, however, the disease was little known other than as a mild, endemic infection experienced mainly by children, hence the name 'infantile paralysis'. It was not considered infectious and for years paralysis during infancy was believed to be caused by 'teething, foul bowels or a fever',[28] 'even from sitting on the damp ground'.[29] In 1772, Sir Walter Scott described how, at 18 months old, he suffered an attack of fever which left him lame. The reaction of his parents to his paralysed right leg is worth noting.

> My anxious parents, during the course of many years, eagerly grasped at any cure which was held out by the promise of empirics, or of ancient ladies or gentlemen who considered themselves entitled to recommend

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[27] Rutty, The Middle Class Plague, p. 33.

[28] Paul, *Poliomyelitis*, p. 9.

[29] Paul, *History of Poliomyelitis*, p. xiii.

various remedies, some of which were of a nature sufficiently singular.[30]

Michael Underwood was the first physician to give a clear clinical account of polio in 1784 and to recognise the disease as an entity. In his book, Treatise on Children, under the heading, 'Debility of the Lower Extremeties',[31] he wrote: 'It is not a common disorder (which) seems to arise from debility and usually attacks children previously reduced by fever, seldom those under one or more than four or five years old.'[32] Underwood recommended the use of calomel and volatile as treatment during the first few days or weeks of the disease.

In 1813, in Milan, Giovanni Battista Monteggia offered a more detailed description of the effects of the disease on the body. He mentions the high fever and describes how 'the member remains immobile and regains, with time, only an imperfect degree of strength', which can be carried on into adulthood as 'a dragging leg'. In an era when the medical profession paid small heed to an accurate diagnosis, these observations accurately outline the clinical course of the disease.[33]

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30 Gear, *Poliomyelitis Research Foundation*, pp. 4-5.

31 *Ibid.*, p. 24.

32 Gear, *Poliomyelitis Research Foundation*, p. 5.

33 Paul, *History of Poliomyelitis*, pp. 27-28.

In 1835, J. Badham followed four patients in Sheffield in England over a period of a week, observing the symptoms of thirst and drowsiness, the unusual appearance of the eyes and the patient's inability to stand.[34] In 1836, Sir Charles Bell described the first epidemic which occurred on St Helena following a description of the mother of a little girl who was part of a group of children who contracted polio on the island. She called it an 'epidemic fever'; the children were 'similarly affected with a want of growth in some part of their body or limbs'.[35]

By 1840, Jacob von Heine, in Germany, suggested that the symptoms of the disease 'point to an infection of the central nervous system, specifically of the spinal cord' causing sudden paralysis preceded by 'pain in the extremties, fever, irritability and convulsions in most cases'.[36] He advocated rest and wrapping the affected limbs in a warm cloth in place of the standard purges, blisters and emetics used during that time.[37]

By 1870, J. Charcot, a famous French medical scientist, confirmed Heine's theory of the involvement of the central nervous system in polio. With the aid of the microscope, Charcot demonstrated how the large motor nerve cells in the grey matter of the spinal cord were lost during the early or acute stage of the disease. The neuropathology of polio

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34 *Ibid.*, p. 41.

35 *Ibid.*, p. 43.

36 *Ibid.*, p. 53.

37 Ross, 'Poliomyelitis in New Zealand', p. 10.

was thus established, which set it apart from other kinds of acute and chronic diseases involving the CNS.[38]

The germ theory, developed by Louis Pasteur and Robert Koch during the nineteenth century, introduced the era of the bacteria; the poliovirus was only recognised in 1909. Although this recognition of the role of the pathogen may have led to a search for the cause of polio, its impact was necessarily limited. More important was the work of K. Medin who in 1884 gave the first description of a large polio epidemic, in Sweden, after which 'the epidemic character of polio began to be taken seriously'.[39] Sweden had the reputation as the country with the worst epidemics, although it was not understood why. However, Medin's observations helped delineate the clinical course of the disease. The minor symptoms and slight fever of the febrile period signified a generalised process, which could be followed by serious damage to the CNS. He observed that the course of the acute disease was sometimes interrupted by a brief, afebrile period or a time when symptoms cleared up entirely and the individual appeared perfectly well, but within one or two days, without warning, the disease recommenced with paralysis. In 1917, Draper called this biphasic nature of the disease, the 'dromedary course' of polio.[40] Medin's work was important to the understanding of the disease and of rest as a treatment.

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38 Paul, *History of Poliomyelitis*, pp. 54 -57.

39 Paul, *Poliomyelitis*, p. 10.

40 Many sources have delighted in catching Draper out; the dromedary camel has only one hump, the term 'biphasic' is more accurate in describing this feature in the course of the disease.

In1894, Dr Charles Caverly, a physician and public health officer in Vermont in the United States of America, pointed out how older children were becoming victims of polio, which represented a move away from the endemic pattern which affected mainly infants. He also recognised abortive cases. This American epidemic recorded 1031 cases, and high mortality rates of 13.5 per cent, revealing another truism of the disease: the older the polio patient, the higher the death rate.

This gradual shift in age-incidence is an important element in the understanding of polio since the advent of its epidemic form. Caverly also reported a curious finding which, although never linked in any way to polio, is worth noting, as a similar instance occurred during the 1944-1945 polio epidemic in South Africa. A nervous disease, resulting in paralysis, killed a number of horses, dogs and fowls in the same geographic area as the epidemic.[41] Finally, Caverly questioned whether polio was contagious or not as, during the epidemic, he only came upon one instance in which more than one member of the family contracted polio. Such systematic observations of epidemics were important to build up an understanding of the epidemiology of polio. While Caverly was the first American to have done this, arguably, Ivor Wickman was probably the most valuable.

Wickman was a pupil of Medin, 'indoctrinated by him in the current knowledge of poliomyelitis.[42] He had also witnessed two epidemics in Sweden – in 1899 and 1903 --

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41 Paul, *History of Poliomyelitis*, pp. 83-85.

42 Ibid., p. 88.

and had written a thorough review of the disease. During the 1903 epidemic, he observed, as Medin had, that overcrowding was not the cause of polio, as was the case with many other diseases; rather overcrowding provided an opportunity to build up immunity against polio, which children in remote areas were unable to do.

Wickman also noted that, in some instances, the infection might have missed the CNS altogether. Such abortive cases, also mentioned by Caverly, did not result in paralysis, but might equal or even outnumber the paralytic ones. He thought the ratio of abortive cases to frank polio cases could be several hundred to one.[43] As already discussed, this group continued to transmit the disease, although outwardly displaying no symptoms. Wickman discussed the incubation period of the virus, fixing this at three to four days from the time of exposure to the virus, and eight to ten days to the fever that was associated with the major illness.[44]

It had become clear that polio was highly contagious. A significant difference from scarlet fever or smallpox was the fact that doctors were usually guided by a

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[43] J.L. Braudo, 'Clinical Manifestations of Fifty Cases of Acute Poliomyelitis seen at the Children's Hospital, Johannesburg, during the 1948 Epidemic with Special Reference to the Management in the Acute Phase and the Phenomenon of Spasm' (MD thesis, University of the Wiwatersrand, 1958), p. 8.

[45] Paul, *History of Poliomyelitis*, p. 94. Paul adds that for over 50 years textbook articles stated that the incubation period averaged eight to nine days with a minimum of five days and a maximum of 35 days.

definitive rash or pustules.[45] To diagnose 'infantile paralysis', in the absence of paralysis, seemed impossible to many doctors because this was so contrary to their understanding of the clinical and epidemiological picture of the disease in the early twentieth century.

In 1908, Karl Landsteiner and his assistant, E. Popper, finally confirmed that polio was caused by a virus.[46] This confirmation of the aetiological agent promised fresh opportunities for research but this knowledge did not help the average family doctor, health workers, or the parents whose children still faced the threat of ever-increasing polio epidemics which no one knew how to control. The next step was to grow the virus in order to reproduce spinal cord lesions in experimental animals which were comparable to those found in human spinal cord samples. Landsteiner successfully implanted the poliovirus into two different species of monkey.[47] Together with Levaditi, a member of the Pasteur Institute, Lansteiner then demonstrated the presence of poliovirus in non-nervous tissue which was vital to later vaccine work.[48]

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45 Ross, 'Poliomyelitis in New Zealand', p. 9.

46 Paul, *History of Poliomyelitis*, pp. 98-106. Landsteiner was also responsible for paving the way for the identification of the four major blood groups, thus laying the groundwork for the science and techniques of blood transfusion.

48 These were the *Macaca Rhesus* and the *Cynocephalus Hamadryas* species of monkey; the latter was plentiful in South Africa and was used in further polio research here.

48 Gear, *Poliomyelitis Research Foundation*, p. 10.

But it was Wickman who had laid the basis for the modern epidemiological concept of the disease; he had emphasised its infectious nature, its spread through human contact and the importance of mild cases and carriers. Yet polio research from 1910 turned to the lure of the laboratory and studying the disease in animals. This side-tracked the vital issue of how polio worked in the human body and the possible discovery of a much-needed diagnostic test.[49] 'It has been said of this particular time that everything one discovered through the use of a microscope must be true.'[50] C. Ross considers Landsteiner's discovery that polio was indeed a virus as a landmark in the history of the disease[51] but it also marked an unfortunate tangent in polio research which would affect the lives of thousands of people.

> The course of events was typical of the way knowledge in poliomyelitis seems to have progressed – in fits and starts, often punctuated by long periods of frustrating inactivity followed by spurts of misdirected effort.[52]

In 1911, Dr Carl Kling and Wilhelm Wernstedt after their studies on the 1905 and 1911 epidemics in Sweden suggested that during an epidemic the natural immunisation of

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49 *Ibid.*, p. 106.

50 *Ibid.*, p. 97.

51 Ross, 'Poliomyelitis in New Zealand', p. 11.

52 Paul, *History of Poliomyelitis*, p. 97.

thousands of people could take place. These important advances in the epidemiology of polio were unfortunately ignored in favour of America's growing involvement in research. Simon Flexner, Director of the Rockefeller Institute in New York, was the first to be sidetracked into the animal study of polio. By 1908 he had succeeded in passing the virus between monkeys, so establishing the virus outside the human body. He also used immune serum from monkeys, which were recovering from the disease, to neutralise the active poliovirus in a test tube, thus contributing to the later use of serum as a treatment of polio. He was so convinced that he was on the right track with these animal experiments that he announced to the *New York Times* that, within six months, a specific remedy might be expected. 'We have already discovered the disease and the achievement of a cure, I may conservatively say, is not now far distant.'[53]

No cure for polio has ever been found and more than forty years would elapse before a safe and reliable method of prevention was developed. What Flexner failed to keep in mind was that the manifestation of the disease in monkeys might differ according to the species and might not follow the same course in humans. He had hoped that the pathology of the disease in monkeys and humans would be sufficiently similar to make a distinctive breakthrough in the laboratory. By the time that Dr J.H.S. Gear in Johannesburg became involved with polio research during the Second World War, Flexner's theories had been replaced. However, it was to Flexner that the medical and

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53 *Ibid.*, p. 117.

health authorities in Johannesburg turned for advice during the first polio epidemic which broke out in the city in 1918.

By 1918 the features of poliomyelitis were well documented, mainly due to the immense effort put into the collection and analysis of statistical data collected during the 1916 New York epidemic. Nevertheless, it is interesting see how an American epidemiologist defined polio in 1910:

> A peculiar gastro-intestinal condition possibly the result of a specific infection, perhaps like summer diarrhea, due to a non-specific, miscellaneous, bacterial interrelation with poor nutritional conditions under abnormal climatic surroundings, resulting in the formation and absorption of poisonous substances which attack the central nervous system diffusely, the exact clinical results depending upon the concentration and the effects of the poison at various points.[54]

By 1918, however, certain aspects of polio were more clearly understood. According to the Public Health Services Report after the 1916 United States epidemic investigators concluded that polio was exclusively a human infection, transmitted from person to person without any necessary intervention of an animal or insect host. The precise mechanism of transmission and avenues of infection were unknown. During an epidemic a considerable number of the population, both children and adults became

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[54] *Ibid.*, p. 139.

infected without clinical manifestations or displaying mild symptoms and were the main carriers of the disease. Reported cases made up a small percentage of the actual number infected and played a minor role in the spread of infection. During an epidemic, one to three recognised cases per thousand are sufficient in number to immunise the general population to such an extent that the epidemic spontaneously declines, 'due to the exhaustion or thinning out of infectable material'.[55] The degree of immunity within that population is sufficient to limit the incidence rate of a subsequent epidemic. Because infection during an epidemic was so widespread, isolation and quarantine regulations had little value in preventing the spread of polio.

[55] Gear, *Poliomyelitis Research Foundation*, p. 12.

Chapter Three

The 1918 Poliomyelitis Epidemic in Johannesburg:

The Medical Response

3.1 Epidemic polio appears in Johannesburg: the course of the epidemic

'It is to be feared that the present local epidemic will add nothing to our knowledge of this obscure disease.'[1]

In January 1918, Dr E.P. Baumann, Senior Physician at the Johannesburg Hospital, announced to the Witwatersrand Branch of the British Medical Association (Witwatersrand BMA): 'This summer, for the first time in the history of the country, so far as any records show, we have been visited with poliomyelitis in an extensive epidemic form'.[2]

The first indication of an epidemic was in November 1917, when a number of serious polio cases were experienced in and around Johannesburg. Baumann admitted that once the mortality rates began to rise, he knew that the outbreak was grave. For

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1 Editorial, 'Poliomyelitis', *Medical Journal of South Africa* (*MJSA*), vol. 13, no. 7 (Feb. 1918), p. 113.

2 *MJSA*, vol. 13, no. 6 (Jan. 1918), p. 87.

years, sporadic cases had occurred 'as would be expected of an endemic disease',[3] but death was unusual during such outbreaks, although there were incidences of paralysis.

Illustration 3.1

Dr E.P. Baumann

Source: Dr S. Heymann, 'The Transvaal Memorial Hospital for Children 1923-1973', *SAMJ* , vol. 47 (13 Oct. 1973), p. 1829.

By January 1918, the polio epidemic was confirmed. March proved to be the month with the highest number of infections, by which time over 100 children in Johannesburg had been struck down by the disease. As the weather cooled, the numbers tapered off.[4] By May, the epidemic was over. Johannesburg and Reef towns had been affected, with polio reaching Krugersdorp to the west and Springs to the east, while

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3 *MJSA*, vol. 13, no. 6 (Jan. 1918), p. 87.

4 *MJSA*, vol. 13, no. 7 (Feb. 1918), p. 114.

Pretoria recorded the lowest toll.[5] There were also outbreaks 'at various remote places throughout the Transvaal', but these remained small and contained.[6]

Notification of polio as an infectious disease became compulsory on 15 February 1918, but before this date figures were unreliable, although private practitioners, on request, had reported 58 cases of polio.[7] Later official figures stood at 145 for the entire epidemic of which only six (four per cent) were of black people. 143 of the 145 cases (99 per cent) were under 15 years old. The death toll was between 20 and 24.[8] The Medical Officer of Health (MOH) report for 1916-1919 places the case load at 181 with 24 deaths and states: 'A number of other cases existed which were neither reported nor notified and some cases which, on account of their mildness, escaped notice altogether.'[9] Keeping in mind that the actual case rate was higher, the 1918 white population of Johannesburg of

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5 *MJSA*, vol. 13, no. 14 (Sep. 1918), p. 245.

6 *The Star*, 26 Feb. 1918.

7 Report of the Medical Officer of Health on the Public Health and Sanitary Circumstances of Johannesburg during the Three Years, 1 July 1916 - 30 June 1919 (Johannesburg, June 1920), p. 24. This report will be referred to as ARMOH (1916-1919) in later references.

8 J.W. Millar, 'Poliomyelitis in Johannesburg', *Public Health*, vol. 13 (Mar. 1949), pp. 143-148; J. L Braudo, 'Clinical Manifestations of Acute Poliomyelitis', pp. 2-13; Eric Rosenthal's article in *The Star*, 5 June 1944, raises the count to 181 cases and 20 deaths.

9 ARMOH (1916-1919), p. 24.

140 750[10] enables one to calculate an incidence rate per 100 000 of population (whites) to be approximately 99, which is higher than the subsequent epidemic of 1944-1945,[11] where 174 cases among whites gives an incidence rate of 52 per 100 000.[12] The stated figures of 1918 may not be totally accurate, principally due to a lack of notification, but the incidence rate as shown above indicates that Johannesburg's first polio epidemic was indeed a serious one. Adding the earlier 58 cases before February, a breakdown of cases follows:

Table 3.1

Feb.	Mar	Apr	May	Jun	Jul	Aug	Total
43	**60**	**15**	**2**	**1**	**1**	**1**	**181**

Incidence of polio cases in Johannesburg, February – August 1918

Source: ARMOH (1916-1919), p. 24

The epidemic seemed to take the authorities by surprise, despite the fact that the United States of America's (USA's) epidemic in 1916 had been widely publicised in both the press and medical publications as 'the most formidable that had hitherto been

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10 *Ibid.*, p. 1.

11 Population Statistics taken from the Official Year Book of the Union and Basutoland, Bechuanaland Protectorate and Swaziland, no. 24 (Pretoria, 1949), p. 1097.

12 Millar, 'Poliomyelitis in Johannesburg', pp. 143-148.

recorded';[13] 27 000 cases and 6 000 deaths had occurred in 26 states.[14] New Zealand had also experienced a severe epidemic in 1916, with 1 018 cases and 123 dead,[15] and it was only a matter of time before the disease reached South Africa. Earlier in 1917, Dr J. Marius Moll, part-time Medical Officer of Schools in Rand Central area, had remarked that 'although sporadic cases of the disease are usually to be found in most countries, epidemics are fortunately rare'; but his assurance was short-lived.[16] Case numbers increased during a period of heavy rain[17] in November and December 1917, but little was

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13 J.M. Moll, 'Epidemic Poliomyelitis: Review of our Present Knowledge', *MJSA*, vol. 12, no. 13 (Aug. 1917), p. 2.

14 N. Rogers, *Dirt and Disease: Polio before FDR* (New Brunswick, Rutgers University Press, 1992), p. 10.

15 J.C. Ross, 'A History of Poliomyelitis in New Zealand' (MA thesis, University of Canterbury, 1993), p. 15.

16 *MJSA*, vol. 12, no. 13 (Aug. 1917), pp. 2-5.

17 *The Star*, 4 Nov. 1917; R. Debré et al, *Poliomyelitis* WHO Monograph Series, no. 26 (Geneva: World Health Organisation, 1955), p. 19. Debré comments on a possible relationship between polio and rain: 'Something happens during summer weather which either introduces the virus into the community, or enormously facilitates the dissemination of the virus throughout the community, or makes certain people, the non-immune, far more susceptible.' In his report the Johannesburg's MOH also mentioned that the epidemic occurred during months of 'quite unusual "recorded rainfall" … The subsidence of the epidemic coincided with the cessation of the rains in

published in the press about incidence rates, no doubt to allay any cause for alarm. Further, as this was the first epidemic experienced in South Africa, there was no polio policy on which to act.

Eventually, on 29 January 1918, the *Rand Daily Mail* published a report written by Dr. Watkins-Pitchford, Director of the South African Institute for Medical Research (SAIMR), offering information on polio 'practically all that is known of interest to the general public'.[18] Watkins-Pitchford informed readers that the name 'infantile paralysis' was incorrect, as adults could also contract poliomyelitis, and that the disease was called 'acute poliomyelitis … which in plain English implies a severe inflammation lasting only a short time and affecting the gray matter of the spinal cord'.[19] He did not consider polio to be 'markedly contagious', but was most likely spread from person to person. He described polio as:

> Formidable, not so much on account of its prevalence and fatality as in respect of the terrible frequency with which it leaves the patient

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April 1918 … it would however be very unsafe to make any deduction herefrom': ARMOH (1916-1918), p. 25.

18 *Rand Daily Mail,* 29 Jan. 1918.

19 *Ibid.,* The name change did not become common parlance until the 1940s and many articles in newspapers continued to appear with the familiar 'infantile paralysis'. Medical journals, however adopted the name change.

permanently paralyzed. The virus both enters and leaves the body through the lining membrane of the nose … distributed in the microscopic spray produced when a patient coughs or speaks.

Illustration 3.2

Dr W. Watkins-Pitchford,
First director of SAIMR

Source: M. Marais, *In Quest of Health: The South African Institute for Medical Research 1912-1973* (Johannesburg: Lowry Publishers, 1988), p. 26.

This was how fresh cases were spread and some infected individuals became carriers without showing any signs of the disease. Watkins-Pitchford had thus asserted the claim of doctors as unquestioned authorities on the subject, which is in keeping with the trend towards 'medical interventionism' both in Britain and in the colonies at the turn of the century. The superiority of Western medical science and imperial power permitted this

'unprecedented right … over the health and over the bodies of its subjects'.[20] As the first comprehensive statement yet published in the press, this information must have alarmed parents enormously, especially those who were not yet aware that polio was a threat. It was believed that the poliovirus had been brought into South Africa by returning troops who had completed operations in the Middle East towards the end of the war.[21] South African doctors and health authorities looked to the USA, contemporary leaders in polio research, for guidance.

Since the aetiology of polio was unknown, the control of its spread would be extremely difficult, if not impossible. Although in close proximity to one another, there was never an overwhelming number of cases in one place during the Johannesburg epidemic. However, to some extent the pattern of cases did display the class division of Johannesburg society of the day. An anomaly of polio was to attack the homes where

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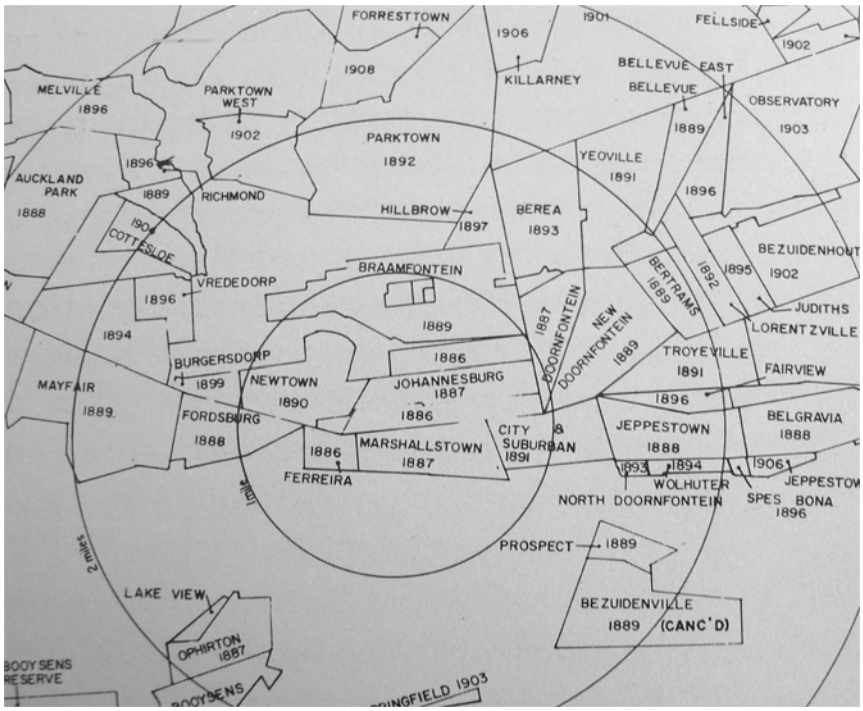
[20] D. Arnold, *Imperial Medicine and Indigenous Societies* (Manchester: Manchester University Press, 1988), p. 18.Tropical or colonial medicine developed in the late 1890s with the founding of the London and Liverpool Schools of Tropical Medicine, initially to safeguard the lives of British personnel working in the colonies who were exposed to life-threatening diseases such as malaria and yellow fever.

[21] J.H.S. Gear, *The History of the Poliomyelitis Research Foundation* (Johannesburg: Poliomyelitis Research Foundation, 1996), p. 14.

living standards were higher, contrary to the usual pattern of diseases such as smallpox and typhoid, which took hold in the poorer, less sanitised areas of the growing city.[22]

Illustration 3.3



Johannesburg in 1912

Source: H. Rudolph, *Johannesburg One Hundred Years* (Johannesburg: Chris van Rensburg Publications, 1986), p. 47.

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[22] Epidemics of the plague, smallpox and typhoid had occurred in Johannesburg during the 1900s. Smallpox and scarlet fever cases were also numerous in 1918.

Newtown, Fordsburg and Mayfair, poorer working-class suburbs, had only three cases; Vrededorp and the locations experienced one case. Johannesburg city itself had ten cases, while Jeppestown and Belgravia, together with other middle-class residential areas, such as Doornfontein, Bertrams, Kensington and Bezuidenhout Valley, had 32 cases; Berea, Yeoville and Bellevue recorded ten cases. Booysens, Turffontein and Rossetenville, to the south, had five cases.[23] By January, Pretoria had reported eleven cases, while Krugersdorp, Roodepoort, Boksburg and Benoni had 'some', and Germiston and Springs 'had a great many'. Other provinces were hardly affected: Cape Town, Grahamstown, Graaff-Reinet and Kimberley experienced 'ordinary sporadic cases', while Durban and Bloemfontein were unaffected.[24]

Modderfontein Dynamite factory, a self-contained area, with workers housed in extensive grounds, reported one case throughout the duration of the epidemic.[25] The reasons why polio did not spread among the other children eluded the doctors, but because of its isolated nature, residents were in 'quarantine'. Some 200 kilometres from Johannesburg, a small town, Carolina, had ten polio cases and two deaths; the Village Main Reef Mine – 'the residential part of the mine, which runs in a narrow strip, and has

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23 Johannesburg City Council Minutes, Adjourned Ordinary Meeting, 356 (9 Apr. 1918).

24 *The Star*, 5 Dec. 1944; *MJSA*, vol. 13, no. 6 (Jan. 1918), p. 100.

25 *The Star*, 5 Dec. 1944.

mines on each side' experienced approximately 20 cases with four deaths,[26] while none of the adjacent mines had any cases at all. In Johannesburg, Dr Baumann found that the distribution was equally curious:

> In one street in Yeoville, on both sides of the street, in houses almost opposite, there have been cases, and in the street back to back with this particular street, there have been cases … how capricious the spread is.[27]

Some thought that there was a common source of infection, possibly an animal reservoir, similar to the goat as a reservoir for Malta fever; others thought that the infections originated from the same source, yet often only one member of the family was infected. All agreed, despite divisions on the understanding of transmission, that this was 'a subject wrapped in mystery' and a cause of frustration.[28] Facing an epidemic never experienced before required a concerted and united effort between doctors and public health officials, yet a specific health department which could co-ordinate responses to such a health crisis did not exist.

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[26] *MJSA*, vol. 13, no. 6 (Jan. 1918), p. 101.

[27] *Ibid.*, p. 101.

[28] *MJSA*, vol. 13, no. 6 (Jan. 1918), p. 100.

3.2 Polio and Public Health in 1918

> It is certainly anomalous that a modern State should possess a medical officer and no health department, but public health is one of those things that has waited vainly for Union co-ordination up to the present … [There] exists an urgent reminder of the necessity of a law enabling some one to 'take hold' at a critical moment, and with some comprehensive plan at once attempt to deal with and localize epidemics.[29]

The devastating 1918 influenza epidemic is usually regarded as the event which precipitated a more effective public health administration in South Africa. However, the confused response to the 1918 polio epidemic, which immediately preceded the influenza epidemic, alerted the medical profession to the urgent need for more effective tools to combat such threats to the health of the South African public. Public Health administration on a national level was limited, having only existed as a separate sub-department within the Department of the Interior since 1917. Its role was mainly advisory, its functions remained undefined, its powers unspecified and its establishment small.[30] Dr J.A. Mitchell, deputy to Dr F.A. Arnold, the Advisory MOH for the Union in Pretoria, admitted that in 1918 the department was 'still in embryo' and it was 'just as

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29 *The Star*, 10 Apr. 1918.

30 H. Phillips, *'Black October': The Impact of the 1918 Spanish Influenza Epidemic of 1918 on South Africa* (Pretoria: Government Printer, 1990), p. 101.

inadequate as it had been since 1910'.[31] After 1910, health and responsibility for most hospitals were provincial matters in terms of the Union Act, but local municipalities were still expected to take care of public health. Their ability to do so depended on the competency of individual Public Health Committees and Medical Officers of Health (MOH); such competencies varied considerably.

In Johannesburg the war had affected many positions in the municipality. Some posts were made part-time to enable staff to go into war service. Dr R.W.B. Gibson, a general practitioner, was chosen to stand in as acting MOH for the very popular and capable Dr Charles Porter, while Porter assumed the role of the Union's Sanitary Officer during the war. Porter was well qualified in both medicine and law, and had been the

Illustration 3.4

Dr C. Porter,
First Medical Officer of
Health for Johannesburg

Source: V.A. Zangel, '"The Seething Masses": Housing, Water and Sanitation in the Lives of Johannesburg's Poor 1886-1906' (MA thesis, North West University, 2004), p. 113.

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31 *Ibid.*, p. 101.

MOH of Johannesburg since his appointment by Lord Milner in 1901. He had proved himself to be an effective organiser, and had inspired confidence while in this position. Gibson was disadvantaged by his lack of experience as a MOH, but nevertheless was expected to carry on where Porter had left off.

As MOH, Gibson liaised with the Johannesburg Public Health Committee, the Johannesburg Town Council and the Witwatersrand BMA on matters safeguarding Johannesburg's public health. During a crisis like the polio epidemic, it was up to Gibson to direct quarantine procedures and to ensure that isolation facilities were available and functioning. He needed to inform the press on the latest precautionary measures and on medical information which might educate the public, and hopefully maintain a sense of calm. This was a great deal to ask of a man who had yet to establish public trust, as Porter had done.

Illustration 3.5

Dr R. Gibson, Acting MOH for Johannesburg during the 1918 poliomyelitis epidemic

Source: Adler Medical Museum

Certain problems were unavoidable. The war had depleted the nursing staff as well as doctors. Even in peacetime numbers had been inadequate. Now trained nurses were needed to staff the local military hospitals, to serve the troops in German South West Africa and in East Africa, and to staff the hospital ships plying the waters between the Cape and East Africa. Contingents of trained nurses had also been sent to staff the South African base hospitals in Britain and the hospitals on the Western Front. Some nurses joined the British Army Nursing Services and served in Serbia and in the Middle East. Approximately 3 000 South African-trained nurses were believed to be serving in military hospitals during the course of the First World War.[32] This lack of medical staff negatively affected all hospitals throughout the Union and in Johannesburg during the polio epidemic, as the disease required intensive and time-consuming treatment.

Facing the problem of containing the epidemic, Gibson and the Johannesburg Public Health Committee were guided by the 1916 epidemic in the USA, which had resorted to strict quarantine to prevent transmission of the disease. The vastness of that country had forced central health authorities to allow local health officials to handle the quarantine individually. This proved unreliable, as the incubation period of poliomyelitis was unknown; carriers who appeared healthy might well have disseminated the disease across borders or into public places. Some states believed that if the movement of children under the age of 16 was restricted, the spread of polio could be contained, while

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[32] C. Searle, *The History of the Development of Nursing in South Africa 1652-1960* (Cape Town: Struik, 1965), p. 256.

others had even resorted to issuing travel certificates assuring that the holder was 'free from disease'.[33] Posters in red were displayed at the main entry roads into certain towns warning travellers that children were not allowed to mix with the community within; churches and Sunday schools would not accept children under the age of sixteen during the epidemic; schools remained closed for a further two weeks after holiday breaks; cinemas could not admit children and 'circuses were childless'.[34]

Fortunately for Gibson, a recent article by Dr J.M. Moll, part-time MOH of schools in the Rand area, offered a simplified guide to quarantine measures:

> Every frank and every suspected case is to be notified; compulsory hospitalization of every ascertained case unless the home conditions are very favorable and strict measures can be carried out; quarantine of sick contacts for eight weeks, and of healthy contacts for at least ten days; the massing of children at picnics, bioscopes, etc., to be forbidden; mobilization and increased activity of the sanitary forces; enforced cleaning-up of unsanitary places; fly-swatting campaign, and re-enforcement of anti-spitting regulations.[35]

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33 Rogers, *Dirt and Disease*, p. 37.

34 *Ibid.*, pp. 33-44.

35 J. M. Moll, 'Epidemic Poliomyelitis: Review of our present knowledge', *MJSA*, vol. 12, no. 13 (Aug. 1917), p. 5.

Because the polio outbreak was mainly within the Johannesburg municipal area, it was not necessary to go to the lengths pursued by people in the USA. However, in order for quarantine to be effective, certain strict measures were necessary. Dr Jane B. Henderson Ruthven questioned how one would know that a house was infected. 'How is one to know, when one calls on a friend that there is not a child sick from the disease inside that house?'[36] There is no evidence to suggest that notices were hung outside affected homes. No doubt warning went out by word of mouth. Colonel A.J. Orenstein, Director of Medical Services, was also concerned about the danger of transmission:

> The question is what we as a community should do to prevent its spread. We hear of drastic measures being taken in America as limiting the freedom of movements of the population. Apparently it had no definite effect on the spread of the epidemic but on the other hand we really don't know perhaps if those measures had not been taken instead of thousands of cases there would have been tens of thousands of cases ... I am not so sure that very stringent measures should not be taken particularly with a view to limiting the migration of the children.[37]

Despite the fact that such quarantine measures had been declared inadequate after the 1916 USA epidemic, Johannesburg authorities had little choice but to attempt, at least, to

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[36] 'Discussion of Dr Baumann's Paper and Dr R. L. Daly's Case', *MJSA*, vol. 13, no. 6 (Jan. 1918), p. 98.

[37] *Ibid.*, p. 96.

isolate the known polio cases and to quarantine family members. To achieve this, poliomyelitis needed to be declared a notifiable infectious disease by amending the Contagious Diseases Act. Medical practitioners who suspected or diagnosed polio would be obliged to send a certificate to the MOH naming the patient and his or her address. The head of the family, relatives or guardians were likewise required to inform the MOH in writing, giving the name of the patient and those of any recent close contacts.[38] Gibson, however, hesitated until February 1918 to initiate a clear policy of action. This indecisive behaviour was perhaps influenced by the fact that he was inexperienced as a MOH, 'doing the work of two Medical Officers of Health',[39] running his own private practice and dealing with council employees who were agitating for strike action.[40]

In the meantime, medical officials were very concerned about the situation in Johannesburg. At their January meeting, the Witwatersrand BMA pointed out that hospital accommodation was at a premium, due to the large number of scarlet fever cases in the Fever Hospital. More cases of polio were waiting to be admitted and, because of the frequent state of the patients' paralysis, accommodation would have to be found for them 'even if we put up a wooden or iron shanty in the grounds, or hire some houses

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38 Johannesburg Municipality Minutes, Special Meeting of Public Health Committee (7 Feb. 1918), p. 64.

39 *The Star*, 20 Feb. 1918. Dr Porter's assistant MOH, Dr A.J. Milne, was also called up for service.

40 J.P.R. Maud, *City Government: The Johannesburg Experiment* (Oxford: Clarendon Press, 1938), p. 82.

nearby'.[41] The Witwatersrand BMA urged the brow-beaten Gibson to take the idea of listing polio as a notifiable disease to the Health Committee, although Dr Baumann felt 'that it had come too late'; he had already experienced the bulk of his most serious cases in November and December 1917:

> I would like the meeting to pass a resolution, emphasizing to the municipal and public health authorities the necessity for providing sufficient hospital accommodation and arriving at rules of guidance for the public.

A motion was passed at the meeting to form a sub-committee, which would work on these issues in an advisory capacity and at the same time 'strengthen Dr. Gibson's hand' when he met his committee to discuss the urgent need to have polio declared an infectious disease.[42]

On 4 February 1918, three months after the outbreak began, Gibson recommended in an urgent report before a special meeting of the Public Health Committee that 'Acute Anterior Poliomyelitis be added to the list of notifiable diseases in terms of Chapter III, Article 3, of the Public Health By-laws'. The recommendation was adopted by the Public Health Committee. For the period of a year, polio was to be a notifiable disease within the Municipal Area alone. This resolution became effective on 15 February 1918, one

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41 *MJSA*, vol. 13, no. 6 (Jan. 1918), p. 101.

42 *Ibid*. The sub-committee was made up of Drs. Baumann Gibson, Lister, Bliedon, and Moll.

week after the publication of an advertisement in a local newspaper.[43] Doctors were requested voluntarily to report any cases that had occurred earlier; 58 cases were accounted for in this way, which the Committee believed was 'approximate'.[44] It is, however, safe to say that the number was far greater. Although the doctors of the Witwatersrand BMA considered the notification to be a 'great step in the direction of stamping out the present epidemic', to those already affected it was a hollow reassurance.[45]

Outside the municipality of Johannesburg, the disease was not notifiable. Other municipalities were requested to be 'both wise and helpful',[46] but the migration of people from all over the Union into and out of the bustling and rapidly growing mining town could jeopardise the containment of the epidemic. *The Star* reported:

> Municipal areas are not enclosed within four walls and the efficiency of municipal measures is weakened if cases of infantile paralysis occur across the municipal borders and are not notifiable. In such

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43 *Rand Daily Mail*, 9 Feb. 1918. In 1919, the Public Health Act made notification of polio compulsory for the whole of South Africa.

44 *The Star*, 26 Feb. 1918.

45 *MJSA*, vol. 13, no. 6 (Jan. 1918), p. 101.

46 *The Star*, 13 Feb. 1918.

circumstances there is nothing to prevent carriers bringing infection into the towns.[47]

Neighbouring countries were aware of the epidemic in Johannesburg, but the South African state was remarkably dilatory in dealing with their queries. As early as February, Portuguese authorities in Mozambique requested verification of the disease so that they could judge whether there was any danger of polio spreading to Mozambique, 'in view of free intercourse between adults and children of [the] two territories'.[48] Only after a month, confirmation that 73 cases of infantile paralysis had occurred in Johannesburg during December to early February was sent from the Prime Minister's office to the Consul-General in Lourenco-Marques, by which time this figure was already out of date.[49] As a result, the Portuguese brought in a by-law from 1 April 1918 'prohibiting entry into the province of all children up to five years of age' as a first preventative step,[50] and stated that children between five and fifteen would be medically

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47 *The Star*, 6 Mar. 1918.

48 South African Archives Bureau (hereafter SAB), Governor-General (hereafter GG), 1230 33/926, telegram from H.M. Consul General, Lourenco-Marques to Governor General, 5 Feb. 1918.

42 SAB, GG, 1230 33/935, minute 357 from Prime Minister's Office, Cape Town, to the Consul General, 8 Mar. 1918.

43 SAB, GG, 1231 33/942. Telegram from H.M. Consul, Lourenco-Marques, to Governor General, 28 Mar. 1918.

examined at the border.[51] This 'portaria' remained in place until 1 June 1918, despite assurances from Pretoria that the epidemic would be over by May. Meanwhile, Pretoria objected that 'farmers and others'[52] were being inconvenienced by the restrictions on the border and that about 300 families who had come to the Transvaal to escape the heat of Mozambique would be affected by the by-law if they did not return at once by train.[53] These communications with Mozambique were prolonged over five months, with Pretoria taking up to a month to reply to each item of correspondence. It obviously felt no urgency to speed up the process; this matched the rather slow pace of Johannesburg's MOH.

By failing to take earlier steps to control the epidemic, Gibson came under scathing criticism. On 18 February 1918, during a meeting of the Johannesburg Town Council, a vote of no confidence was cast against him. 'The public health department was upside down' and although the speaker 'had nothing against Dr Gibson,' who was a good man, 'Dr Porter is a top-notcher' and no other man was equal to him. When he was in charge, 'this was the best town for health of any in the world'. Johannesburg's health was suffering. 'We have smallpox, infantile paralysis and more scarlet fever than ever before in this town'; staff are 'at sixes and sevens', walking the floor without work to do' and

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51 *The Star*, 29 Mar. 1918.

52 SAB, GG, 1231 33/960, minute 890, reply from Prime Minister's office to H.M. Consul, Lourenco-Marques, 25 May 1918.

53 *The Star*, 18 Feb. 1918.

the council could not let this continue.[54] Such criticism undoubtedly influenced Gibson's decision not to extend his appointment past the March due date. Although he was not totally without a support base, Gibson could not match the popular Dr. Porter, who was expected back in Johannesburg in March to confer with the Health Committee and, hopefully, to resume duties as MOH of Johannesburg.

Almost three months into the epidemic Dr Gibson issued his long-awaited bulletin on infantile paralysis.[55] After outlining the geographical extent of the epidemic, as well as the estimated number of cases, Gibson gave very little hard information about polio, either to maintain a distance between medical ranks and lay public or to minimize anxiety. 'The symptoms of fever, a sore throat, transient flushing of the face, abnormal sweating, headache, drowsiness, irritability, restlessness and constipation,' he acknowledged, 'simulated any of the indefinite illnesses of childhood … a sore throat was not uncommon'. The preventive measures instituted by the Johannesburg municipality were based on information from other parts of the world and could be regarded as up-to-date. The late edition of *The Star* dated 26 February 1918 announced that a special polio hospital would be established in a few days. The article acknowledged that public anxiety 'naturally has been considerably aroused, especially in view of the conflicting statements and theories which have been given'. It was hoped that parents would be further cheered to hear that patients in the General Hospital were responding

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54 *The Star*, 20 Feb. 1918.

55 *The Star*, 26 Feb. 1918.

'splendidly' to treatment, which concentrated on posture of the limbs 'to avoid undue stretching of muscles'. Parents were advised to ensure that children received hospital treatment, especially in the earlier stages of the disease, as it was believed that early intervention would prevent the situation from becoming dangerous:

> Even if the patient is completely paralysed, restoration to practically the usual health is considered only a matter of time, if parents will see to it that no time is lost in getting expert advice.[56]

The reassuring tone of these articles must have atoned, in some measure, for the earlier neglect of parental concerns; many felt relieved that polio patients would in future be in a separate establishment. This was the Otto Beit Home which, as agreed at a special meeting of the Johannesburg Hospital Board, would be set aside for infantile paralysis cases.[57] The Municipality would meet costs, hoping that at a later stage the Provincial Government would absorb half of the expense. The sum of £5 000 was requested for equipment, management and control expenses for the following three months. It was hoped that this 'prompt response' of the MOH and the Health Committee 'will allay the anxiety that has prevailed in town'.[58]

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56 *The Star*, 26 Feb. 1918.

57 Municipal Council of Johannesburg (hereafter referred to as Municipal Council), Minutes 355 (12 Mar. 1918), p. 120.

58 *The Star*, 1 Mar. 1918.

Illustration 3.6

The Otto Beit Convalescent Home, Queens Road, Parktown

Source: Adler Medical Museum

Gibson decided to withdraw from office at the end of March 1918, and the Defence Department indicated that Dr Porter and Dr Milne would be available to resume duty from the end of February. This sudden flurry of activity appeared to have been calculated, as the article continued to show, that 'the committee has the situation well in hand'.[59] This was to become a somewhat clichéd comment frequently used by public health officials during later polio epidemics, although such rhetoric in the light of events was meaningless.

In reality the authorities pinned their hopes on the expectation that the virus would disappear when the cold weather set in, but there was no certainty that this would be the case. Uncertainty and conflicting opinions showed up a lack of cohesion among the

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[59] *The Star*, 26 Feb. 1918.

various health authorities. Outside districts were sending cases to Johannesburg, while the MOH on the East Rand had closed schools without consulting the Rand Medical Inspectors of Health. These schools remained closed because the Medical Inspectors had no authority to intervene, although they felt that school closure was futile and would 'cause more harm in increasing public anxiety … than controlling the spread of the disease'.[60]

There was a desperate need to call in someone who had experience of polio, a person who could offer a more cohesive approach towards management and research. Initially the Witwatersrand BMA considered Sir Arnold Theiler as a person whose opinion was respected and who could make investigations into the disease.[61] Finally the Health Committee, once again acting on the Witwatersrand BMA's advice, decided to bring in an expert from the Rockefeller Institute in New York.[62] The investigation into polio 'was considered of National concern, not only to stamp out the present epidemic but as an aid to throw new light on a difficult and obtuse subject'.[63] As the epidemic advanced, Watson-Pitchford had been in cable contact with Dr Flexner, who chose Dr

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60 *The Star*, 16 Mar. 1918.

61 *Cape Argus*, 14 Mar. 1918. Sir Arnold Theiler was a distinguished veterinarian and bacteriologist: W.J. de Kock and D.W. Kruger (eds), *Dictionary of South African Biography*, vol. 2 (Pretoria: Tafelberg for Human Science Research Council, 1972), pp. 733-737.

62 Municipal Council, Minutes 355, 12 Mar. 1918.

63 *The Star*, 12 Mar. 1918.

Edward Taylor, 'a scientist from the Research laboratory of the Vermont State Board of Health in Burlington', who would 'carry out research and advise the local authorities as to the latest methods of administration in outbreaks of infantile paralysis'.[64] The Council would give £500 towards the cost of the trip and the SAIMR undertook to pay the other costs:

> It is a matter of experience that an outbreak of infantile paralysis in epidemic form is invariably followed by epidemics in succeeding years on the same locality and for this reason it appears to us to be important that an opportunity of this nature for increasing the medical knowledge of this disease should not be lost.[65]

Due to wartime conditions, transport was slow and Taylor only arrived by aircraft on 23 June 1918. Earlier in April, two infantile paralysis experts who formed part of an American Red Cross mission en route to Palestine were persuaded to call on the Rand. As the number of cases was dropping, they predicted that the epidemic would be over by May.[66] Consequently Taylor was only able to investigate isolated cases in Kimberley and

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64 *The Star*, 19 Mar. 1918.

65 Municipal Council Minutes, 355, 12 Mar. 1918.

66 *The Star*, 5 Dec. 1944. This is an article written by Eric Rosenthal on the 1918 polio epidemic.

Jaggersfontein.[67] He did act on a consultative basis, examining 'all notified and suspicious cases', and giving advice on the treatment of actual cases as well as old cases with residual paralysis.[68] His lectures were well received but added little to the scant knowledge about the disease; however, he was adamant that polio was contagious. 'The microbic cause is conveyed from one individual to another by personal contact'.[69]

South African doctors remained skeptical. The President of the Witwatersrand BMA asked how sharply localised outbreaks, as experienced at Modderfontein and the Village Reef mine, could be explained by the contagion theory: how and by what means was polio disseminated?

> How can we safeguard ourselves prophylactically? In order to transmit the disease artificially to monkeys, drastic procedures such as inoculations are used yet among human beings [transmission] is almost fairy-like in the mode and character of its spread. It flies from case to case by almost

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67 M. Marais, *In Quest of Health: The South African Institute for Medical Research 1912-1973* (Johannesburg: Lowry Publishers, 1988), p. 222.

68 ARMOH, 1916-1919, p. 24. The publication Taylor referred to in his lectures was: E. Taylor and H. L. Amoss, 'Carriage of the Virus of Poliomyelitis, with Subsequent Development of the Infection', *Journal of Experimental Medicine*, vol. 26, no. 1 (Sep. 1917), pp. 745-754.

69 *MJSA*, vol. 13, no. 14 (Sep. 1918), p. 247.

> untraceable channels and is so erratic in its incidence that relatively few members of the community appear to fall under its influence.[70]

Taylor did not contest the theory of nasal transmission, but felt that nasal sprays were ineffective against the polio virus and might irritate the nasal mucous membrane. Serum treatment if administered before paralysis 'gave very definite results'. In answer to a question on immunity and why often only one member of the family was infected, he replied: 'There are chronic carriers in various diseases and there must be chronic carriers in poliomyelitis or we would have no epidemics. It would die out.'[71] Taylor could not understand why Johannesburg's doctors had avoided using the lumbar puncture as a diagnostic tool. 'It takes five minutes to do and about five minutes to examine microscopically. Unless it is done, you lose a great many days in isolating your patient.' To enable Taylor to have more time for polio research, the SAIMR requested that he stay on in Johannesburg for another six months, guaranteeing a third of the estimated £900 costs and offered the Institute's facilities for his research. Taylor was not able to observe polio first hand, but he did experience the Spanish 'flu epidemic which broke out on the gold mines of the Rand.[72]

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70 *Ibid.*, p. 244.

71 *Ibid.*, p. 247.

72 Phillips, '*Black October'*, p. 1. Spanish influenza began to appear among black mine workers on the central Rand about the 18 September and by 27 September over 14 000 cases had been reported; *MJSA*, vol. 14 (Nov. 1918), p. 462. Dr D. Macauley and Dr J. van Niekerk lost their

3.3 The Treatment of Polio in 1918

> I think, as a matter of ordinary humanity we must provide hospital accommodation for these children. It is pitiable to see, as I suppose many of you have seen, a child going to pieces simply because it is in a poor home, in a small room, and has to share a bed with other children; it is not even undressed properly; it is not washed; its paralyzed limbs are not supported .All this because there is no hospital accommodation![73]

Dogged by ignorance as to the cause of polio, traditional notions about the workings of disease lingered on in the medical profession. Familiar terminology such as 'poison' was often used in place of the word 'virus', a new concept.[74] The vague notion of 'poison' had long been used to refer to the invisible microbe of disease; doctors described how the 'poison' of polio entered 'into the cerebrospinal system through the naso-pharyngeal

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wives to influenzal pneumonia during this epidemic and Dr J.S. Thwaites, also a member of the Witwatersrand branch of the British Medical Association, passed away.

[73] *MJSA*, vol. 13, no. 6 (Jan. 1918), p. 101.

[74] It was only after about 1920, with the appearance of a number of viral diseases throughout the world that the term 'virus' became more commonly used. 'In fact it was the feeling among some medical researchers that perhaps new super viruses were developing or that the human race was becoming more susceptible to central nervous system infections': Ross, 'Poliomyelitis in New Zealand', p. 5.

region' or how the flea, fly and bug could carry the 'poison' which infected the child.[75] Another doctor described the disease as dependent on a 'definite organism, very difficult to identify as it cannot be seen or captured in unglazed porcelain due to its minute size'.[76] The idea of a virus so small was contrary to the known and familiar, visible bacteria. This mix of the new scientific language and ideas, together with the old, is a feature of this early epidemic, as the medical profession itself tried to accommodate changing medical knowledge.

Polio was 'a disease always to be regarded with particular anxiety by the physician'.[77] Diagnosis was difficult; it was impossible to predict accurately how serious the paralytic effects might be in any given case and doctors had no effective drugs to treat acute polio patients. In contrast to the familiar diseases of poor sanitation and poverty, polio tended to strike at the heart of the sanitised suburb and home. Since the source of polio infection was unknown, doctors were forced to draw on existing knowledge about disease and its origin.

The main obstacle the doctor faced was the diagnosis of polio. There was no definite indicator or diagnostic test available to assist, as was the case with diphtheria and

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75 *MJSA*, vol. 13, no. 6 (Jan., 1918), pp. 95-96.

76 *MJSA*, vol. 13, no. 7 (Feb. 1918), p. 117.

77 C.J. Rutty, 'Do Something! Do Anything!': Poliomyelitis in Canada, 1927-1962 (PhD thesis, University of Toronto, 1995), p. 42.

enteric fever, among other diseases. Main indicators of polio, such as stiff neck, fever, nausea and weakness, also characterised other, more common children's diseases. Alternative diagnoses could include influenza, acute gastroenteritis, poisoning, pneumonia, meningitis, typhoid fever or even rheumatism, rheumatic fever, rickets and osteomyelitis.[78] A fear of alarming parents unnecessarily prompted doctors to delay identifying the disease until paralysis occurred and they were reluctant to precipitate such dramatic actions as hospitalisation, disinfection of the home, clothes and belongings and the quarantine of family members. Dr M. Bliedon, a member of the Witwatersrand BMA Committee, argued that if carriers, as claimed, were the probable means of spreading the disease, 'what is the good of isolating a patient for five weeks when according to the instructions I have received, the breadwinner may be the most likely person to spread the disease?'[79]

As the diagnosis had to be made purely on a clinical basis, without the aid of laboratory tests, Baumann listed what he thought were notable visible symptoms of polio in order to assist local practitioners. The course of the disease could be divided into distinct stages: the pre-paralytic stage which could last from twelve hours to nine days; the acute stage, once paralysis had set in; the convalescent stage, which began once the tenderness had disappeared; and the stationary stage, generally considered beginning after

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78 *MSJA*, vol. 13, no. 14 (Sep. 1918), p. 91.

79 *MJSA*, vol. 13, no. 6 (Jan. 1918), p. 97.

two years.[80] In summer, and 'especially during the prevalence of an epidemic', symptoms such as a fever between of 100-104 degrees Fahrenheit, sweating and gastro-intestinal disturbances, diarrhoea or constipation could indicate polio. Baumann found the 'spine sign' of great importance. When lifting the patient's head to place on the chest, the neck would remain rigid and the trunk would lift, 'causing the child to cry out with pain'.[81] Sensitivity to touch and light, as well as headaches, backaches and pains in the legs, were also common symptoms. Tremors and muscle twitching, no matter how slight, could point to polio. Unfortunately such symptoms were not always clear. A child examined at a Johannesburg boarding school displayed only a slight tremor of the left hand and a fever before paralysis of the left arm set in.[82]

Bulbar polio and what was referred to as cerebral or encephalitic polio were the most dangerous forms of the disease. The respiratory muscles, muscles of the tongue and the jaw, and the muscles of the throat became paralysed. This meant that the patients would lose the ability to swallow, cough or clear their throat in any way, resulting in 'drowning'.[83] In 1918 little could be done for these patients, other than positioning the patient in the head-down position to facilitate drainage – 'even hold the child up by the

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80 *MJSA*, vol. 13, no. 1 (Aug. 1917), pp. 4-5.

81 *MJSA*, vol. 13, no. 6 (Jan. 1918), p. 89.

82 *Ibid.*, p. 89.

83 J. Trueta, *Handbook on Poliomyelitis* (Oxford: Blackwell Scientific Publications, 1956), p. 60.

heels' – although reference is made to Meltzer's 'tracheal insufflation', a form of artificial respiration.[84] In Baumann's experience, death could take place within 12 to 24 hours from the onset of respiratory paralysis.[85] Case-mortality could range between five and 30 per cent, dependent on the severity of the attack. By January 1918, Baumann claimed that six of his 35-40 cases had died (15 per cent), while other doctors had experienced worse results. On one of the mining properties, 50 per cent of polio cases had died. One must presume that these were mainly white cases; as has been noted, only six polio cases were recorded for blacks in 1918, although numbers could have been higher.[86]

The characteristic 'sudden paralysis' was the ultimate diagnostic sign of acute polio. Paralysis could occur without any increase in pain; the legs usually became immobile first, although this was not necessarily the pattern. Baumann recalled: 'We observed the onset of facial paralysis and the paralysis of the arms whilst we stood at the patient's bedside.' Abdominal muscles could be affected as well, 'so that the abdomen is puffed out in an extraordinary manner when the patient cries or coughs'.

If severely paralysed, a child would lie on his or her back, without making any effort to move, the face clearly showing apprehension, 'the eyeballs moving but not the head, often acutely attentive to the surroundings' and terrified of being touched for fear of

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84 *MJSA*, vol. 13, no. 1 (Aug. 1917), p. 4.

85 *MJSA*, vol. 13, no. 6 (Jan. 1918), p. 92.

86 Braudo, 'Clinical Manifestations', p. 2.

the resulting, intense pain.[87] Treatment options were very limited. During the acute stage of the disease, a long-standing remedy, used by Badham eighty years earlier, was a purge with calomel (mercurous chloride).[88] 'We may hope, by such means to evacuate a certain amount of virus per rectum.'[89] Urotropine, 'for its antiseptic effects on the central nervous system'[90] and adrenalin were also administered, but the former was of little benefit, while the latter, although relieving pressure around inflamed areas, needed to be injected every four to six hours, intraspinally, which could be traumatic for a young patient. The lumbar puncture could also be used to relieve pressure but, as Flexner had warned, 'simple lumbar puncture attended by even very slight haemorrage promotes infection by opening the way for the passage of the virus from the blood into the central nervous system.'[91] Drugs used for pain relief were aspirin, as a sedative alone or used in combination with

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87 *MJSA*, vol. 13, no. 6 (Jan. 1918), p. 90.

88 J.R. Paul, *A History of Poliomyelitis* (New Haven and London: Yale University Press, 1971), p. 39.

89 *MJSA*, vol. 13, no. 1 (Aug. 1917), p. 4; *MJSA*, vol. 13, no. 7 (Feb. 1918), p. 119.Calomel was mentioned by Baumann as 'the most efficacious drug' for the treatment of obstinate constipation, 'a common feature of the present epidemic and of considerable diagnostic import'.

90 F.A. Saunders, 'Acute Anterior Polio-Myelitis', lecture delivered before S.A. Trained Nurses Association (4 Sep. 1918), p. 14.

91 *MJSA*, vol. 13, no. 6 (Jan. 1918), p. 93.

other analgesics to relieve pain.[92] Morphia was also on the list for pain relief.[93] Throat washes with a one per cent solution of menthol, was thought to be effective 'to kill the microbes', as well as nasal washes which might flush out the virus.[94] 'Kaolin',[95] surprisingly, was suggested as a nasal spray 'to neutralise the virus' and peroxide of hydrogen, condy's fluid or salt for gargling.[96] During the first polio epidemic, the children of Johannesburg were subjected to throat and nasal washing in a frenzied attempt to avoid infection. Rutty had found this to be the case in Canada, where some desperate parents were using salt water to wash out the nose.[97] The objective of the nasal spray was to block the poliovirus from entering the olfactory nerve, as Flexner believed that the nose was the portal of entry and exit; this implied that the virus was circulating in the air.[98]

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92 *MJSA*, vol. 13, no. 7 (Feb. 1918), p. 120.

93 Saunders, 'Acute Anterior Polio-Myelitis', p. 14.

94 *Ibid.*, p. 93.

95 *Ibid.*, pp. 99-100.

96 *Ibid.*, p. 17.

97 Rutty, 'The Middle Class Plague', p. 48.

98 Paul, *History of Poliomyelitis*, p. 247.

Another treatment option open to doctors was a human antipolio convalescent serum.[99] Based on the model of the successful diphtheria antitoxin developed in France in the 1890s, it was used as a polio prophylaxis. In the 1916 New York epidemic, the serum was thought to have 'definite therapeutic value'.[100] Polio serum was prepared from the blood of individuals who had recovered from an attack of polio and which possessed poliovirus antibodies. E.C. Rosenow of the Mayo Clinic in the USA had developed an animal-based immune serum, by immunising horses with the 'pleomorphic streptococcus' bacteria, which he believed was responsible for polio.[101] During the 1918 epidemic, the Witwatersrand BMA committee discussed this serum at length. Results from the USA seemed to suggest that use of the Rosenow serum resulted in far less paralysis and a lesser incidence of the fatal form of respiratory paralysis. Watkins-Pitchford indicated that supplies of Rosenow's serum were expected from the USA, but he warned doctors not to be too optimistic as to its efficacy. He emphasised the need for a sound diagnosis and offered the services of the SAIMR in order to analyse spinal punctures. He also requested doctors to supply the Institute with cerebrospinal fluid where possible, since this could then be used in experiments. He asked that a small

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99 Rutty, 'Do Something! Do Anything!', p. 41.

100 *Ibid.*, p. 41.

101 *Ibid.*, p 42.

quantity of blood be taken from any recovered patient of about ten years of age, with the view to making serum which could be stored for use in acute cases.[102]

In desperation some doctors are known to have resorted to alternative therapies. It is impossible to gauge the extent of its use, but Afrikaners had used herbal remedies as part of their medical routine for decades. There is no reason to doubt that this practice had been passed on to relatives in Johannesburg. Animals were an important part of these therapies: 'The intestinal contents of different animals or their excreta were believed to possess almost magical healing qualities'.[103] Thus, it is not surprising that a doctor in Klerksdorp, desperate to help his young daughter, dismissed the voices of 'his accursed education' and, perhaps urged on by his female family members, resorted to the familiar remedies of his upbringing. He treated the girl during the acute stage of polio by covering her legs in warm cow dung,[104] a well-known treatment for rheumatism.[105] It was hoped that the warmth of the dung might ease the pain of the muscles in spasm and hopefully

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102 *MJSA*, vol. 13, no. 6 (Jan. 1918), p. 99.

103 E. van Heyningen, 'Women and Disease', p. 15; E.H. Burrows, *A History of Medicine in South Africa up to the End of the Nineteenth Century* (Cape Town: A.A. Balkema, 1958), p. 192.

105 Interview with Monica, 12 Sep. 2002. Her grandmother, who was related to this particular family, contracted polio in 1918.

105 Van Heyningen, 'Women and Disease', p. 16.

draw out the 'poison'.[106] Wearing a camphor bag was also a well known 'deterrent' to disease; a clove of garlic was often added.[107]

The lack of an effective treatment regime was one of the most frustrating aspects of polio. In the absence of effective drug therapies doctors had recourse only to management of the physical symptoms of the disease. Bauman's preference was for rest. By this he meant: 'Not only a comfortable bed, but careful nursing and devices to find a comfortable position for painful parts. There should also be freedom from excitement, entertainment and from visitors.'[108] It was very important to avoid the stretching of weakened muscles by placing the legs in a certain way. Over-stretching could also be caused by gravity and over action of certain muscles. A deformity hastened by pressure was foot drop. A wire cage was advised to support the weight of the bedclothes and a board or box, placed at the bottom of the bed, ensured that the feet rested at a right angle to the legs. A splint with a foot piece at right angles was an alternative to the board. Baumann emphasised that a position of over-correction was advisable, using blankets and pillows to maintain this. (Although the diagram used [Illustration 3.7] to clarify Baumann's explanation is from later articles, the principle remains the same.) Sandbags

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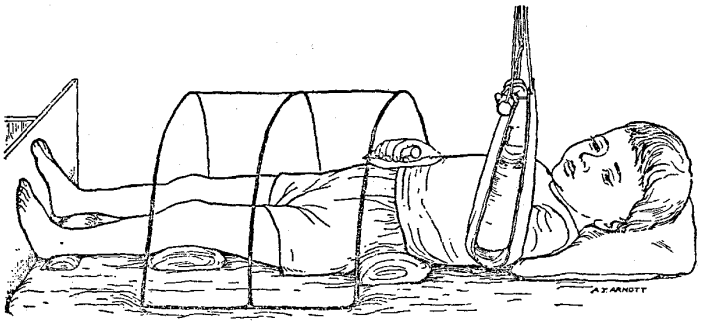
106 Burrows, *History of Medicine*, p. 192. The addition of vinegar to the cow dung makes a poultice for the pain of sprained joints that might well be used in pain management for muscle spasm during the acute stage of polio.

107 Phillips, *'Black October'*, p. 134.

108 *MJSA*, vol. 13, no. 6 (Jan. 1918), p. 92.

Illustration 3.7



Maintenance of normal or optimum posture

Source: J. Trueta, *Handbook of Poliomyelitis* (Oxford: Blackwell Scientific Publications, 1956), p. 48.

The knees rest on a low pillow so as to slightly flex the hips and the knees. The hip joints are moderately abducted with a soft pillow. It is important that the child remains lying if the buttock muscles are involved. Sitting would stretch the gluteus and interfere with circulation. The paralysed arm is abducted at the shoulder; the fingers are slightly flexed by holding rolled gauze. The feet are placed against the board to prevent shortening of the calf muscles, rolled gauze behind the heels distribute the weight of the feet and prevent contracture in the Achilles heel.
Source: G.T. du Toit, 'The After-Care of Convalescent Poliomyelitis Cases', *SAMJ*, vol. 19 (9 June 1945), p.193.

were also used to control limbs.[109] Alternatively splints could be used to hold the leg in position during rest periods. Temporary light aluminium splints, made to order for individual cases, were used at the Johannesburg Hospital; Dr R.L. Daly, a surgeon, assisted with this work. The advantage of such splints was that they could be easily removed when the limb needed to be massaged. Warmth was regarded as a 'beneficial

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109 Saunders, 'Acute Anterior Polio-Myelitis', p. 18.

treatment'[110] so electric light bulbs were placed inside the wire cage to provide warmth. Baumann did not think that plaster or splints were necessary in the pre-paralytic stage but believed that simple restraining measures to prevent the patient from sitting up were enough, along with 'freedom from excitement', attention to the bowels and effective ventilation of the sick-room as necessary adjuvants to the treatment.[111]

Baumann embarked on his own research project on the value of bed rest in the treatment of polio and believed that rest, if started early enough, could result in the cessation of the disease. His paper, 'The Abortive Treatment of Acute Poliomyelitis by Physiological Rest', was read before the Witwatersrand BMA on 21 March 1918, at the height of the Johannesburg epidemic.[112] Bed rest, he argued, could limit the development of the polio attack, even to the point of aborting the disease, thus preventing permanent deformity. This idea was based on the observations of Dr. Leon Louria made during the 1916 New York epidemic. The majority of doctors at the meeting agreed that rest was vital, but were rather cutting in their remarks about its ability to halt the disease, as most felt that such cases would have aborted in any case, and there were no 'other known infectious diseases being made abortive by rest'.[113]

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110 *MJSA*, vol. 13, no. 6 (Jan. 1918), pp. 93-95.

111 *Ibid*, p. 92.

112 *MJSA*, vol. 13, no. 7 (Feb. 1918), p. 114.

113 *Ibid.*, pp. 114 -117.

No matter how beneficial bed rest was, it was extremely difficult to keep small children still for long periods of time to avoid damage to the muscles. Baumann wanted to prevent mothers from 'lifting and dandling [*sic*] children', or taking them about town. Dr A.G. Brinton said that he had been horrified to see a mother descending from a tram, with her child's limbs 'wobbling about'. All agreed that: 'An over-fond mother who insists upon dandling the child in her arms' could indeed cause the child great harm. Dr. Bliedon recalled another instance of a young boy whose mother, an 'uneducated and not a very intelligent woman', failed to prevent him 'from being twice out of bed when the doctor called'.[114] Such action 'jarred the irritable brain and cord and strained the weakened muscles', which could lead to permanent crippling.[115]

Unfortunately, if the muscles were 'overstretched', only prolonged and unpleasant treatment could rectify this. A young girl, who had contracted polio while at St Andrew's School in Johannesburg, was allowed out of bed too soon and overstretched the muscles of her legs, which prevented her from walking normally. On medical advice, her father took her out of school to Isipingo to convalesce. She had to endure having her legs 'doubled up and fixed in plaster of Paris for three months, in the hope that the stretched

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114 *MJSA*, vol. 13, no. 7 (Feb. 1918), p. 116.

115 *MJSA*, vol. 13, no 6 (Jan. 1918), p. 92.

muscles would contract'. Her condition improved so that she could walk 'almost normally'.[116]

The 1918 epidemic had highlighted a sense of confusion and intense frustration within the medical community. The eagerly awaited polio specialist, Dr Taylor from the USA, did not allay these fears and he offered little additional information to that which was already known. Watkins-Pitchford observed, while thanking Taylor after a lecture: 'There is a considerable residuum of mystery in the disease, a residuum which Dr. Taylor himself has not resolved'.[117] Taylor did, however, confirm that the real factor in the fight for the prevention of polio was the control of the human carriers, as polio spread through direct contact, the nasal pharynx being the source of entry:

> Naso-pharyngeal secretions in a condition of health are capable of neutralising the virus … while those, in whom the naso-pharynx is in a diseased condition, such as enlarged tonsils and adenoids, favour the development of the disease.[118]

This was a new angle on Flexner's naso-pharyngeal work but was not accurate; it was another attempt to explain the frequent sudden cessation of the symptoms and illness in some cases. Taylor believed that the organism was definitely neurotropic (lived in

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116 R.C. Acutt, *Reminiscences of a Rand Pioneer* (Johannesburg: Ravan, 1977), p. 130.

117 *MJSA*, vol. 13, no. 14 (Sep. 1918), p. 243.

118 *Ibid.*, pp. 243-254.

nerve tissue), gaining entrance to the central nervous system through the branches of the olfactory nerve.

Dr. J.A. Mitchell, deputy head of the Department of Health in Pretoria, was keen to seek advice on the control of polio.[119] Taylor contradicted the idea that multiple cases in one family was rare by citing several instances during the New York epidemic, including one in which all three children in one family had died, while another family had experienced five cases. He therefore advised that isolation of the patient was the simplest way to contain the disease during an epidemic; at home 'for the rich and well-to-do' and in an isolation hospital for those in poorer circumstances, quarantining contacts for two weeks and the patient for four weeks.[120] Dr. Mitchell's hope that the latest practical disinfectant using steam sprays of chloride of zinc and dichloramine-T would meet Taylor's approval, were dismissed as having no scientific backing.[121]

There was, however, one positive treatment developed during the 1918 Johannesburg epidemic. Sadly it was never used. Dr W. Steuart, a radiologist on a Johannesburg mine, came to show the Witwatersrand BMA an apparatus he had invented to help with respiratory problems found among miners. He had hoped that it might 'possibly be a means of saving some children', but it was completed about six hours after

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119 *Ibid.*, p. 244.

120 *Ibid.*, p. 253.

121 *Ibid.*, p. 247.

the last victim had died. There is little doubt that Steuart had created the first 'iron lung'[122] in South Africa, no matter how rough and ready it was.[123] His demonstration led to animated discussion about possible adjustments; Colonel Orenstein felt that Steuart should test the apparatus on a dog first. Dr Watford-Pitchford had also been involved with the project and Steuart's 'iron lung' was bought by the Johannesburg Hospital for the Otto Beit Home should the epidemic recur the following year.[124]

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122 Steuart's lung was made from wood and, more appropriately be referred to as a 'breathing machine' according to the *Special Report Series* listed below. The iron lung will be discussed in more detail in Chapter Five.

123 The honour for the development of the first recognised 'iron lung' was given to Drinker in 1929. Emerson developed this further. 'Breathing machines' dated back to the 1770s in Holland, France and England, Medical Research Council, 'Breathing Machines and their Treatment', Report of the Respirators (Poliomyelitis Committee) *Special Report Series*, no. 237 (London: His Majesty's Stationery Office, 1939), p. 6.

124 'Demonstration of Apparatus for Inducing Artificial Respiration for Long Periods', *MJSA*, vol.13, no. 8 (Mar. 1918), pp. 147-151; R. Melzer, 'A to Z in South African Medical History "I", *Bulletin of the Adler Museum of the History of Medicine*, vol. 2, no. 3 (Oct. 1976), pp. 19-22.

Chapter Four

The 1918 Poliomyelitis Epidemic in Johannesburg: The Public Response

Don't wear each other's hats.

Don't drink too much school water, which is not boiled.

Don't loiter after school hours but go straight home.

Don't fondle strange animals.

Don't put into the mouth anything off the ground.

Don't take a bite off anything from each other's mouth.[1]

If medical responses to polio were uncertain and confused, it was natural that lay responses should reflect this. The fear of polio haunted white South African parents for over half a century. 'We dreaded the summer; that was the time we knew the children were at risk'.[2] Children's' lives were turned upside down. They were closeted indoors unable to play with their friends, restricted from crowds and bioscopes; some were even

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1 Advice sent to *The Star*, 20 Mar. 1918, by Mrs. R. Magnus for school children to follow during the epidemic.

2 Interview Pat and Margaret, 3 Aug. 2002.

forbidden to go to Sunday school. 'Parents taught their children to fear polio.'[3] Reflecting a constant theme in public health and popular literature, writers consistently referred to the image of the home which was threatened by 'natives' and 'erring mothers, who did not take requisite precautions'.[4]

The polio epidemic and the increasing publicity spurred a number of lay people to ponder the nature of the disease. In letters to the editors of newspapers and magazines, correspondents offered their views on the causes of polio, as well as on alternative treatments. Some looked to religion to explain the place of disease and healing, while others were drawn to conditions around them as possible sources of illness. Those with any medical background were especially driven to ask research and health authorities seriously to consider the revelations of their own experiences as possible solutions to the polio epidemic. Fear of the unknown and anxiety for their children also acted as a lively spur to racist responses on the part of middle-class whites. In South Africa social fears tend almost invariably to play themselves out in racial terms, so this perspective needs to be explored in any examination of public responses to polio.

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3 C.J. Rutty, 'Do Something! Do Anything!': Poliomyelitis in Canada, 1927-1962 (PhD thesis, University of Toronto, 1995), p. 3.

4 *The Star*, 7 Mar. 1918.

4.1 Polio and Racism

We have already seen that the medical profession, clinging to long-established experience about the origins of disease, looked to 'the slum' as a source of infection. In South Africa the denizens of the slums, 'the others', were invariably equated with black people, whether they were coloured people in Cape Town, Indians in Durban or Africans in Johannesburg, although the poor whites in areas such as Vrededorp and Fordsburg were similarly stigmatised. To some, the Afrikaner inhabitants were rather 'uncivilized'[5] and Boer women had been regarded as 'ignorant and careless in sanitary matters' by British authorities during the South African War.[6] In 1918, working-class neighbourhoods in Johannesburg were still fairly multiracial[7] and formed part of the 'septic fringe' believed to contribute to racial tensions with regard to the threat of disease.[8] Yet the poorer areas were least affected by polio during the 1918 epidemic. Lay people initially assumed that

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5 L. Lange, *White, Poor and Angry: White Working Class Families in Johannesburg* (Aldershot: Ashgate Publishing Ltd., 2003), pp. 102, 118.

6 E.B. van Heyningen, 'Women and Disease: The Clash of Medical Cultures in the Concentration Camps of the South African War' (Paper, 'Rethinking the South African War' Conference, Unisa Library, Pretoria, 3-5 Aug. 1998), p. 1.

7 Lange, *White, Poor and Angry*, p. 126.

8 M.W. Swanson, 'The Sanitation Syndrome: Bubonic Plague and Urban Native Policy in the Cape Colony 1900-1909', *Journal of African History*, vol. 18, no. 3 (1977), pp. 387-388.

the source of polio might be from black areas in and around the city, while other whites were deeply concerned by the mere presence of blacks within their town.

Such racism was not unique to South Africans during polio epidemics. In New York, the immigrants had been singled out as carriers of polio and similarly 'defined in class and ethnic terms'.[9] Their presence raised feelings of prejudice and xenophobia. Epidemics have a tendency 'to sharpen behaviour patterns' and reveal 'deeply-rooted social imbalances'.[10] Rogers adds that in attempting to explain disease, underlying social and political ideologies become more explicit 'in times of urgency, such as epidemics'.[11]

The idea that blacks were purveyors of disease was a favoured theme for some of Johannesburg's citizens. A letter to *The Star* suggested a possible source of polio: 'The filthy spots all over town where the washing is done by Kaffirs, coolies and Malays in the dirtiest hovels and under most unsanitary conditions.' The writer was obviously concerned by the link between smallpox infection and clothing; there had been a recent smallpox outbreak on the Rand. 'Not many years ago we were told in the papers that a case of smallpox infection had been traced to a wash place and it was carried into a

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9 N. Rogers, *Dirt and Disease: Polio before FDR* (New Brunswick: Rutgers University Press, 1992), p. 29.

10 H. Phillips, *'Black October': The Impact of the 1918 Spanish Influenza Epidemic of 1918 on South Africa* (Pretoria: Government Printer, 1990), p. xv.

11 Rogers, *Dirt and Disease*, p. 7.

suburban house.'[12] The writer thought that the 'boy' or 'girl' might be a polio carrier, since domestic servants spent time 'in dirty yards or congregating in the street with servants from other houses with the disease'. Added to this, the washing was done 'in the dirtiest hovels' and despite being dried in the sun, 'a natural disinfectant', the washing was then further handled, folded and bundled.

The threat of blacks to health was taken further by J. Cunnif, who offered a solution to the problem:

> Everything we eat and drink and the clothes we wear are handled by natives. I have not the least hesitation in stating that if the white population in this country would quit the close association with the Negro they would be free from many diseases.

He referred to this association as the 'hidden plague'. This letter warranted a reply from the editor who drew the writer's attention to the following: 'Diseases most prevalent among the natives in this country today were originally introduced by Europeans … If we tolerate the housing conditions which exist in Johannesburg we must expect epidemics.'[13] Mothers who 'entrust their babies entirely to natives' were also remonstrated; a writer described how she had followed a servant with a 'white baby, daintily dressed' who then

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12 *The Star,* 7 Mar. 1918.

13 *The Star,* 8 Mar. 1918.

entered into a native servant's hut 'and shut herself up with him' while the child was 'obliged to share the stifling atmosphere'.[14]

Nevertheless, the relatively low incidence of epidemic paralytic polio among blacks, combined with evidence that suggested that this was a disease of whites, meant that the 'sanitation syndrome'[15] did not come into play where polio epidemics were concerned. Racism in this case was a reflex response rather than a reaction with any real bite.

4.2 Polio, Sanitation and Motherhood

If blacks were not the source of infection, other explanations had to be sought. Poor sanitation continued to be an obvious source of concern. The general public sometimes linked polio with sewage and unclean toilets. Although the scientific recognition of polio as a gastrointestinal disease was at a discussion stage within medical circles, 'Fairplay' coincidentally made such a connection in a letter about the state of the ablution block at a Troyeville school: 'Sickness of various kinds has been prevalent in this district for many months and last week a case of infantile paralysis appeared at the school.' A child had died within five days of contracting the disease, and a correspondent called on parents 'who care anything for the health of their children to pressurise the authorities to improve

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[14] *The Star,* 7 Mar. 1918.

[15] Swanson, 'The Sanitation Syndrome', pp. 387-410.

on the state of the school.[16] Another reader claimed that the sewage system of Johannesburg was a 'disgrace … most of the illnesses of this town are due to the present system of sanitation'. He demanded that the council place 'the whole of Johannesburg under a water-borne system'. If this was not done immediately 'it should be the duty of the Johannesburg public to elect a Council which will'.[17]

The idea that the environment played a significant role in regulating disease is also an old belief picked up by residents in Johannesburg. 'The enemy you have to fight is dampness', 'Agnostic' declared. Flannel underclothes would help as would the removal of linen sheets and pillowslips 'which absorb and retain damp'.[18] The inability to control the infection in their environment often resulted in criticism of the health authorities who were held responsible by the general public.

> I wish to draw the attention of the Medical Officer of Health to the expectoration that is going on in the vegetable and fruit market. I have often spoken to natives about the way that they spit on the floor and drag potatoes along. What are the inspectors, police and Health authorities doing to allow this sort of thing to go on?[19]

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16 *The Star*, 6 Mar. 1918.

17 *The Star*, 9 Apr. 1918.

18 *The Star*, 8 Mar. 1918.

19 *The Star*, 2 Apr. 1918.

It is important to note that, prior to the late nineteenth century, the medical understanding of 'contagion' was based on a direct, two-stage, person-to-person model of transmission. Pasteur's germ theory of disease (1870-1880) had confirmed that the agents of such infection were micro-organisms. A new concept in the understanding of disease emerged over a three-decade period: a living creature, itself unaffected, which might be an intermediate carrier or vector of infectious disease. The intermediate causes of epidemic diseases such as plague, typhus, malaria and yellow fever were shown to be arthropods – fleas, flies, lice and mosquitoes.[20] Such discoveries constituted a milestone and advance in medical thinking, an important shift in understanding from 'the long-known association of disease with poor personal and civic hygiene, with swamps and the miasmata associated with them',[21] to the idea of being able to prevent disease by eliminating the offending insects. Such visible means of disease control would have the

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20 This relatively new concept was brought to the fore by medical researchers such as Dr Ronald Ross. His work on the mosquito showed that it hosted malaria. Dr Walter Reed identified mosquitoes as vectors of yellow fever. Dr David Bruce exposed the tsetse fly as the intermediate vector to sleeping sickness and Dr Charles Nicolle demonstrated that the human louse was the transmitting agent for typhus. Knowledge about the rat flea and the plague also surfaced during this period, in 1904: D. Arnold, *Imperial Medicine and Indigenous Societies* (Manchester: Manchester University Press, 1988), p. 165.

21 J. Pearn, 'Arthropods and Disease: The Evolution of Knowledge about Vector-Borne Disease', *The International Society of the History of Medicine, 39th International Congress* (Bari, Italy, 2004), http://eprint.uq.edu.au/archive/00001326, accessed 2 Nov. 2006.

added bonus of to reassuring and allaying the anxieties and expectations of the general public.[22]

The housefly became a favourite target for health officials during epidemics. 'Fly Campaigns' to alert the population about the dangerous link between flies and disease were undertaken by health departments and newspapers worldwide. The *Sunday Times* claims that it was the original newspaper in South Africa to promote a 'Fly Campaign'. Free fly-swatters and bottles of formaldehyde were offered to the public; entrants were even asked to send their flies to the local health department.[23] During the 1918 epidemic the anti-fly campaign continued, although reservations were expressed about it:

> We do not know the use of the housefly and have always looked upon it as a carrier of disease from all sources of filth and decaying matter and for years past a fly-swatting campaign has gone on in Johannesburg and along the Reef. But nothing is done in most cases to destroy the filth, which breeds these pests. Does it not seem possible that these so called pests have a way of dealing with micro-organisms, which is not understood by us?[24]

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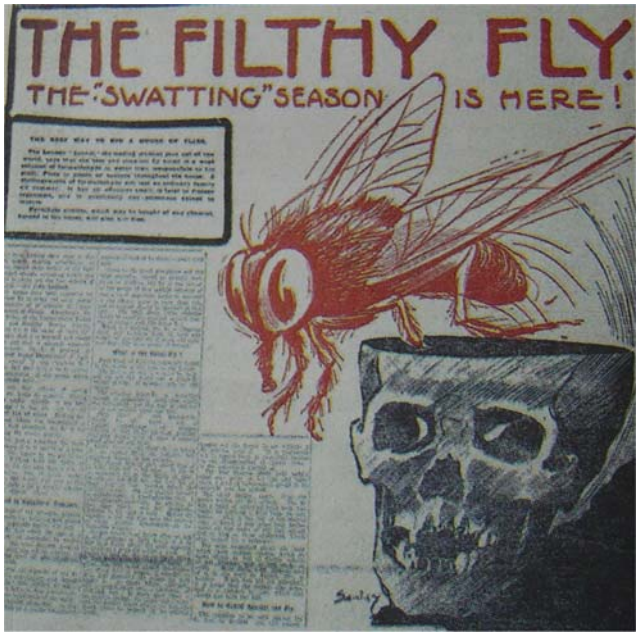
22 Rogers, *Dirt and Disease*, p. 18.

23 *The Best of the Sunday Times, Part One, 1906-1931: The Beginning*, supplement to *Sunday Times*, 4 Jun. 2006, p. 8.

24 *The Star*, 7 Mar. 1918.

Illustration 4.1



Images and articles – scare tactics – to involve the public in the fly campaign, 1912

Source: *The Best of the Sunday Times, Part One, 1906-1931: The Beginning*, *Sunday Times*, 4 Jun. 2006, p. 8.

The fly was considered to be a possible vector of polio in 1918, although 'the target of much scientific debate'[25] – within the Witwatersrand BMA[26] and abroad – but after the 1944-45 epidemic, South African researchers investigated this link more closely. The fly theory, however, placed the responsibility for infection squarely on the mother as

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25 Rogers, *Dirt and Disease*, p. 63.

26 *MJSA*, vol. 13, no. 6 (Jan. 1918), p. 98.

housekeeper; if houses were clean there would be no flies. At the same time this kind of thinking emphasised one of the many ironies in polio history: 'flies that supposedly spread the polio germ by flying in only one direction from the slums to the suburbs.'[27]

Yet another revelation of the early twentieth century was the understanding of the relationship between motherhood and infant mortality. By the end of the nineteenth century, although adult mortality had declined in countries like Britain, infant mortality was still high, at a rate of 100-150 deaths per 1 000 births. The major focus of public health in the new century was to come to terms with this problem. The South African War of 1899-1902 had highlighted certain worrying issues about 'the longevity or even viability of Great Britain as an Empire'.[28] Soldiers were found physically unfit to carry a rifle; many lacked physical stamina and were constitutionally prone to illness. An alarming decline in the birth rate and increased infant mortality rate was regarded as the root of the dilemma which threatened Britain's global pre-eminence. In short, infant life needed to be protected; Josephine Baker, an activist in child care work put it bluntly: 'When a nation is fighting a war or preparing for another … it must look to its future supplies of cannon fodder.'[29] The Bishop of London illustrated this with chilling

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27 *Ibid.*, p. 189.

28 D. Dwork, *War is Good for Babies and Other Young Children: A History of the Infant and Child Welfare Movement in England 1898-1918* (London: Tavistock, 1987), p. 167.

29 *Ibid*, p. 209.

statistics: '[w]hile nine soldiers die every hour in 1915 twelve babies die every hour, so it is more dangerous to be a baby than a soldier.'[30]

The First World War engendered a renewed sense of urgency to establish a comprehensive infant and child welfare system. Infant deaths were due to epidemic diarrhoea, enteritis, respiratory diseases, premature births, wasting disease (meningitis and convulsions) and congenital defects.[31] Many were also at risk because of incorrect feeding; breast milk was frequently substituted by tainted cow's milk, unsuitable infant food such as condensed milk and mixed food, such as bread, rusks, oatmeal, sago, tapioca and patent foods.[32] The babies who survived suffered from teeth problems, stunted growth and continuing ill-health. It was necessary to protect infant and child life both legislatively and in the home.

The principle was to interest women in the growth and health of their infants while at the same time inducing them to observe strictly all physicians' directions. After all, although mothers were 'ignorant and poor', they were 'eager to fulfill their obligations to their children'.[33] And so the mother in the home became the new centre of attention; baby clinics and health nurses drove home the lessons of the value of breast-

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30 *Ibid.*, p. 211.

31 *Ibid.*, p. 167.

32 *Ibid.*, p. 30.

33 *Ibid.*, p. 98.

feeding and the need to manage an orderly and safe home environment. 'First concentrate on the mother, what the mother is the children are … let us glorify, dignify and purify motherhood by every means in our power.'[34] Such was the rhetoric at the First National Conference on Infantile Mortality in 1906 in London, but the reality of the matter was different.

In class-conscious Britain the medical profession often viewed the working-class mother negatively, stereotyping her as incompetent, ignorant, and a poor mother. In South Africa, with its high infant mortality rate,[35] doctors readily adopted similar attitudes. As long as the source of polio infection remained unclear, such stereotyping was also transferred to the mothers of polio victims. Mothers were blamed for not calling the doctor at the first symptoms of illness, for '[they] attempt to hide their suspicions until it is too late'. Dr Baumann criticised the average mother 'of the uneducated classes, the more the child yearns for rest, the less will she allow it to rest'.[36] In one instance a

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34 *Ibid.*, p.114.

35 A high rate of 108.8 was recorded in Johannesburg for 1916-17. This had dropped to 80-90 by 1918 but was higher than that of 50 recorded in New Zealand at the same time: Report of the Medical Officer of Health on the Public Health and Sanitary Circumstances of Johannesburg during the Three Years, 1 July 1916 - 30 June 1919 (Johannesburg, June 1920) (hereafter ARMOH, 1916-1919), p. 10.

36 *MJSA*, vol. 13, no. 7 (Feb. 1918), p. 119.

mother was acting out of fear, having lost a child to meningitis. She probably had confused instructions and thought she had to keep the child awake.[37]

Despite medical criticism of mothers, the evidence suggests that many women responded to the plight of their children with courage and self-sacrifice. Almost invariably, the responsibility for home care fell on the mothers who frequently demonstrated heroic efforts, based on a powerful emotional need to do something practical to help their suffering children. For most, this involved massage, heat and water, either separately or in combination. In later epidemics polio survivors reported how their mothers, and sometimes their fathers, spent hours each day massaging and exercising the affected muscles. This attention could become overwhelmingly burdensome. A work colleague described how an exhausted father came to the office for weeks on end, after spending half the night massaging his son's limbs in a warm bath, in an attempt to ease the pain.[38] In other cases mothers were required to ensure that the child reached a treatment centre. Thelma Warren, who had polio in 1918, explains:

> Daily my mother pushed me in my pram from Eckhart Street in Braamfontein to the Children's Hospital in Hillbrow for water treatment in the "bubble bath".[39] Over the years she also dragged me to healing

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37 *Ibid.*, p. 117.

38 Miss A Thomas, interview 8 June 2003.

39 This was the Transvaal Memorial hospital established in 1923.

> sessions, a big thing in those days, where I sat on the stage step waiting for something to happen. I soon lost faith but my mother never stopped trying.[40]

Some parents wanted to do the best for their children and sought reconstructive surgery. After consulting several doctors, Thelma's mother discovered Dr. E.F.A. Sthamer, a Pretoria medical practitioner with a special interest in orthopaedics,[41] who consulted at a chemist shop in Johannesburg on Saturday mornings. Despite being warned that he was a 'butcher' by other parents, the mother went ahead and the operation was successful. 'If my mother had not chosen to trust her instincts, I would have lost the opportunity to walk again with hardly a limp.'[42] It is noteworthy that Dr. Sthamer collected Thelma from her home in Braamfontein in his own car, a Model T Ford, and

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[40] Mrs. Thelma Warren, interview 25 Aug. 2004. She contracted polio in 1918 when she was 18 months old.

[41] G.F. Dommisse, *To Benefit the Maimed*: *The Story of Orthopaedics and the Care of the Crippled Child in South Africa* (Johannesburg: The South African Orthopaedic Association and the National Council for the Care of Cripples in South Africa, 1988), pp. 14 and 101.

[42] *Ibid.,* During the operation for a claw foot, tendons were removed from the front of her foot in order to make the back tendon longer. Tendons were also removed from her big toe to supply the other toes of her foot in order to release them. Finally, an incision was made under the foot to straighten it. She was in hospital for three weeks and plaster for a further month. 'The leg was corrected from a four-inch deficiency to half an inch.'

took her to the Pretoria Hospital for the operation to save the family from the train journey.[43]

During the 1918 epidemic, a difficult task confronting doctors was to persuade parents to send their children to hospital. Many survivors of the South African War had developed an innate distrust of hospitals. Mothers in the concentration camps chose to hide their children rather than allow them into hospitals, fearing that they would be neglected, starved or never come out alive. It was also the Boer mother's role to nurse her child at home.[44] This negative view of camp hospitals had become deeply entrenched in the mythology of the camps and this fear was retained by urbanised Afrikaners more than a decade after war. Similar difficulties were experienced during the 1916 New York epidemic. Mothers refused officials permission to take their children to hospital or, in one instance, a mother kept her children locked up in an unventilated room, fearing outside

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43 *MJSA*, vol. 14, no. 9 (Apr. 1919), p. 441. Another doctor held a different view on philanthropy within the profession: 'We have taken so much credit for the humanitarian aspect of our work that the community would glorify us as missionaries and blame us for not accepting as duty what is but charity … We have selected [the] profession as a means of earning our living. [The Union] … must voice the statement that we expect the monetary rewards to be commensurate with the responsibility and arduousness of our work; that we do not want super-praise for the philanthropy …'

44 E.B. van Heyningen, 'The Voices of Women in the South African War', *South African Historical Journal*, vol. 41 (1999), p. 36; Van Heyningen, 'Women and Disease', p. 11.

contact might result in contracting the disease or that the virus might enter through the windows.[45]

Ignorance about contagion led some mothers to fear that their children might contract polio in hospital. In fact, doctors were as fearful. Johannesburg practitioners queried the possibility of hospital infection. Dr J.J. Lynch explained how a young patient of his, while awaiting an operation in the Johannesburg Hospital, had developed polio in the last few days of January and the case was 'pretty bad'.[46] Considering the evidence that there was rarely more than one infection per family, other doctors felt that it was unlikely that infection would take place in hospital, especially in 'well-conducted fever hospitals where the necessary precautions were taken by the staff', such as face masks and frequent washing of hands. This had worked in hospitals in Germany and the United States, where diphtheria and scarlet fever cases were kept in the same wards without cross-infection.[47]

4.3 Lay Explanations for Polio and its Treatment

Johannesburg resident Catherine Blomfield's view on infantile paralysis was published in the main body of *The Star* early in the epidemic, which suggests that the editor

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45 Rogers. *Dirt and Disease*, p. 42.

46 *MJSA*, vol. 13, no. 6 (Jan. 1918), p. 87.

47 *Ibid.*, p. 96.

considered it newsworthy. Other editors refused to print lay theories on illness claiming that these 'throw no more light on the subject.'[48] Blomfield was confident that her ideas were based on facts that had come to her knowledge. She ventured that infantile paralysis was a form of 'Beri-Beri', closely akin to the destructive cattle diseases in South Africa of *lamsiekte* and *stijfsiekte*. She believed such diseases were caused by insufficient 'proper food lacking in the constituents necessary for nourishing the nervous system and the body generally'.[49] Prevention of infantile paralysis could be achieved by ensuring that the children avoided imported, coloured sweets, by keeping their mouths clean and ensuring that they did not suffer blood loss from fleas, lice and bugs which would leave them exhausted and unable to fight disease. The idea that good nutrition enabled the body to fight disease was part of a modern approach to health which developed throughout the twentieth century. Insects, as vectors of disease, we have seen, formed part of the recent successes of medical entomology in explaining the spread of bubonic plague, sleeping sickness, yellow fever, malaria and typhus. A letter from Dr J. McMullen, a former MOH assisting in public health work in Liverpool, thought that the local research institute 'should experiment with white mice, guinea pigs or poultry', as there was 'sufficient reason to believe the [polio] germ is introduced by fleas and bugs and that rats and mice help to harbour the germ.'[50].

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48 Editor, *Sunday Times*, 10 Mar. 1918.

49 *The Star*, 20 Feb. 1918.

50 *The Star*, 8 Mar. 1918.

A former hospital nurse who had worked in London believed that the cause of poliomyelitis was ‘a congenital weakness handed on by a progenitor who had been known to suffer from spinal diseases or brain trouble’. It was ‘catching’ and not due to a germ but:

> the action of the nerve centres, those delicate wireless messages sent off from one brain to another. If the nervous system which receives the suggestion of sickness be strong and free from impurities, the suggestion will be thrown off as a ball will rebound from something solid; but if there be weakness, exhaustion, impurity of blood, the suggestion will be retained and the disease “caught”.

She believed that fear was the most infectious of all nervous complaints and that ‘we must keep our children in a healthy state of body and mind’. A wise axiom for mothers to remember was: ‘An empty bowel makes a clear brain.’[51] Although rather wide of the mark, the letters display the modern concern that diet and disease are linked. It could be argued that the role of stress in illness was recognised at this early stage, as stress and diet continue to be linked to disease today. ‘Leonard’ blamed too much meat and its products in the diet which prevented children from being ‘really healthy and immune from disease’. He advocated complete abstinence from meat, especially during the epidemic.[52]

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51 *The Star*, 27 Feb. 1918.

52 *The Star*, 19 Mar. 1918.

Lay writers displayed ready knowledge of medical terminology, which could have been picked up from the press, but their understanding of polio was rather clouded. It is interesting how these writers were attempting to cross the divide between the old and new medicine by picking up on the information that polio is a disease affecting the nervous system. Others were inclined to have their hopes raised by any suggestion of a cure:

> I would like to ask if any of the doctors of Johannesburg have had the foresight to obtain the wonderful Rosenow Serum. One reads the comforting assurance that this terrible disease need not be fatal, and the realization that the cure for it is possibly a few thousand miles away, brings a chill to the hearts of mothers of tiny children.[53]

This mother was referring to an article entitled 'An Arresting Serum', which offered no cure but a possible means of preventing and arresting the paralysis by killing 'the invading organism so that the work of destruction is stopped'.[54] Such misinterpretations of published medical articles must have been the bane of many doctors who firmly believed that medical matters should be left in their capable hands. Yet during the epidemic even the doctors were not confident about their knowledge of polio, especially how to avoid infection. Baumann admitted that he gave 'a very guarded opinion when

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53 *The Star,* 14 Feb. 1918.

54 *The Star,* 8 Feb. 1918.

rung up'.[55] It is little wonder then that rather radical treatments were considered. Three years previously, the Radium Institute in London had treated cases of paralysis with great success 'by giving patients one tumbler-full of radium emanation water three times a day'.[56] The writer thought that the medical men in the Union should give radium a trial.

Religious opinions as to why the epidemic occurred are rather mixed. One writer attributed the epidemic and other 'dread' diseases to the lack of correct Christian observations. Good Friday should be set aside as a 'Day of Intercession', like the Jewish Day of Atonement, instead of for picnics, sports galas 'and a great agriculture show'(the Rand Easter Show at Milner Park). 'What use is it to waste money in research investigating disease when the very evil lies at our own door?'[57] One wonders about the epidemic beyond the Easter period. Another writer believed that if the members of the medical profession studied 'Higher Laws', germs would be rendered totally harmless. He stated that some doctors had turned to psychology having found 'material medica [*sic*] a failure', while other doctors 'are beginning to see the summit, studying and practicing "spiritual" psychology which takes into account the Creator and His spiritual laws which are something more than ethical'. Having advised the medical profession that spiritual psychology 'overcame all diseases', E.J.W. declared that he was looking forward to the time when 'the fine building [SAIMR] recently erected on Hospital Hill for the purpose

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55 *MJSA*, vol. 13, no. 6 (Jan. 1918), p. 101.

56 *The Star*, 9 Mar. 1918.

57 *The Star*, 26 Mar. 1918.

of finding the cause of disease, which will never be discovered by such means, will be turned into a museum and good money put to a better purpose'.[58] This could be regarded as an implicit attack on the religious scepticism thought characteristic of modern scientists. 'Inquisitive' wondered why the miracle workers of 'the apostolic faith' were so slow in coming forward with a cure for polio after a recently publicised cure in Krugersdorp.[59]

This collection of letters reveals how health and illness had been understood by various citizens of Johannesburg. 'As medicine is a dynamic process of negotiation between doctor and patient within the context of the family and community', these testimonies offer an opportunity to understand the development of medical culture in South Africa.[60] In their responses to epidemic polio, members of the public were no less entranced, reflective and confused than the health officials and doctors. The correspondence shows how the writers were trying to integrate the theories of germs, laboratory research and medical orthodoxy with their own ideas and notions. Dr Haven Emerson, health commissioner of New York City during the 1916 epidemic, commented on the letters his department had received: 'One hardly knows whether to laugh at the

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58 *The Star*, 11 Mar. 1918.

59 *The Star*, 19 Mar. 1918.

60 Rogers, *Dirt and Disease*, p. 107.

fantasies or weep over the ignorance and superstition exhibited'.[61] No doubt similar sentiments were held by health authorities in Johannesburg.

This cross-section of letters, however, also reveals a thinking public, concerned about the disease and disorder within their environment over which they had little control, leaving many feeling susceptible and vulnerable not only to possible infection of their children by polio but to other diseases. A perceived lack of commitment from health authorities to eliminate the sources of contamination by means of increased sanitation inspections and the removal of slums became a source of increasing aggravation.

As happens during most times of tragedy, there is always a group which can put the fear experienced by others to their financial advantage. Manufacturers advertised household products as a defence against germs. 'Ronuk sanitary polish' left furniture and linoleum 'smooth and dry to which dust, dirt and germs cannot adhere'. Disinfectants were popular in treating disease and to prevent its spread. An advertisement announced that Lysol would ensure that germs and dust would be sanitised. Camphor as a disinfectant against infantile paralysis 'is unequalled', claimed The Transvaal Drug Company.[62] 'Vigilant' proposed that the interior of all cars should be disinfected 'with one of the many efficacious mediums now on the market. This would benefit the community and enable mothers (who will not leave their children to the tender mercies of

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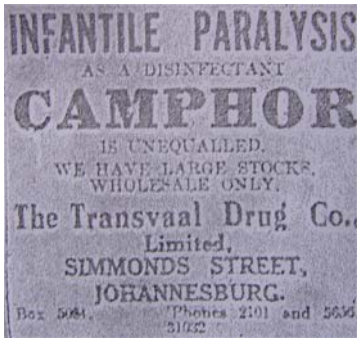
61 *Ibid.*, p. 109.

62 *The Star*, 12 Mar. 1918.

Illustration 4.2



A carefully worded advertisement

Taking advantage of the polio outbreak and mothers' fear during the month with the highest number of cases must have seen a substantial rise in sales.

Source: *The Star*, 12 Mar. 1918.

a coloured servant), to take their children in the car with less likelihood of infection'.[63] Doctors were also warned to 'make a point of disinfecting themselves thoroughly after visiting a case of infantile paralysis before proceeding to another case, no matter what the illness may be'.[64] Advertisements of familiar children's remedies were adapted to be used during the epidemic. Ashton and Parson's Infant Powders, 'for little princes and princesses' would ease the symptoms 'if the child is cross or feverish'.[65] Dr Cassell's Tablets claimed to have helped a crippled boy in Strydenburg, Cape Province to walk again. Such psychologically loaded advertising at the height of the polio epidemic must have persuaded worried parents to try these tablets where just in case the virus was

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63 *The Star*, 14 Mar. 1918.

64 *The Star*, 26 Mar. 1918.

65 *The Star*, 5 Mar. 1918; *Cape Argus*, 22 Mar. 1918; *The Star*, 12 Mar. 1918.

lurking nearby. A closer examination of the small print in this advertisement revealed that the boy had become paralysed from typhus.[66]

Just as the press was used by the health authorities to control and educate the community during an epidemic, it was an equally useful platform to launch a critical attack on such authorities, since their somewhat haphazard communications had failed to impress. Mathilda Cohen, a concerned parent, wrote:

> It would be decidedly of service to know what actual cases are in existence locally and also what steps parents should take as immediate remedies. If infection is being carried abroad would it not be advisable to consider closing all schools until the epidemic abates? It behoves the authorities to issue sound advice and for the parents to follow it with extreme care. Unfortunately many parents are ignorant of the dire and terrible malady.[67]

Cohen has in fact set out the basic polio policy which health authorities, in their own convoluted manner, eventually arrived at during Johannesburg's first polio epidemic. At last Dr Alexander Mitchell was able to draw together important issues learnt from the epidemic and publish these in a 'Memorandum on Acute Poliomyelitis' in April 1918.[68]

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66 *The Star*, 11 Mar. 1918.

67 *The Star*, 20 Feb. 1918.

68 Cape Archives Depot (KAB), Town Clerk, Peddie, 1/PDE, vol. 9, 22/18/37.

For doctors and health officials alike, the handling of the epidemic had been rather a hit-and-miss situation. The epidemic was finally over but one thing was clearly understood – polio in its epidemic form would be back, and the question was when? Dr Baumann warned the Witwatersrand BMA:

> The disease seems to run in peculiar cycles through the world. We are probably only at the beginning of the cycle … if the disease follows the same lines as in other countries we are bound to get a worse out-break next year.[69]

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69 *MJSA*, vol. 13, no. 6 (Jan. 1918), p. 101.

Chapter Five

Poliomyelitis Research between the Wars

5.1 Like the Plagues of Egypt[1]

Early in September 1918, the worst epidemic of the twentieth century broke out on the mines near Johannesburg. The final death toll of the Spanish influenza epidemic was estimated at more than 300 000,[2] with South Africa sustaining 'one of the highest per capita death-rates in the world'.[3] The Department of Health had been labeled 'tardy and inco-ordinate' in its handling of the polio epidemic,[4] while during the influenza epidemic its conduct was described as 'masterly inactivity'.[5]

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1 H. Phillips, *'Black October': The Impact of the Spanish Influenza Epidemic of 1918 on South Africa* (Pretoria: The Government Printer, 1990), p. 153. A comment made to describe the troubled times of 1918.

2 *Ibid.*, p. 159.

3 *Ibid.*, p. 176.

4 *The Star*, 10 Apr. 1918.

5 Phillips, '*Black October*', p. 105.

Phillips points out that during the influenza epidemic the department was 'in constitution, scope, staffing and resources wholly inadequate for the task of safeguarding the health of the Union's population'.[6] As had been the case with the polio epidemic, the onus of coping with the crisis was once again placed on local authorities, while the Department assumed the role of advisor and assistant. In fact, local authorities throughout the Union, knowing that little assistance would come from the impotent department, were forced to take control of the situation for themselves as matters worsened in their respective areas.

Problems presented by the influenza epidemic were far more dramatic and visible than those experienced during the recent polio epidemic. The infection had spread like 'quick silver'.[7] People died 'like flies'[8] and at times 'the dead lay unattended for hours',[9] while makeshift mortuaries were set up.[10] In Cape Town the daily death toll rose to three figures.[11] In Johannesburg schools and all places of entertainment were closed to be

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6 *Ibid.,* p. 123.

7 *Ibid.*, p. 121.

8 *Ibid.*, p. 62.

9 *Ibid.*, pp. 13 and 19.

10 *Ibid.*, p. 48.

11 *Ibid.*, p. 19.

reopened in November 1918.[12] The municipality, as in other provinces, set up food and medical depots.[13] Although the epidemic was over in a matter of weeks, it profoundly affected the Union demographically[14] and economically, creating and leaving in its wake huge societal problems which needed to be addressed by state intervention.[15] The public were shocked at the 'revelation of slums and degradation' exposed by the epidemic.[16]

The 1918 influenza epidemic can be used as an example of how the concept 'epidemic' is 'almost by definition frightening' as 'a grave illness' infects large numbers, 'one after another', creating enormous 'fear and anxiety';[17] 'influenza was the worst pandemic of modern times in terms of speed and toll'.[18] On the other hand, the 1918 polio

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12 Report of the Medical Officer of Health on the Public Health and Sanitary Circumstances of Johannesburg during the Three Years, 1 July 1916-30 June 1919, p. 26. In the Johannesburg magisterial district, 2 284 out of a total population figure of 259 302 died from influenza.

13 *Ibid.*, p. 26.

14 Phillips, *'Black October'*, p. 230.

15 *Ibid.*, p. 183.

16 *Ibid.*, p.165.

17 C. Rosenberg, *Explaining Epidemics and other Studies in the History of Medicine* (New York: Cambridge University Press, 1992), p. 293.

18 H. Phillips, 'The Re-Appearing Shadow of 1918: Trends in the Historiography of the 1918-19 Influenza Pandemic', *Canadian Bulletin of Medical History*, vol. 21, no. 1 (2004), p.122.

epidemic dragged on for months with a much more modest death toll of 24. Although the polio epidemic had raised similar problems of quarantine, staff shortages, limited treatments, and an abiding sense of desperation and uselessness, it did not paralyse daily life,[19] but only individuals. The influenza epidemic did not return, as feared, but polio did, on an ever-increasing scale. Ross rather bluntly sums up how she understands the difference between the terms 'epidemic' and 'polio epidemic':

> An epidemic that kills its victims leaves a reduced population to mourn its dead and then gradually to forget. But the community could not forget its polio victims. Most did not die; they lived, their wasted limbs, their calipers and their crutches a constant reminder of the fate which could befall anyone.[20]

5.2 Administrative Changes after the 1918 Influenza Epidemic

It is difficult to determine the extent to which the 1918 polio epidemic influenced the ground-breaking Health Act of 1919, if at all. However, one can only suggest that some doctors present at the Bloemfontein discussions on the draft Act, which was designed to

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19 H. Phillips, 'South Africa's Worst Demographic Disaster: The Spanish Influenza Epidemic of 1918', *South African Historical Journal*, 20 (1988), p. 58.

20 J.C. Ross, 'A History of Poliomyelitis in New Zealand' (MA thesis, University of Canterbury, 1993), p. 104.

promote a more efficient health system, did so with a very vivid memory of the polio victims. Many at the conference realised that practical medicine needed a collective investigative approach and specialised expertise to cope with the type of diseases they now encountered. A centralised health department, under the control of a minister, would help co-ordinate this combination of theory, practice and specialisation, and convey this to the general practitioner, 'who, after all is the ultimate agent whereby the citizen reaps the benefits of modern medicine'.[21] The influenza epidemic had made the public and local authorities more aware of just how inadequate public health policies were in the face of epidemic disease.[22] 'Had it not been for the compelling forces of the dreadful and disastrous epidemic of influenza it is doubtful whether such a measure would have been passed.'[23]

The Public Health Act was finally passed in June 1919[24] and the administration of the country's health was put on a national footing under a fully-fledged Department of

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21 'London letter, from our Special Correspondent', *MJSA*, vol. 14, no. 10 (Dec. 1919), p. 463.

22 *The Star*, 13 Jan. 1919.

23 Phillips, *'Black October'*, p. 206.

24 *Ibid.*, p. 206.

Public Health.[25] This Health Act was called 'an outstanding piece of legislature', 'a revolutionary measure in its day', and a 'pioneering act in the Union'.[26] Relevant to polio was the improved epidemic notification network to neighbouring countries and to other parts of the British Empire which the Act expanded. Hopefully this would be an improvement on the lethargic communications which had passed between the Union and Mozambique during the polio epidemic. In 1920 South Africa joined the International Bureau of Public Health in Paris, which issued monthly bulletins by post on epidemic outbreaks all over the world.[27] The Act also imposed stricter quarantine measures and the government undertook to refund two-thirds of the expenses incurred by local authorities while 'safeguarding public health',[28] with the proviso that the government might intervene where necessary and gazette special regulations.[29]

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25 H. Phillips, 'The Local State and Public Health Reform in South Africa: Bloemfontein and the Consequences of the Spanish 'Flu Epidemic of 1918', *Journal of Southern African Studies,* vol. 13, no. 2 (Jan.1987), p. 210.

26 *Ibid.,* pp. 204, 205.

27 *Ibid.,* p. 207.

28 A. Jeeves, 'Public Health in the Era of South Africa's Syphilis Epidemic of the 1930s and 1940s', *South African Historical Journal*, 45 (Nov. 2001), p. 79.

29 H. Phillips, 'Black October: Cape Town and the Spanish Influenza Epidemic of 1918', in C.C. Saunders (ed.), *Studies in the History of Cape Town* , vol. 1 (Cape Town, 1979), p. 100.

The question was: how would such changes help the future handling of polio epidemics? No adjustment to quarantine measures would make any difference in containing the disease, for in its epidemic form infection spread rapidly. Financial help would assist local health departments, burdened by the cost of opening and running special isolation wards, a vital requirement during a polio epidemic. Finally, the more South Africa could glean from international public health experience and research, the better. For the next 26 years the Union was free from polio epidemics. The poliovirus did not disappear; later research indicated that such a hiatus between the first epidemic and the next was a trend in polio 'in transition' from its endemic state to 'epidemic stage'.[30] As other countries were hit by increasingly severe epidemics, the Union was lulled into a false sense of security and inattentiveness. In an under-developed country such as South Africa, polio infections continued in primitive communities. Those protected from the virus by their sanitised surroundings for a generation or more could expect a severe epidemic when an invasive strain of the poliovirus was introduced.[31] The children who had experienced the disease in 1918 would be reminded of the horror as the next epidemic struck their children.

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30 R. Debré, et al., *Poliomyelitis*, WHO Monograph Series, no. 26 (Geneva: World Health Organization, 1955), p. 41.

31 *Ibid.*, p. 56.

5.3 The Incidence of Polio between the Wars

Between 1918 and 1938, approximately 64 cases of polio were notified in Johannesburg, 47 of which were among the white population.[32] From 1939 until 1944, there were 85 cases, with 70 being white:[33]

Table 5.1

Year	White	Black	Total
1939-40	8 (2)	2 (3)	10
1940-41	20 (4)	3 (1)	23
1941-42	7 (1)	3	10
1942-43	6 (2)	0	6
1943-44	29 (4)	8 (2)	36
			85

Incidence of polio in Johannesburg 1939-1944

Figures in brackets indicate the number of deaths.

Source: Scott Millar 'Poliomyelitis in Johannesburg', p.143.

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32 Dr J.W. Scott Millar, 'Poliomyelitis in Johannesburg', *Public Health* (May 1949), p. 143.

33 *Ibid.*, p. 143.

Table 5.2 indicates a sudden increase in the number of cases in the Union during the mid 1930s and in 1940-1941. In 1934, Bloemfontein recorded 40 cases with a 35 per cent mortality rate, but this remained a localised outbreak.[34]

Table 5.2

Year	Whites	Blacks	Total
1922	27	6	33
1923	2	3	5
1924	0	3	3
1925	15	6	21
1926	8	4	12
1927	11	10	21
1928	22	10	32
1929	14	8	22
1930	22	8	30
1931	17	8	25
1932	15	7	22
1933	29	17	46
1934	40	24	64
1935	35	26	61
1936	10	16	26
1937	57	25	82
1938	9	9	18
1939	15	18	33
1940	36	26	62
1941	65	27	92
1942	34	11	45
1943	31	5	36
1944	52	23	75

Incidence of polio in the Union 1922-1944

Source: H. Nelson, 'Poliomyelitis: Epidemiology and Preventive Measures', *Public* Health, vol. 13 (Mar. 1949), p. 133.

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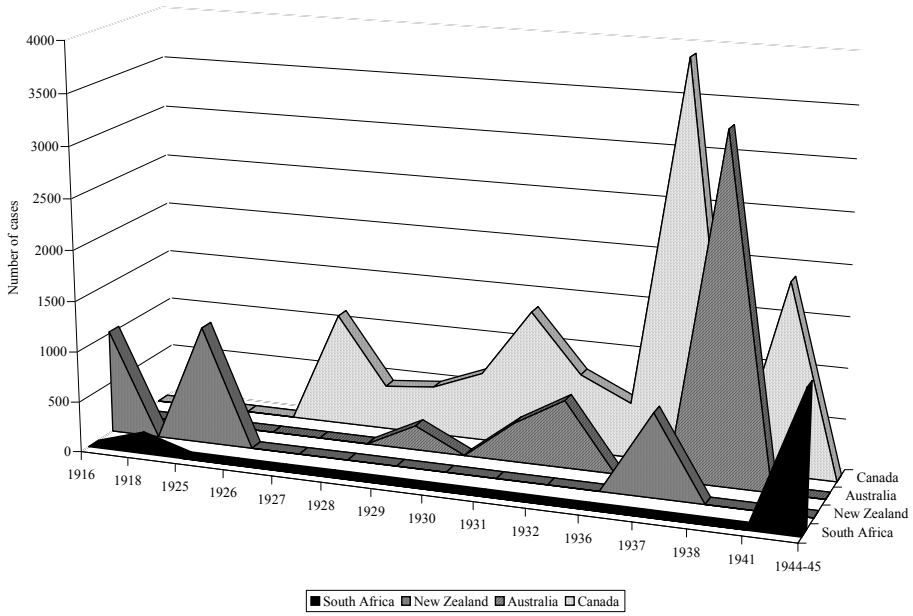
[34] *Ibid.*, p. 143.

Figure: 5.1



Poliomyelitis epidemics in the Union and other countries 1916-1945

Sources: J.C. Ross, 'A History of Poliomyelitis in New Zealand' (MA thesis, University of Canterbury, 1993), p. 108; C.J. Rutty, '"Do Something! Do Anything"! 1927-1962' (PhD thesis, Toronto University, 1995), p. 397; J.H. Smith, 'Fear, Frustration and the Will to Overcome: A Social History of Polio in Western Australia' (PhD thesis, Edith Cowan University, 1997), p. 112.

Case numbers in New Zealand, Canada and Australia were generally over 1 000. While these countries had already experienced more than three epidemics, South Africa's outbreaks were still localised. It was becoming clearer that epidemic polio was linked to

the stage of development of a country. Later research revealed that the infant mortality rate of a country might be used as an index of such development and an indicator of an approaching epidemic.[35] Generally, those countries with an infant mortality rate below 50 were more likely to experience polio epidemics.[36] In 1918, the white infant mortality rate in Johannesburg was 81.04 per 1 000 births, the black rate was 298.50.[37] The white infant mortality rates dropped dramatically over the 26-year interval between 1918 and 1944 but the black infant mortality rates remained high at 264.16.[38] Where there was a high infant mortality rate, the poliovirus, although 'hidden' by other infectious diarrhoeal diseases, continued in its endemic state immunising black infants. It was really only a matter of time before the next serious epidemic broke out in the Union and the vulnerable white children, screened from normal exposure to the virus, would be the main victims.

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35 A.M. Payne, 'Polio as a World Problem', Poliomyelitis Papers and Discussions presented at the Third International Poliomyelitis Conference (Philadelphia: J.B. Lippincott and Co., 1955), pp. 393, 395.

36 *Ibid*., p. 396.

37 Report of the Medical Officer of Health on the Public Health and Sanitary Circumstances of Johannesburg during the Three Years, 1 July 1916 - 30 June 1919 (Johannesburg, June 1920), (hereafter ARMOH, 1916-1919), p. 9.

38 ARMOH, 1949-1950, p. 200.

5.4 Interwar Care for Polio Victims

Initially, medical authorities did not push for hospital isolation of all polio patients, but only for those whose homes were inadequate or if there was an immediate danger of contamination. After 1919, however, all notified polio cases were required to be hospitalised. Most acute polio cases were sent to the Fever Hospital, which had been opened in Hoofd Street in Hillbrow in1916, initially with 59 beds. Once the infectious stage was over, after approximately three weeks, the patients were transferred to the Transvaal Memorial Hospital for Children (TMHC, also referred to as the Children's Hospital), which opened in 1923.[39] The TMHC was used for post-polio cases and corrective operations in paediatric cases up to the age of 14, with Dr J.M. Edelstein in charge, assisted by Dr M. Davis. The professional staff also consisted of clinicians in private practice. Representative bodies and private individuals endowed cots and wards which in turn were named after their benefactors.[40] A full Orthopaedic Department was

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[39] L. Schreiber, *Johannesburg Hospital 1890-1990* (Johannesburg: Johannesburg Hospital Board, 1990), p. 26.

[40] S. Heymann, 'The Transvaal Memorial Hospital for Children 1923-1973', *SAMJ*, vol. 47 (13 Oct. 1973), p. 1827. *The Sunday Times*, Primary Schools, Musicians' and Red Cross wards were used for observation, isolation and surgery during polio epidemics.

established in the Johannesburg General Hospital Complex in 1935 under Mr F.P. Fouché.[41]

Illustration 5.1

The Transvaal Children's Memorial Hospital, Johannesburg

Source: L. Schreiber, *Johannesburg Hospital 1890-1990* (Johannesburg: Johannesburg Hospital Board, 1990), p. 26.

The Otto Beit Home continued to serve as an annex to the General Hospital for the next thirty years. The East Rand was served by the East Rand Hospital which was able to admit polio cases into isolation. The establishment of the Children's Hospital was a pioneering move, vital to the well-being of the children of the province, while paediatrics and paediatric surgery, together with the relatively new and major disciplines of orthopaedics and physiotherapy, were becoming established.

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[41] M. Beaconsfield (ed.), *The Transvaal Memorial Hospital for Children 1923-1973: 50th Anniversary Golden Book* (Johannesburg: TMHC, 29 Oct. 1973), p. 22.

Convalescence of polio patients was a long, drawn-out process which could last up to two years or longer before mobility returned, if indeed paralysis was not permanent. If the limb remained paralysed for four months, paralysis was regarded as permanent.[42] Some fortunate patients were able to walk within weeks, but many still needed physiotherapy and medical care. It all depended on how severe the initial infection had been. The Hope Convalescent Home played an important role in the rehabilitation of polio patients. In 1915, Mr R.W. Schumacher, chairman of Rand Mines, and his wife donated their home 'Pallinghurst', in Westcliff, to the City of Johannesburg and district of Witwatersrand 'as a home for sick and needy children'.[43]

It was to be 'free and open to all white children resident in the Witwatersrand from Springs to Randfontein'.[44] Hope Home, bearing Mrs. Schumacher's Christian name, eventually became a major rehabilitation centre, not only for polio children, providing accommodation for extensive periods of convalescence and offering necessary medical treatment. Initially, there were 40 beds, but within 20 years the number had increased to over 60. Dr E.P. Baumann was the first doctor in charge. Although originally the home

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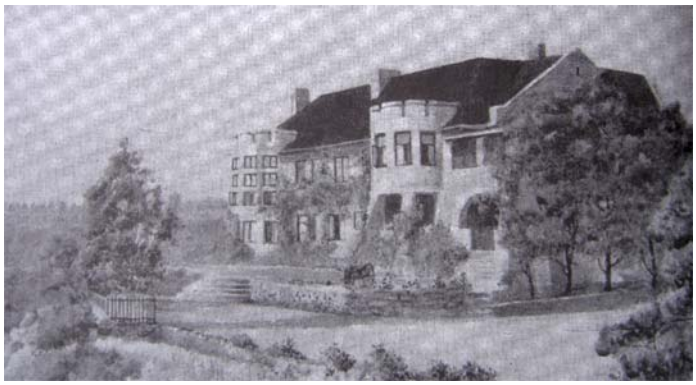
42 G.T. du Toit, 'The After-Care of Convalescent Poliomyelitis Cases', *SAMJ*, vol. 19 (9 Jun. 1945), p. 193.

43 A. van der Walt, 'The History and Scope of the Hope School and Homes, Johannesburg' (BEd thesis, University of the Witwatersrand, 1972), p. 13.

44 *The Star*, 16 Feb. 1918.

was intended for local children, by 1938 children from other provinces were accepted, as well as some from African countries.

Illustration 5.2



Early painting of Pallinghurst, front view

Source: *Hope School 75th Anniversary Magazine* (Johannesburg: Hope Home, 2004), p.6.

The Hope Home assured a certain number of beds to convalescing patients from the Children's Hospital, but during later epidemics, polio cases were drafted directly from the Fever Hospital and the TMCH to the Hope Home once all infection was over.[45] Polio directly influenced other developments at the Hope Home. Schooling was provided for children, especially those who needed to undergo surgical procedures and after-care. Initially the school was a rather haphazard affair, with only kindergarten lessons given in the wards, but after the 1928 Vocational Education and Special Schools Act, a more

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45 Van der Walt, 'History of the Hope Homes and Schools', p. 28.

formal school was started.[46] 'The scheme of work followed is of necessity one to meet their special needs. Recreative exercises are done daily giving mental and physical stimulation to the children.'[47]

Illustration 5.3

Hope Home School

Source: *Hope School 75th Anniversary Magazine* (Johannesburg: Hope Home, 2004), p. 7.

In 1929, the Transvaal Provincial Education Department took over all expenditures and 'the school continued to be a great success'.[48] There was an increasing

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46 Interview with Mr J.B.V. Snow, ex-principal of the Hope School, 6 Nov. 2003.

47 Van der Walt, 'History of the Hope Homes and Schools, p. 33.

48 G.F. Dommisse, *To Benefit the Maimed: The Story of Orthopaedics and the Care of the Crippled Child in South Africa* (Johannesburg: The South African Orthopaedic Association and the National Council for the Care of Cripples in South Africa, 1982), p. 11.

need to provide for the older children who, beyond the ages of twelve for boys and fourteen for girls, could no longer remain at the Convalescent Home.

Illustration: 5.4

Hope Convalescent Home, circa 1930

Source: Museum Africa.

Through the auspices of the Cripples' Care Association of the Transvaal, established in May 1934, and at the request of the National Council of Women, the Hope Training Home was officially opened on 9 September 1936. Earl Clarendon announced:

> There are no limits to what we can make of the crippled child … they are highly intelligent in utilizing their depleted physical powers to best advantage … By training them we can make of them an asset instead of a liability to the State and at the same time give them abiding joy … we

> shall enable them to become self-supporting … we shall be amply repaid by their radiant joy.[49]

Of the 24 children admitted, the majority were polio sufferers.[50] In 1939 a fully equipped government school was completed, with eight classrooms and provisions for bed cases. By 1944, 122 children attended the school up to Standard Seven. 'Radiant joy' is not how the residents of the Hope Convalescent Home would have described their experience:

> We were all in the same boat. Our afflictions united us and like normal children we teased each other and had fun. When I returned to 'normal' schooling I was met at the gate by a boy who shouted out: 'Hello funny face!' Now I was different. The home had been a refuge from all this.[51]

Morris offers an explanation for this behaviour: 'Each entry into the public world will be dominated by stares, by condescension, by pity and by hostility … Prejudice we experience is often a reaction to physical difference', the notion of being defective.[52] The

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49 *Ibid.*, p. 12.

50 Ibid., pp. 36-38.

51 Interview with Eden Harrington, 20 Aug. 2003.

52 J. Morris, *Pride against Prejudice Transforming Attitude to Disability* (London: The Women's Press, 1991), p. 25.

Cripple Care Association and the National Council for the Care of Cripples became synonymous with the image of the disabled polio child.

An enormous boost to the development of the National Council and thus to polio in South Africa, was Lord Nuffield's generous donation of £100 000 in 1937. Similar donations were also given to other Commonwealth countries. This money was intended for: 'the development of orthopaedic surgery and organised services, for the discovery of, and cure for crippling disabilities on a carefully considered plan in South Africa'.[53] Nuffield hoped that the donation go towards a 'living organisation' rather than spent only on buildings and equipment. Scholarships were offered to enable doctors to specialise in orthopaedics overseas and postgraduate training for orthopaedic nurses was initiated. Ultimately Nuffield's money, together with funds raised by the National Council, was used to establish orthopaedic clinics and facilities and to subsidise universities for research into cripple care. After-care facilities for crippled children also benefited them, as did workshops and training centres. The National Council emphasised the point that the Nuffield's Gift 'should in no way be used to relieve the Union Government or the Provincial administrations of their ordinary responsibilities'.[54]

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[53] Dommisse, *To Benefit the Maimed*, p. 25. Nuffield, a motor magnate, was regarded as one of Britain's greatest philanthropists who during his lifetime donated more than £27 million to charitable causes. The donation was also referred to as 'the trust' or 'the gift'.

[54] *Ibid*, p. 37 and p. 48. The main function of The National Council for the Care of Cripples, established in 1939, was to ensure a comprehensive service for physically disabled people of all ages and population groups.

The sole fund-raising appeal to the public for cripple care was the Easter Stamp Fund. The first campaign was launched in March 1944, prior to South Africa's second polio epidemic. Fortuitously the interwar years had seen a vital infrastructure set in place to support the increasing number of disabled, especially through polio.

5.5 Interwar Developments in Treatment and After-Care

The 1918 polio epidemic in South Africa had illustrated some of the significant difficulties the country could face in any future epidemic. Lack of knowledge about the poliovirus and limited treatment for its victims caused much concern. During the interwar period, research continued in the United States (USA), prompted by ongoing epidemics. Canada was only affected by polio epidemics after 1927, when the Connaught Laboratories in Toronto began their own polio research. The SAIMR, however, focused its research on other diseases, since there were no serious polio outbreaks until the 1940s.

Convalescent or blood serum was believed to be most effective if administered before paralysis set in, yet there was no way of predicting when this might happen. Any treatment applied at the pre-paralytic stage, by the very nature of the disease, would appear to have a high success rate, as generally only one in 100 cases developed paralysis.[55] In principle, serum treatment was therapeutically correct but it failed because of the small doses used. By the time the serum was administered, the body was already

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[55] Debré et al., *Poliomyelitis*, p. 22.

manufacturing its own antibodies to polio. By 1937, after two failed vaccines, the consensus of medical opinion was that serum treatment had little value and could in fact be dangerous.[56] Emphasis in treatment continued to be placed on the management of the paralysis, prophylaxis and the after-care of polio victims.

During the 1918 epidemic, the only treatment during the acute stage of the disease was bed rest, with affected limbs immobilised in splints or plaster. Where these precautions failed to prevent deformity, surgery was an option. Orthopaedic after-care, although still in its infancy in 1918, grew rapidly after the First World War. There was a worldwide need to repair or rebuild damaged bodies and the expertise of nations such as the USA and Germany led others.[57] Polio survivors benefited from this spurt of orthopaedic knowledge. Convalescent homes which first met the need of returning soldiers became the institutionalised structures polio victims would require in the wake of ensuing polio epidemics.

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[56] Ross, 'Poliomyelitis in New Zealand', p. 48. Most works on the development of the polio vaccine cover the failed vaccine attempts of Drs M. Brodie and J.A. Kolmer in America which resulted in the death of a number of vaccinated children.

[57] Dommisse, *To Benefit the* Maimed, p. 2. The American Orthopaedic Association was formed in 1887, the German Orthopaedic Association came into being in 1901 and the British Orthopaedic Association (BOA) was formed in 1918. Dommisse considers that the BOA, more than any other, influenced South African orthopaedic events. In South Africa the Orthopaedic Surgeon's Group came into being in 1942.

Orthopaedic surgery developed according to the increased need for reconstructive surgery. Polio accounted for 25 per cent of crippling cases which required lengthy and meticulous care.[58] In South Africa recognition for this specialised discipline was slow. According to Dr P. Edelstein 'it took many years to break down the resistance of general surgeons who at that time included orthopaedic work in their activities'.[59] Reference to Dr E.A. Sthamer's role in reconstructive surgery was made at an earlier point.[60] Dommisse acknowledges Sthamer's pioneering work as the first orthopaedic consultant in the Transvaal until 1925, when Dr F.P. Fouché returned from overseas training. Prior to the Second World War, postgraduate training in orthopaedics was not available in South Africa. The pioneer orthopaedic surgeons such as Drs Pieter Moll, P. Roux, P. Edelstein, A. D. Polonsky, F.P. Fouché and G.T. du Toit studied further at Liverpool or Edinburgh Medical Schools.[61]

Surgeons developed a wide variety of procedures to correct or reduce the characteristic deformities of polio. The sheer variety of such deformities was a challenge to any surgeon's skill and ingenuity. Treatment needed to be highly individualised and although most operations were standardised, surgeons developed variations to adapt to the

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58 *Ibid.*, p. 116.

59 *Ibid.*, p. 12.

60 See Chapter Four.

61 *Ibid.*, p. 179. Before his appointment to the General Hospital, Fouché created the first orthopaedic unit at the Germiston General Hospital.

patient's needs. The development of deformities was caused by muscle imbalance, and each case needed to be carefully supervised during the growing years as that is when the deformities became severe if unattended.

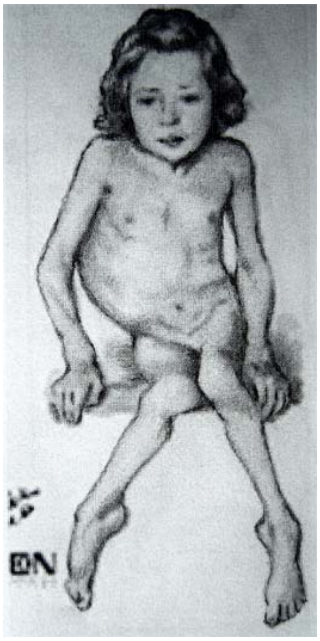
Illustration 5.5

Deformity of the leg

Overstretching of the knee has been caused by possible incorrect treatment during the illness and lack of support during rehabilitation. This child should have been fitted with a caliper to keep the knee in place and support the weakened muscles of her leg. The ankle joint and foot have also been affected.

Source:
http:www.dokter.ch/krankheten/kinderlaeh-mung.html, accessed 19 Nov. 2006.

Illustration 5.6



If polio weakened or destroyed the muscles of the torso, especially if one side was left stronger than the other, **scoliosis or spinal curvature** often developed. It could take the form of an 's' or bring the head or neck forward to the chest. Here the feet are in a typically dropped position, the hands and arms display contracture, the joints are swollen and stiff. The size of the upper body and lower body are disproportionate, the pelvis has subsided and the legs hang uselessly, contracted and atrophied (withered) from disuse.

Source: http://www.netterimages.com/image/2009.htm, accessed on 19 Nov. 2006.
D.J. Wilson, *Living with Polio: The Epidemic and its Survivors* (Chicago: University of Chicago, 2005), pp. 159-160

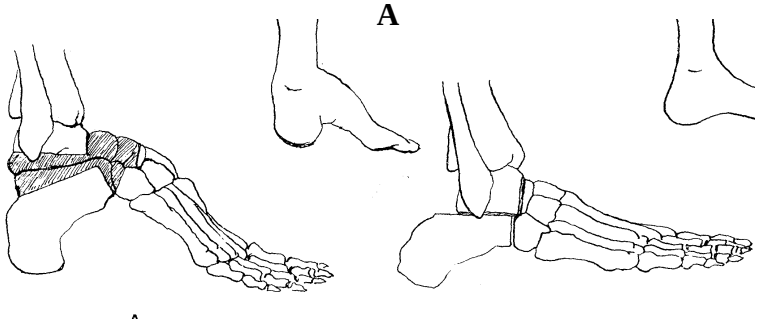
Illustration 5.7

Spinal surgery was a difficult, painful and drawn-out procedure. If the curvature of the spine, or scoliosis, was severe and left unattended, internal organs might become compressed and breathing impaired. Lengthy periods in a brace or plaster preceded the operation in order to stretch the spine and straighten it as much as possible before it was fused. The operation could be done through a hole cut in the back of the cast. The spine was fused with bone taken from the hip or leg. Later a 'Harrington rod' was developed which was inserted along the spine to keep it straight. This was followed by several months in a body cast to allow the spine to heal.

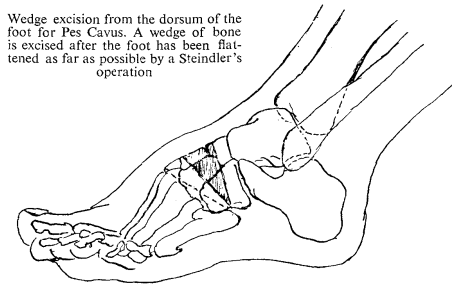
Source: *Ibid;* Wilson, *Living with Polio*, pp. 160.

Illustrations 5.8

A

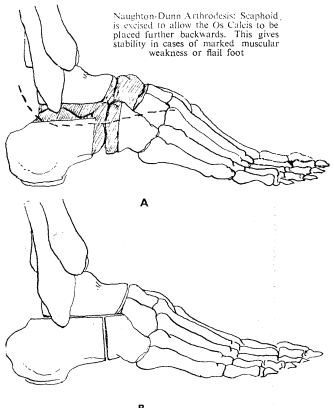


B



Wedge excision from the dorsum of the foot for Pes Cavus. A wedge of bone is excised after the foot has been flattened as far as possible by a Steindler's operation

C



Naughton-Dunn Arthrodesis: Scaphoid is excised to allow the Os Calcis to be placed further backwards. This gives stability in cases of marked muscular weakness or flail foot

Paralytic deformities of the feet

A.

The mid tarsal and joints are removed to make the foot more stable.

B

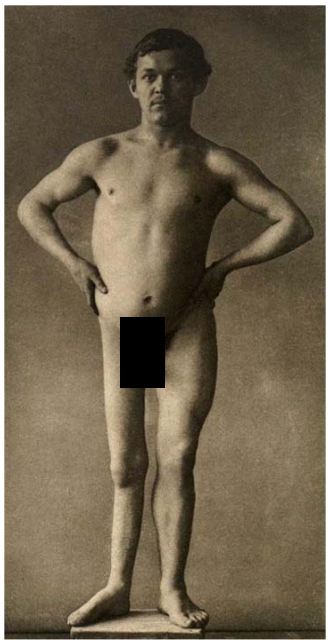
A wedge of bone is cut out to flatten the foot after a previous operation which detaches or splits ligaments and short muscles to enable the foot to be wrenched straight. The foot is then encased in plaster for six weeks before the wedge operation. If the patient is young it is usually sufficient to manipulate the foot flat by using 'a Thomas wrench' and encase in plaster. This might need to be repeated up to three times or more.

C

The heel bone is moved backwards and the bones of the foot are fused to ensure greater stability when muscles are too weak to assist with mobility. This is also referred to as 'flail' foot.

Source: H. Bell, 'Poliomyelitis Post-Paralytic Treatment-Orthopaedic Aspect', *SAMJ*, vol. 24 (20 May 1950), pp. 384-386.

Illustration 5.9



Atrophy and paresis (muscle weakness) of the right leg

The picture shows the high grade atrophy of the muscles and fatty tissue of the right leg. Polio has also affected growth in the leg which is now counter balanced by a subsiding pelvis and sloping shoulders. This picture, dating back to the 1920s was taken seven years after polio was contracted. The young man was able to walk and would have been able to compensate for the shorter right leg by having the sole of his boot built up. He did not use a cane or crutch at the time of the photograph.

Source:
http://www.artandmedicine.com/cursch1/plates/Plate26.html

Illustration 5.10

Atrophic paralysis of both legs

The back and abdominal muscles have been affected so that the man is unable to hold himself up unaided. His legs are paralysed and his knee cap tendons are permanently damaged; his left foot is more inverted than the right. Growth in both legs has been slowed by the disease, more so in the left leg which is shorter; both are atrophied. In contrast to his weak lower body is his powerful trunk and arms. The disease was contracted at the age of thirty. There are no details about surgical procedures but he would most likely be wheelchair bound or use crutches and calipers locked at the knee on both legs.

Source:
http://www.artandmedicine.com/cursch1/plates/Plate24.html

Most surgeries required the patient to be hospitalised and in plaster for weeks and, dependant on the procedure, manipulation of the limb could be repeated two or three times. That meant another six weeks in plaster for each manipulation. (The psychological aspect of polio treatment is covered in Chapter Seven). Then there was always the chance that the operation could fail. After years of pain, emotional stress and financial hardship, many polio survivors decided to live as best they could with their disabilities and steer clear of the operating room.[62]

This is the decision that Benny Michel made after more than 50 operations to his legs before the age of seventeen.[63] He had contracted polio when eleven weeks old in Lithuania in1923.The first operations had been performed in Germany when he was four and from 1929, over the next ten years, he endured further operations performed at the TMHC under Drs W.T. Ross, P. Edelstein and A.D. Polonsky. The first was to correct foot-drop. 'An incision was made from the outer side of the left knee down to the small toe, and by stretching the shortened tendon to its normal length again, corrected the ankle's function.'[64] Michel recalls the stench of ether and chloroform, the post-operative agony, months of boredom while immobilised in plaster of Paris castes which caused his

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62 D.J. Wilson, *Living with Polio: The Epidemic and its Survivors* (Chicago: University of Chicago, 2005), pp. 155-161.

63 B. Michel, *Footnotes to a Dream: Memories of a Musician's Journey through Adversity* (Johannesburg: Benny Michel, 2002), p. 14.

64 *Ibid.*, p. 29.

skin to itch and bleed.[65] School holidays were spent in hospital undergoing yet more procedures. When the last operation needed to be redone because the tendon had failed to grow properly, Michel had reached breaking point:

> I envied the dead and felt that death would spare me a tortuous path which would no doubt be life-long … It seemed as if I had always been on the outside looking in – and I could no longer maintain my docile attitude. I was sick and tired of the struggle of it all.[66]

Michel spent the rest of his life in calipers, on crutches and, later, in a wheelchair.

5.6 Angels of Salvation:[67] The Iron Lung

One of the most significant advances in the interwar years was the development of the iron lung. Doctors were desperate for some form of respiratory aid with cases where the virus had severely affected the breathing muscles. Usually in such cases, death occurred very quickly.

> With the onset of respiratory difficulty, it seems almost as if the children were suddenly awakened and made to realise the struggle

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65 *Ibid.*, p. 55.

66 *Ibid.*, pp. 106-107.

67 Wilson, *Living with Polio*, p. 44.

> before them. Little children seem to age in a few hours. One sees a heedless, careless, sleepy child become all at once wide-awake, high - strung, alert to the matter in hand, and this is breathing. The whole mind and body appear to be concentrated on respiration. Respiration becomes an active, voluntary process and every breath represents hard work … He is nervous, fearful and dreads being left alone. The mouth becomes filled with frothy saliva, which the child is unable to swallow so he collects it between his lips and waits for the nurse to wipe it away…

With a sense of foreboding, those attending the child awaited the end as the tell-tale signs appeared:

> There is a little bluish tingeing of the lips and tongue but much more distinctive is the pallor, which is sometimes striking. Sweating is profuse. Then, as respiration gets weaker, the mind becomes dull, and with the occasional return of a lucid interval, he gradually drifts into unconsciousness. An hour or later respiration ceases'.[68]

The iron lung worked on the principle of positive and negative pressure and would take over from the paralysed or weakened respiratory muscles of the patient to enable the process of breathing. The outward movement of the bellows reduced air pressure inside the tank; air pressure or atmospheric pressure outside was then higher than the pressure

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[68] T. Gould, *A Summer Plague: Polio and Its Survivors* (New Haven: Yale University Press, 1995), pp. 17-18.

around the patient's thorax and abdomen and air was forced into the lungs. When the bellows moved inwards the air pressure in the tank reverted to the atmospheric level, and the passive recoil of the patients' expanded thorax and lungs pushed air out. The pressure within the respirator could be controlled according to the patient's physiologic demands.[69] The lung allowed the injured or affected nerves supplying the breathing muscles an opportunity to recover. The patient could remain in the lung for days, even weeks; some were there for life.

Illustration 5.11

First iron lungs made by John Emerson, 1931

Source:http://americanhistory.si.edu/polio/howpolio/images/imgiron_001g.jpg, accessed 6 June 2005.

[69] T.M. Daniels and F.C. Robbins (eds), *Polio* (New York: University of Rochester Press, 1997), p. 104.

The name 'iron lung' was given to the first American respirator built by Dr P. Drinker in 1929 'with all its gruesome implications'.[70] Drinker had been moved by seeing young polio patients on the ward: 'He could not forget the small blue faces, the terrible gasping for air.'[71] It was recognised that certain patients should not be placed into an iron lung which worked best in cases of spinal polio that attacked the respiratory muscles and not bulbar polio. 'Bulbar polio that affected the cranial nerves of the throat also caused respiratory insufficiency by closing the airway' and in these cases the iron lung was ineffective.' Such patients were also at risk of pneumonia, choking on secretions and other complications; approximately 60 per cent died.[72] Patients who had both types of polio had a very poor prognosis. Nurses were alerted to other possible complications such as increased blood pressure, kidney and heart problems. 'Respirator wards were in many respects precursors of today's intensive care units.'[73] A tragic aspect of treating patients in an iron lung was the agonising decisions doctors needed to make when deciding who

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70 J.R. Paul, *A History of Poliomyelitis* (New Haven and London: Yale University Press, 1971), p. 327.

71 Gould, *Summer Plague*, p. 90.

72 Wilson, *Living with Polio*, p. 46.

73 Daniel and Robbins, *Polio*, p. 107.

would benefit most from the respirator.[74] During epidemics iron lungs were often in short supply and the patient thought to have the best chance of survival was placed in the lung. Part of the Nuffield gift referred to earlier was to supply basic wooden lungs to hospitals throughout the Commonwealth. Johannesburg General Hospital received four in readiness for the next outbreak. Nuffield felt very strongly that no child with any respiratory inadequacy should be compromised because of a hospital's inadequate funding.[75] In 1944, during the early stages of the next major epidemic, one of the Nuffield lungs was used in conjunction with another which had been hastily built.[76] The Nuffield lung was used as a prototype when South Africa began to manufacture its own lungs to keep pace with the demand imposed by the epidemic.

5.7 Sister Kenny and her Alternative Treatment

> She has knocked us so completely out of our complacent groove of thought.[77]

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74 Interview with Dr X, 22 Nov. 2002.

75 C.J. Rutty, '"Do Something! Do Anything!": Poliomyelitis in Canada, 1927-1962' (PhD thesis, University of Toronto, 1995), p. 117. The Nuffield lungs were made of 'five-ply wood', based on designs by an Australian inventor, E.T. Booth.

76 *The Star*, 14 Dec. 1944.

77 Paul, *History of Poliomyelitis*, p. 342.

> Sister Kenny, although generally regarded as a rebel against orthodoxy, has evolved a method of treatment in which all the useful elements are orthodox and all the useless (and even dangerous) elements are unorthodox.[78]

> Rarely are medical facts or opinions of any kind accepted unanimously; medical treatment for better or worse almost always differs widely with local judgment, custom, and competence.[79]

These three quotes give an idea of the controversial nature of Sister Kenny's form of treatment which appeared in the 1930s. She approached the South African Health Department in the hope that it would invest in her ideas but it was not easily won over. Sister Elizabeth Kenny, an unqualified nurse from Queensland, Australia, was regarded as a contentious figure during the polio years, from the late 1930s until her death in 1952. This notoriety appears to have strongly influenced the South African Health Department's decision whether or not to adopt her system of treatment in hospitals.

Kenny's step-by-step method of treatment is remembered best now, rather than her claims about the disease, which were generally regarded as unscientific and inaccurate. She maintained that the poliovirus attacked muscles first, and then the nerves

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78 SAB, GES, 2919 PI/20, memo from Secretary of Health to Minister of Health, 1948.

79 *Ibid.*, p. 215.

– not the nerve tissue alone as contemporary science stated.[80] Her treatment offered pain relief through the use of hot packs, while active and passive manipulation of the unused muscles promoted a quicker recovery. By involving the patients in her graded exercise programme, she felt they were psychologically boosted by being involved in their own recovery. She derided the standard treatment of bed rest and immobility; her programme played a major role in ending 'a century of the abuse of rest'.[81]

Warm baths, massage, passive stretching and exercise had been used as early as 1884 in the treatment of polio, and hot packs in various forms had been a standard remedy for many years.[82] Orthodox medicine came to believe that the muscles affected by polio were very frail, hence the immobilisation of the patient in plaster, braces or stretched out on a frame to prevent deformity. Kenny challenged this view by arguing that deformities were the result of persistent muscle shortening, due to muscle spasm. Children would therefore assume unnatural positions because of the intense pain, and this caused contracture and shortening in the limbs which could become permanent.[83] Relief from pain through heat lessened such contracture, and so reduced deformities such as curved

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80 V. Cohn, *Sister Kenny: The Woman who Challenged the Doctors* (Minneapolis: University of Minnesota, 1976), p. 211.

81 *Ibid.*, p. 257.

82 Ross, 'Poliomyelitis in New Zealand', p. 55.

83 SAB, GES 533 67/2/12, Dr W.R. Forster and Dr E.E. Price: Report on an investigation of 23 cases of poliomyelitis treated by the Kenny Method, Children's Hospital, Hampton.

spines, sway backs, twisted feet and arms. Kenny believed that the hot packs also kept the skin and tissues healthy.[84] The controversial hot packs were often a source of dread to some patients. The strips of wool used in the treatment were carried in a tank of boiling water on castors.

Illustration 5.12

Sister Kenny demonstrating how to apply her 'hot pack'

Source:http://americanhistory.si.edu/polio/howpolio/medworld2.htm, accessed 6 June 2005.

'As it arrived on the ward you heard the squeaking wheels … you started to cry way before it was your turn … even the little baby next to me started to cry and it was terrible lying next door listening to the sobs as the treatment proceeded.'

Source: Interview with Patsy, 15 Aug. 2003.

> To this day I can remember the smell of a hot pack. The other memory I have is of the scalding hot nature of them when they went on, the

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[84] Cohn, *Sister Kenny*, p. 253.

> relatively short period of time when they were warm and comfortable and the inordinately long period of time when they were like having a wet nappy on … When these hot packs were taken off and replaced, you were treated with methylated spirits and powder to prevent bed- sores.[85]

Kenny made the most of the muscles that were left intact, which would ultimately lead to muscle function and coordination. She treated painful limbs as soon as possible, even during the acute stage of the disease, stroking and manipulating the muscles in spasm, cajoling the patient to concentrate and relax and push past the pain. By working on one muscle at a time she would re-educate it back to life.

Illustration 5.13

Sister Kenny demonstrating her method of muscle re-education
Source: T. Gould, *A Summer Plague* (New Haven and London: Yale University Press, 1995), photograph section.

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[85] Gould, *Summer Plague*, p. 239.

> Sister Kenny looked me right in the eye and said, 'I am here to try to help you. But, before I can help you, I have got to hurt you'. I had no idea how painful the treatment could be, I'd fight to control myself but inevitably I'd end up screaming … She would actually pull up the pectoral muscles, getting her thumb underneath and tormenting and pulling, stretching them into their limit and then beyond. I knew it was for my own good but I dreaded each visit … And oddly enough, as much as it hurt during the treatment, afterward I seemed better.[86]

Kenny believed muscle fibres did not die immediately 'like cut flowers', but could be kept alive while nature repaired usable nerve connections and branching fibres.[87] The longer the patient did not walk, the more the brain forgot how to walk. Deformities thought to have been caused by the pull of the normal muscle against the paralysed muscle, she believed, could be caused by the unrelenting pull of the over-toned muscle against another not affected by the disease.[88] Each patient had an individual exercise regime and treatment was carried on as long as necessary – no-one was considered incurable.[89]

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[86] Downloaded from the Smithsonian exhibition on polio: http://americanhistory.si.edu/polio/howpolio/medworld2.htm, accessed 6 June 2005.

[87] Cohn, *Sister Kenny*, p. 213.

[88] Gould, *A Summer Disease*, p. 101.

[89] Ross, 'Poliomyelitis in New Zealand', p. 60.

Kenny hated the thought of leaving a child immobile and lashed out at 'the archaic torture devices' such as splints and braces which she called 'medieval contraptions of leather and steel'; iron lungs were 'torture chambers',[90] which according to her, impeded natural recovery and created dependency.[91] Her anti-doctor rhetoric alienated her and her treatment from many in the medical world during the war period, especially when she indirectly likened doctors to the enemy:

> Anyone who stands between the child and his chance of a happy earthly existence is guilty of as great a crime as the torturers of the prison camps.[92]

However, her 'bull dog courage'[93] and apparent success gained the attention of the public in the USA, who, for a time, regarded her with awe. Known as 'the Messiah for polio victims', she reveled in her celebrity status.[94] Doctors regarded her as an imposter who dared speak out against their position of authority, even if limited as far as polio was concerned. Medical science preferred to rely wholly on pathological observation of damage; in the case of polio, complete or incomplete damage to the anterior horn cells.

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90 Cohn, *Sister Kenny*, p. 186.

91 *Ibid.*, p. 92.

92 Cohn, *Sister Kenny*, p. 214.

93 *Ibid.*, p. 213.

94 Ross, 'Poliomyelitis in New Zealand', p. 61.

Kenny used her skills of observation: 'Just by watching a child breathe she could tell how much involvement there was in the chest wall, diaphragm, neck and throat'.[95]

She resented all criticism and did not understand the innate conservatism of conventional medicine. This is evident in her correspondence with the South African Health Department referred to earlier. Kenny envisioned operating clinics in as many countries as possible throughout the world, and was keen to share any reports on her work with the relevant health departments. Her motto was: 'Let my record speak.'[96] She began correspondence with the Secretary of Health in South Africa as early as 1936, by forwarding a report to him. Authenticated by the Brisbane Under Secretary for Health, E.E. Chuter (who added a character reference), the report included information from Drs Dungan, Guinane and F.F. Pincus, all supporters of her method. Dr Dungan lauded her treatment as revolutionary, claiming that 'splinting and consequent operations had been placed in a wrong perspective'. He was sure Kenny's method would reduce the number of cripples. He argued that the placing of patients in plaster and splints resulted in painful joints, whereas frequent movement of weakened muscles and improved nutrition to all parts prevented stiffness of joints.[97] Dr Pincus felt that the most striking feature of the

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95 Cohn, *Sister Kenny*, p. 200.

96 Paul, *History of Poliomyelitis*, p. 341.

97 SAB, GES, 533 2/12/ A, Dr Guinane's Report on Sister Kenny, 14 July 1936.

treatment was the change it had on the psychological condition of the child: 'A whining little idiot was converted in a few months into a bright and cheerful child'.[98]

Kenny also corresponded with business men in Johannesburg. K.S. Hall (of R.V. Cullinan & K.S. Hall) began to write to her in 1935. Both Hall and Lord Albu, the mining magnate, were interested in the case of a wheelchair-bound, Johannesburg man, 53-year old Captain Jones, who worked for the municipality and who had contracted polio in 1927. He had been pronounced 'definitely incurable by three local doctors'. A small committee had sent him to Australia in 1936 to be treated by Sister Kenny: 'He is now able to move around with the help of sticks and is returning in six to eight months.'[99] Due to this success, both men were interested in having a Kenny clinic in South Africa. Hall had passed his correspondence with Sister Kenny onto Sir Edward Thornton, the Secretary for Public Health, who requested that a sub-committee of the Medical Association of South Africa (MASA) investigate her work.[100] In Hall's letter, Sister Kenny had set out certain conditions to be followed by the South African government, should the clinic go ahead. These included, among others: an invitation from the government or Committee inviting her to open the clinic; payment of all costs incurred;

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98 SAB, GES, 533 2/12/A, Report from Dept. of Health, Brisbane to South Africa, 14 July 1936.

99 SAB, GES, 533 51/2/12, letter to Sir Edward Thornton (Secretary for Public Health) by George W. Albu, 12 Mar. 1937.

100 SAB, GES, 533 57/2/12A, memo from Committee of Medical Association to Thornton, 10 July 1937.

the appointment of two Kenny nurses, with salary; the appointment of a doctor who she would train. 'Dr Harrington of Harley Street, London is intensely interested … and is willing to accept the post', she added.

> You need to finalise this as soon as possible, because [when once all is recognised by London], 'all other countries will follow suit and my time will be very much occupied.[101]

Thornton reacted negatively to what he must have thought were rather high-handed requests from a mere nurse. 'It would be extremely unlikely that the Government or Provincial Administration would be willing to import medical men or other staff for the purpose of starting a clinic here'.[102]

Meanwhile, Thornton's sub-committee studied Kenny's book, 'Infantile Paralysis and Cerebral Diplegia'. 'To our mind the most important portion' was the foreword, written by an eminent anatomist, Professor H.J. Wilkinson. 'Sister Kenny's work on Infantile Paralysis seems to have a scientific basis if Professor Wilkinson's ideas are correct', but the committee was concerned that there was insufficient scientific proof that the cases studied were indeed polio cases. It added that most cases, 'without treatment,

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101 SAB, GES, 533 61/2/12A, 11 Aug. 1937, letter to Mr. K. S. Hall from Kenny which was forwarded to the Secretary for Public Health.

102 SAB, GES, 533 57/2/12A, correspondence between the Committee of the Medical Association and Thornton, 10 July 1937.

undergo spontaneous cure'.[103] During the sub-committee's investigation, Thornton also consulted Colonel P.G. Stock of the Ministry of Health, Whitehall, in connection with a test programme started at the Queen Mary's Orthopaedic Hospital, Carshalton, under the supervision of 'an expert committee of medical men' who would observe Kenny over a period of three months and attempt to substantiate her method scientifically.[104] Kenny was so confident that she would pass with flying colours that she informed the Health Department:

> If the medical men of Johannesburg are interested it would be wise for them to wait for this verdict. As a matter of fact I do not see my way clear to further this work to any country until this [report] is available as an honorable test of the methods, under the best supervision available, I should say, in any part of the world, is in progress now … It is my intention to take this [report]as final.[105]

Unfortunately for Kenny, her 'record' did not speak for itself. The three-month experimental period to observe Kenny's system was regarded as insufficient time to be able to arrive at 'definite conclusions', although a doctor known to the Ministry was

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103 SAB, GES, 533 61/2/12A, letter from Medical Association of South Africa (MASA) to the Secretary for Public Health, 9 Sep. 1937.

104 SAB, GES, 533 61/2/12A, letter to Colonel. P.G. Stock from Lord Thornton, 14 Sep. 1937.

105 SAB, GES, 533 61/2/12A, 11 Aug. 1937, letter to Mr. K.S. Hall from Kenny, which was forwarded to the Secretary for Public Health.

'absolutely convinced of her disinterestedness and her complete lack of desire for either money or fame'.[106]

It was not, however, in Kenny's nature to give up, nor did she stick to her word that she would accept the report as final. In a letter to the 'Director of Health' – she must have meant the Secretary of Public Health, now Dr E. Cluver – she referred to a recent visit to Cape Town in September 1938, during which she received an undertaking from Cluver.[107] According to her, he had agreed to the possibility of a Kenny clinic if she could supply 'an official statement … from an Australian medical man'. She later produced a report from Drs W.R. Forster and E.E. Price, who had been involved with an investigation of 23 cases under Kenny's supervision. These doctors concluded that 'after a very few trials' it had been felt that one or two of her ideas were good and one or two definitely harmful.[108] Accompanying the report were Kenny's own comments, correcting or adding to points she felt the doctors had missed. The integrity of the report was jeopardised by Kenny's meddling, and South African medical authorities took due note.

During the 1944-1945 epidemic, Dr Allan dismissed the Kenny method based on both the Carshalton report and a later investigation carried out by the American Medical

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106 SAB, GES, 533 2/12A, letter to Sir Edward Thornton from Colonel P.G. Stock, Ministry of Health, Whitehall, 24 Sep. 1937.

107 SAB, GES, 533 67/2/12/A, letter to 'Director of Health', from Kenny, 28 Feb. 1939.

108 SAB, GES, 533 67/2/12A, Report on an investigation of 23 cases of poliomyelitis treated by the "Kenny System" at the Children's Hospital, Convalescent Branch, Hampton.

Association. 'Using hot packs for all patients with the minimal evidence of "spasm" is of questionable value and a waste of manpower and hospital beds.'[109] Individual doctors in South Africa would most likely have advised the use of hot packs, but it did not become hospital policy. Radiant energy from light bulbs inside a wire cage continued to be used at the Fever Hospital.[110]

But the Kenny method was not just about hot packs. The psychological value of the idea of being healed was irresistible. With the Hampton report, Kenny included a letter she had received from two Southern Rhodesian women, aged 17 and 23, 'one letter of many' which, she claimed she often received from the Union. 'We have been in hospital for two years … but for all this we are not better and not likely to get better.' One woman revealed how she slid along the floor when doing housework. 'I found this was bad for me.' She then described an operation on her heel which had evidently failed. 'We know that you will make us better there is no doubt about it, others have been cured and so shall we too!' The women went on to ask about accommodation: 'For whatever happens we are coming, we both know you will cure us, we are determined and all our faith is with you in Australia.'[111]

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109 SAB, GES, 2919 P1/20, memorandum to the Minister of Health from the Secretary of Health, 1948.

110 Interview with A. Cameron, 2 Aug. 2003.

111 SAB, GES, 533 67/2/12/A, letter to Kenny, 27 Jan. 1939.

In contrast to the carefully deliberated medical approach to Kenny, the utter faith and child-like confidence revealed by this letter partly explains why Kenny fought as hard as she did to spread her help to others. Such blind faith must have inspired her to stand firm in her belief that she was a healer, when some doctors attempted to discredit her, 'it would seem out of professional jealousy'.[112]

Letters from the Johannesburg public highlight alternative points on the Kenny debate. 'Her treatment should be available at each hospital and added to the curriculum at every medical school', declared one.[113] Another accused the medical profession of being antagonistic towards Sister Kenny's treatment: 'Had the same medical treatment been referred by a medical practitioner all would be well.' The writer believed that a full description of the treatment for the benefit of the public was necessary to show up the 'hidebound convention' practiced by the medical profession.[114]

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112 Paul, *History of Poliomyelitis*, p. 340.

113 *The Star*, 9 Dec. 1944.

114 *The Star*, 6 Jan. 1945.

Illustration 5.14

'Don't close that door!'
Source: Gould, *A Summer Plague*, photograph section.

By 1948, although Kenny remained popular with the public, she was dismissed as 'no longer topical … We have dropped this topic … public interest having died down'.[115] Ross, however, argues that the radical changes in the management of paralysed patients and the increasing use of physiotherapy techniques were the result of a high level of acceptance of Sister Kenney's methods. 'Sister Kenny offered more than treatment: she

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115 SAB, GES, 2919 P/120, memorandum to Minister of Health from the Secretary of Health, Dr P. Allen.

offered hope, she offered results and she broke the log jam of medical control'.[116] She gave hope to patients and their families by taking a positive approach to treatment that might help, rather than highlighting the incurable aspects of polio as doctors were inclined to do. She spoke up for suffering children, a cause the press supported: 'They [Kenny and her staff] have weakened the wizard of his power to twist and torture bodies into gross caricature', one columnist wrote.[117]

It seems, however, that South African doctors preferred to stay in control and dictate what they considered best for the polio patient in South Africa. Such control, however, was squarely based on other countries' experiences of the disease. Because South Africa had had no direct experience of polio epidemics since 1918, which would have promoted its own strategies, it was ill-prepared for the reality of the next polio tragedy which was about to strike the country in 1944.

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116 Ross, 'Poliomyelitis in New Zealand', p. 102.

117 *Ibid*, p. 164.

Chapter Six

The 1944-1945 Poliomyelitis Epidemic in Johannesburg

6.1 Outline of the Epidemic and Statistics

The first extensive epidemic in Johannesburg after 1918 did not occur until the later months of 1944, during the Second World War. The infection started in Durban in mid September, and by 11 October there were seventeen notifications of polio.[1] The disease reached Pietermaritzburg by 17 October.[2] Within eleven days, five cases were confirmed in Zwartruggens, approximately 160 kilometres west of Pretoria.[3] By the end of October, polio was raging in Johannesburg and had claimed its first life. Health officials speculated that the virus had been imported from Durban by returning holidaymakers, but initially were not unduly concerned.[4] Durban officials, however, viewed the increase in polio cases very seriously: 'We are approaching the proportions of the severe 1916 epidemic in New York State', Dr G.H. Gunn, the MOH for Durban warned, adding that the steps 'contrived to control the infection'

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1 *Rand Daily Mail*, 11 Oct. 1944.

2 *The Star*, 19 Oct. 1944.

3 *Rand Daily Mail*, 28 Oct. 1944.

4 *The Star*, 31 Oct. 1944.

were not proving successful.[5] By November the number of polio cases had escalated throughout the Union. Finally, in mid November, a localised polio outbreak in the eastern Cape town of Cradock unnerved authorities when it became necessary to send a special ambulance train to the small town to transport patients back to an emergency isolation hospital in Cape Town 'for manipulative treatment'.[6] The outbreak was described as 'explosive', with 27 known cases.[7] Meanwhile, in Johannesburg, the number of cases had risen to 48 for November, 73 for December and 23 in January, 1945. Johannesburg schools were confident to reopen reassured by a School Board official that 'there was no danger of the disease spreading when classes resumed'.[8] February recorded 32 cases,[9] but as the weather cooled numbers tapered off. The disease had peaked in December, at the height of summer. It severely affected Johannesburg, as well as the eastern Witwatersrand and Pretoria.[10] (See Map 1.) The

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5 *Daily News*, 6 Nov. 1944.

6 ARMOH, Year ended 30 Jun. 1945. p. 18; *The Star*, 18 Nov. 1944; *Rand Daily Mail*, 18 Nov. 1944.; SAB, GES, 533 2/12 B, directive from Dr P Allan to the Provincial Secretary, Cape Town, 24 Jan. 1945; *Cape Argus*, 24 Nov.1944.

7 ARMOH, year ended 30 June1945, p.13.

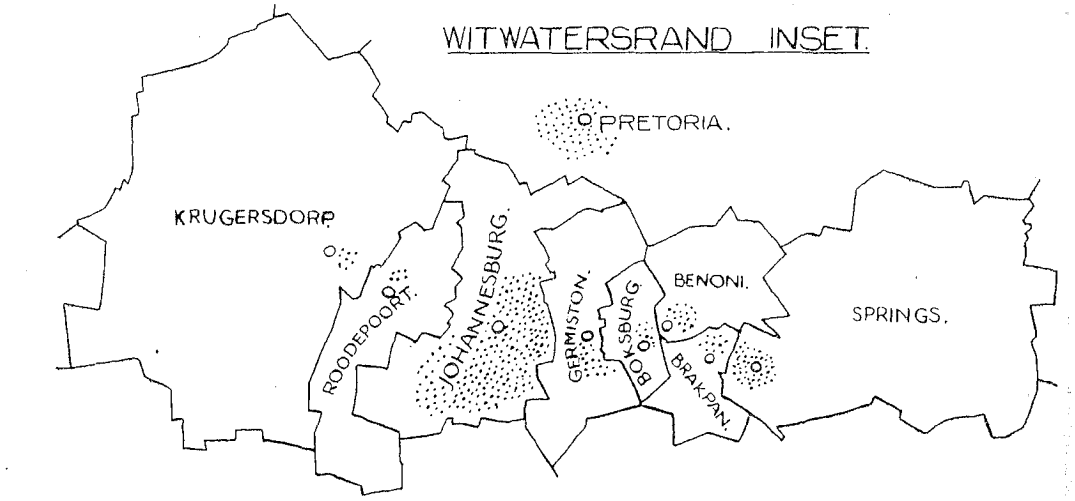
8 *Rand Daily Mail*, 15 Jan. 1945.

9 *The Star*, 6 Feb. 1945.

10 ARMOH, Year ended 30 Jun. 1945, p. 13. Pretoria had 24 cases by mid December.

final official count for Johannesburg was 174 cases among whites. One hundred of them recovered completely, while 48 were left with residuals of the disease.[11]

Map 6.1



Distribution of poliomyelitis in the Witwatersrand and Pretoria, 1944-1945

Each dot represents one case.

Source: ARDOH, 1944-1945, p. 17.

There is no available breakdown of recovery figures for the other population groups in Johannesburg. However, Figure 6.1 gives an idea of the distribution of polio in Johannesburg for 1944-1945. The total number of polio cases for all population

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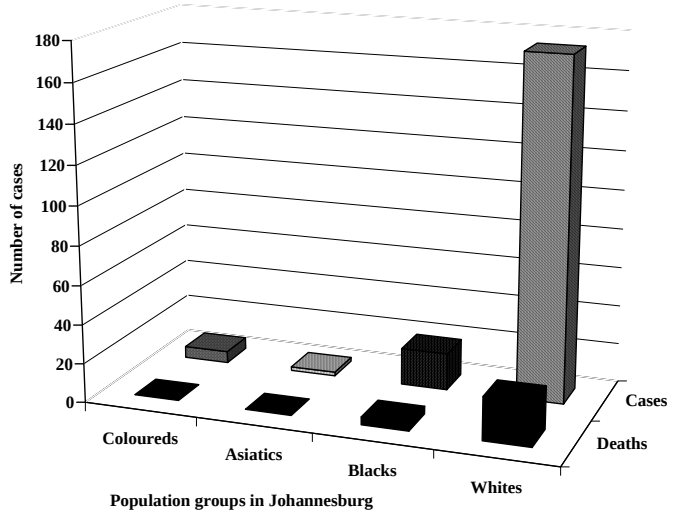
11 SAB, GES, 536 578/2/12F, memorandum by Dr J.W. Scott Millar, Acting MOH, Public Health Department, Johannesburg, 2 July 1948; Dr J.W. Scott Millar, 'Poliomyelitis in Johannesburg', *Public Health*, vol. 13 (May 1949), pp. 143-148. There were two cases unaccounted for.

groups in Johannesburg was 201; there were 26 deaths (22 white and 4 black), but no deaths according to records occurred in among either Indians or Coloureds.

Figure 6.1



	Coloureds	Asiatics	Blacks	Whites
Deaths	0	0	4	22
Cases	6	2	19	174

Distribution of poliomyelitis in Johannesburg, 1944-1945

Source: Dr J.W. Scott Millar, 'Poliomyelitis in Johannesburg', *Public Health*, vol. 13 (May 1949), p. 143.

All figures should be viewed with some scepticism, as any study of the epidemiology of polio is riddled with 'the usual statistical errors, due to such factors as slackness in notification or incorrect diagnosis, which are unavoidable'.[12] There are far greater margins of error in the recordings of polio, compared with other infectious diseases, because so many cases are non-paralytic and are therefore less likely to be

12 Dr H. Nelson, 'Poliomyelitis: Epidemiology and Preventive Measures', *Public Health*, vol. 13 (May 1949), p. 133.

recognised.[13] As mentioned earlier, the signs and symptoms of non-paralytic polio may be very vague and in some cases almost completely absent, and can easily be mistaken for another illness or missed completely. The ratio of clinical cases, or paralytic cases and silent infections, can be as high as 1:1 000 during an epidemic.[14] It is safe to assume that the true incidences of polio cases during an epidemic are generally much higher than the recorded figures. Dr J.H.S. Gear, the renowned South African virologist, considered that the 1944-1945 epidemic 'involved the whole country, affecting every city, town and village'.[15]

It is important to note that the statistics for the 1944-45 polio epidemic were regarded as provisional until 1949, and no Medical Officer of Health (MOH) annual reports are available from 1941 until 1949.[16] As numbers were changing during the epidemic, it would seem that corrections to already-submitted statistics were not

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13 Here non- paralytic cases refer to inapparent and abortive cases.

14 R. Debré, et al., *Poliomyelitis*, WHO Monograph Series, no. 26 (Geneva: World Health Organization, 1955), p. 15.

15 J.H.S. Gear, *The History of the Poliomyelitis Research Foundation* (Johannesburg: Poliomyelitis Research Foundation, 1996), p. 6.

16 These documents could not be found at the Central Archives Depot in Pretoria, the Pretoria National Library or at the Johannesburg Local Government Library, where the file boxes were clearly marked: 'MOH Annual Reports for Johannesburg from 1941-1948 not issued and not attached to the Mayor's Minutes.' The MOH reports resume in 1949.

carried out.[17] Mr H.G. Lawrence, the Minister of Welfare and Demobilisation, however, assured the House of Assembly that 'careful records of the incidence of infantile paralysis had been kept by the Department of Public Health since 1920'.[18]

The need for close analysis and comparison of polio figures is emphasised in the following graphs. According to Figure 6.2, the Transvaal had the highest number of polio cases, yet, when this information is translated into the incidence per 100 000 of population, it is clear that the Orange Free State was 'the province hardest hit' by the 1944-1945 epidemic, with an incidence rate of 17.82;[19] the Cape Province had the lowest at 10.07; the rate for the Union was 12.47.[20] (See Figure 6.3.) For Natal and the Transvaal, the main incidence of polio occurred in November and December and by February the epidemic was beginning to wane. The Orange Free State, however, had a

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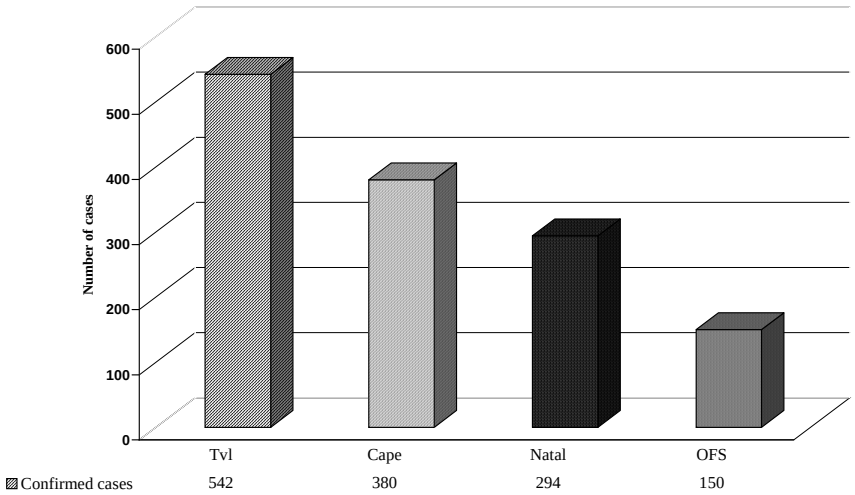
17 SAB, GES, 536 578/2/12F, minutes of meeting of Polio Action Committee, Johannesburg, 2 July 1948.

18 SAB, GES, 533 190/2/12B, question XLIX, asked by Mr Tighy of the Minister of Welfare and Demobilisation, House of Assembly, 30 Jan. 1944. The problem could be one of processing backlogs at the archives in Pretoria, where personnel admitted that there was a great deal to sort regarding public health in Johannesburg.

19 ARDOH, year ending 30 June 1945, p. 14.

20 *Official Year Book of the Union and Basutoland, Bechuanaland Protectorate and Swaziland*, no. 28, 1948 (Pretoria: The State Printer, 1949), p. 1097. The incidence rate per 100 000 in Johannesburg, was 0.06 and 0.007 for blacks. In the 1946 census, on which these figures are based, the white population stood at 332 026 and black population 433 431. The Transkei, with a population of over one million, only had seven cases. I have not included these in the Cape's statistics.

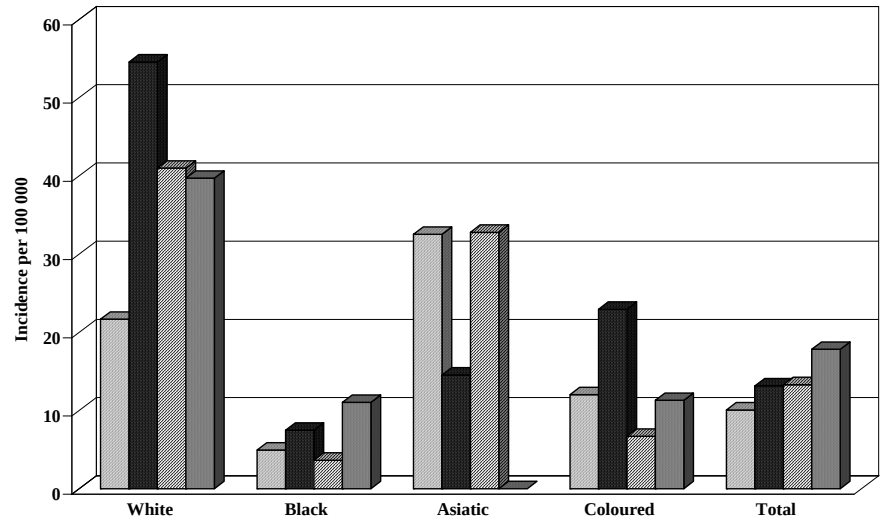
Figure 6.2



Distribution of poliomyelitis in the Union of South Africa, 1944-1945

Source: ARDOH, 1944-1945, p. 14.

Figure 6.3

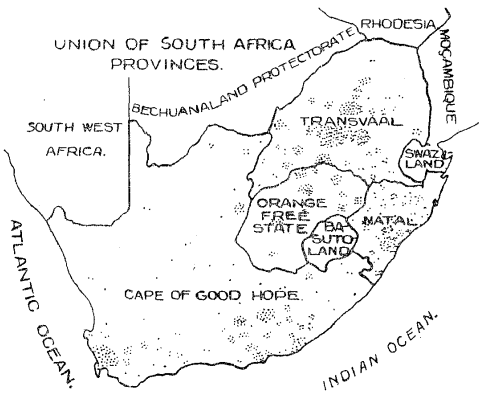


Incidence rate per 100 00 of population of poliomyelitis in the Union of South Africa, 1944-1945

Source: ARDOH, 1944-1945, p. 15**.**

resurgence of the disease in February, and cases continued until April. The Cape's peak month was in January with a total of 71 cases. Even after the epidemic was considered over by May, isolated incidences of polio continued in the various provinces throughout the Union. Isolated cases in Johannesburg also continued; Gear was able to investigate a polio outbreak as late as November, 1945.[21]

Map 6.2



Distribution of poliomyelitis in Union of South Africa, 1944-1945

Each dot represents one case.

Source: ARDOH, 1944-1945, p. 16.

It was noted, with increasing concern, that polio was affecting juveniles and young adults at a higher rate than ever before. These patients were usually severely

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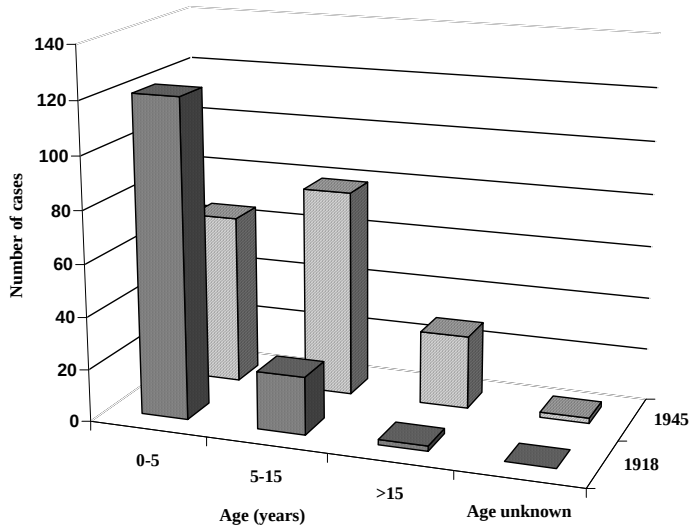
21 J.H.S. Gear and B. Mundel, 'Studies in Poliomyelitis: The Study of an Outbreak of Poliomyelitis Occurring in a Suburb of Johannesburg', *SAMJ*, vol. 20 (9 Mar. 1946), p. 110.

affected by the disease, but this age pattern also confirmed that polio had crossed over from its endemic state into its frightening epidemic form, where it could remain and reappear for years to come. Although the1918 figures represent only part of the epidemic – from February until May – the incidence rate in the 5-15-year age group and older had more than trebled by 1944-1945, while throughout the Union, 49 per cent of the total number of reported cases (1 380) still occurred in the under five group; 23 per cent in children between the ages of five and under ten; and 17 per cent in the ten to 19 age group (see Figure 6.5).

Figure 6.4

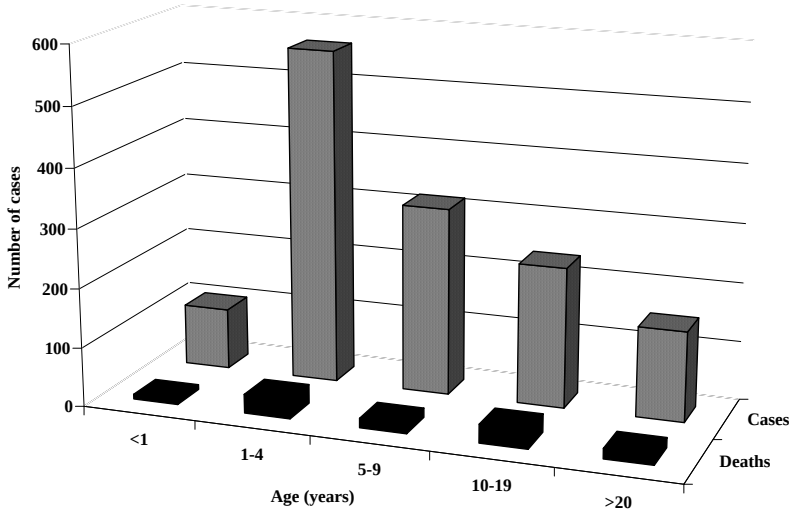


	0-5	5-15	>15	Age unknown
1918	121	22	2	0
1945	65	79	28	2

Age incidence of poliomyelitis in Johannesburg, 1918 and 1944-1945

Source: Scott Millar, 'Poliomyelitis in Johannesburg', pp. 144-145.

Figure 6.5



	<1	1-4	5-9	10-19	>20
Deaths	8	32	16	31	17
Cases	104	565	317	237	152

Distribution of age incidence and deaths of poliomyelitis in the Union of South Africa, 1944-1945

Source: ARMOH, 1944-1945, p. 15

The over twenty age group in the Union was at 11 per cent, which was on a par with numbers in that age group in other countries.[22] Figure 6.6 gives a more detailed age distribution of the disease in the Johannesburg community. (See Table 6.1 for the relevant numbers for Figure 6.6.)

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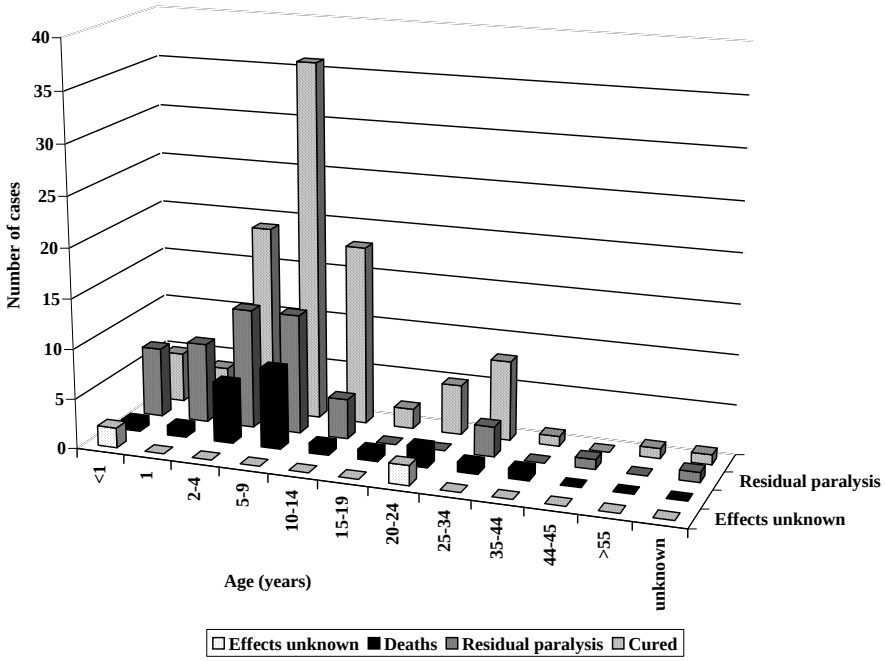
22 ARDOH, year ending 30 June 1945, p. 14; J.C. Ross, 'A History of Poliomyelitis in New Zealand' (MA thesis, University of Canterbury, 1993). In 1937 the over twenty group in New Zealand was ten per cent of its total incidence.

Figure 6.6



Detailed incidence of poliomyelitis cases in Johannesburg, 1944-1945

Source: Scott Millar, 'Poliomyelitis in Johannesburg', p. 148.

Table 6.1

Age in years	<1	1	2-4	5-9	10-14	15-19	20-24	25-34	35-44	55-54	>55
Deaths	**1**	**1**	**6**	**8**	**1**	**1**	**2**	**1**	**1**	**0**	**0**
Residual paralysis	**7**	**8**	**12**	**12**	**4**	**0**	**0**	**3**	**0**	**1**	**0**
Cured	**5**	**4**	**19**	**36**	**18**	**2**	**5**	**8**	**1**	**0**	**1**

Incidence of poliomyelitis in Johannesburg, 1944-1945

Source: Scott Millar, 'Poliomyelitis in Johannesburg', p. 145.

In Johannesburg, whites dominated the 10-14 age group, unlike the rest of the Union. The percentage for the twenty-and-over age group also exceeded the Union figures by more than five per cent. A possible explanation for this difference could be that, as the major epicenter of the epidemic, Johannesburg was hardest hit. It was affected earlier in the epidemic than most places, for many Union towns experienced outbreaks only in 1945. It has also been observed that as an epidemic proceeds, cases do become milder.

A number of soldiers and nurses infected with polio, including several Canadian nursing sisters who had come to South Africa to help in the care of the soldiers, were admitted to the military hospitals, and one of them died of respiratory paralysis in Robert's Heights Hospital, Pretoria.[23] Polio within the ranks had concerned the military; in the Middle East, lives had been lost to polio, and an outbreak on the domestic front was not a good sign. Gear, as head of the Medical Laboratory Service of the South African Medical Corps (SAMC),[24] recalls that this outbreak influenced his decision to become involved in polio research.[25] He had established a Poliomyelitis Research Unit within the SAMC, and after the war this

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23 Gear, *Poliomyelitis Research Foundation*, p. 16.

24 J.H.S. Gear and R.M. Yeo, 'The Medical Laboratory Service of the South African Medical Corps', *SAMJ* (26 Jul. 1947), pp. 527-534; M. Marais, *In Quest of Health: The South African Institute for Medical Research 1912-1973* (Johannesburg: Lowry Publishers, 1988), p. 224.

25 Gear, *Poliomyelitis Research Foundation*, p.16.

research was continued at the SAIMR in the Virus and Rickettsial Research Unit, in collaboration with the City Health Departments of Johannesburg and Germiston. The Johannesburg Fever Hospital's staff was also closely involved.[26]

Illustration 6.1

Major J.H.S. Gear, with members of his unit, next to the SAMC Field Laboratory truck, outside SAIMR

Source: Personal photograph

6.2 Local Authorities React to the Epidemic

As polio first erupted in Durban, Dr Gunn, the MOH, assumed responsibility for his area, but expressed his reservations about the Health Department's advisory role during epidemics, first set out in the 1919 Health Act. This policy of limited responsibility placed a heavy burden on the Union municipalities, which Gunn was experiencing first-hand as polio cases increased. 'We have pointed out before that, in

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[26] Marais, *In Quest of Health*, p. 224.

all these diseases Durban fights in vain, so long as it is left to fight alone … this most terrifying of all infectious diseases.'[27] The major problem was that local authorities were powerless to prevent carriers transmitting the disease from moving in and out of other provinces. The fact that the epidemic took place during war-time conditions is most significant. A national quarantine policy, backed by the Department of Health, would have proved ineffectual and costly, especially in terms of personnel, which was already stretched by war-time demands. Border closures were difficult to maintain, as experienced during the 1916 epidemic in the USA. Moçambique's 1918 closure of its borders had caused delays and inconvenience to both countries. Gunn was well aware of the problems:

> Conditions favourable to occurrence and reoccurrence of epidemic poliomyelitis now exist in Durban and these conditions relate to the accumulation of war-time stresses and strains on the community as a whole.

The population had increased over the last five years due to trade, industry and traffic, 'both human and material. The town is overcrowded.'[28] Having had time to access different polio policies from abroad, the Department of Health demanded weekly notifications from local authorities. This was a time-consuming operation; responsibility already rested heavily on the shoulders of the local authorities which were in the unenviable position of watching the onslaught of a disease for which

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27 *Daily News*, 6 Nov. 1944.

28 SAB, GES, 533 2/12/B, memorandum to Durban's Town Clerk regarding the outbreak of poliomyelitis' control programme from Dr G.H. Gunn.

'there was no clear cause of infection, no universally adopted method of treatment, no adequate means of control and which caused dread and panic in the general public'.[29]

6.3 Misleading Directives: The Course of the 1944-45 Epidemic in Johannesburg

At first, it seemed that the increased incidence of polio cases was almost ignored. Newspaper reports on the appearance of 'infantile paralysis' were appended to information on the smallpox epidemic, which was more the editor's decision but nevertheless indicative of general lack of concern.[30] At the end of October, Dr J.W. Scott-Millar, the deputy MOH, reassured readers that, although the incidence of the disease was higher than usual, 'Public Health Officials were watching all suspected cases of infantile paralysis very closely'. Contacts were being placed under quarantine and, thus far, there was no question of an epidemic.[31] Within days, however, the civilians in Johannesburg had been bombarded with information about the increasing threat of smallpox, of typhoid cases in Durban, and an allegation that six dogs had developed paralysis after eating whale meat in Durban.[32] Umtata was stricken with pneumonic and bubonic plague, and a child had died from infantile paralysis in the

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29 Ross, 'Poliomyelitis in New Zealand', p. 60.

30 *Rand Daily Mail*, 11 Oct. 1944.

31 *Rand Daily Mail*, 1 Nov.1944.

32 *The Star*, 1 Nov. 1944.

Johannesburg suburb of Linden.[33] It is not surprising that a public meeting was called for the following week, to discuss 'the Union's health situation', posing the question: 'Are South Africans a sickly people, or is the spread of disease due to inadequate health services?'

Illustration 6.2

Dr G.D. Laing, Medical Officer of Health for Johannesburg

Source: J.R. Shorten, *The Johannesburg Saga* (Cape Town: Cape and Transvaal Printers, 1970), p. 393.

Dr G.D. Laing, MOH for Johannesburg, felt that public anxiety was getting out of hand. He chose to defuse what he saw as 'undue alarm', by withholding any figures in the next weekly report and by assuring readers that cases were only slightly above average. He pointed out that this number (purposely not disclosed), had been equaled in June 1941: in fact cases had dropped since February, and none at all had been recorded in September.[34] Laing blamed the uneasiness of the public on the

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33 *Rand Daily Mail*, 30 Oct. 1944.

34 ARMOH, 30 Jun. 1945, p. 12. There had been a sudden spate of 20 cases in February 1944, but the outbreak subsided quickly.

growing number of newspaper reports concerning the accelerating Durban outbreak. He spoke against the 'absolutely unfounded rumours with regard to whole batches of cases in particular areas', and against the unnecessary action on the part of parents, 'preventing children from attending public swimming baths'. Laing offered the following directive to ensure that calm returned:

> Parents are advised not to alarm themselves and their children by unnecessary restrictions … see that children lead normal active lives, eat proper meals and keep their bowels open.[35]

Laing was only downplaying the situation; the rest of his announcement turned to the smallpox epidemic in Johannesburg. He was, in fact, missing a vital opportunity to win the confidence of the parents, as well as their co-operation, which was so essential to cope with an obviously serious health situation developing in the city. He had also underestimated parental concern as the disease took hold in several suburbs. By isolating their children and keeping them indoors, parents were merely acting out of concern and on previous directives issued by the health authorities on infectious diseases. Laing's advice may, in fact, have promoted the spread of the virus if parents had followed it.

Fortunately, within a week of his announcement, Laing was forced to change his guarded position, and the case numbers were published in *The Star*. By 18 November, the total number of polio cases throughout the Union stood at 213, with the Transvaal's 29 cases behind Durban's estimated 100; the situation was regarded as

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35 *The Star*, 13 Nov. 1944.

'the most serious in years'. Yet the statement denied that infantile paralysis had reached epidemic proportions.[36] Parents must have felt very edgy and confused by this turnaround from the previous week's secrecy. The following day, the Department of Public Health intervened, 'fully alive', it declared, 'to the serious increase in the number of cases of infantile paralysis' throughout the Union.[37] Case figures dating back to 1934 were published, and the Health Department assured 'co-operation in every way' to limit the incidence of the disease. A warning was issued that people should be aware that the virus might be carried in milk and sewage. It added that only a few of those infected were likely to develop the disease, and that there was no proof of the existence of 'healthy carriers'.[38] In his article on 'Poliomyelitis', issued by the Department of Health two weeks later, Dr R. Turner contradicted this statement by clearly identifying a 'carrier' as someone who was already infected with the abortive or non-paralytic form of polio. 'Because of their great infectivity, their large number, and because they are unrecognized, they would appear to be the chief sources of spreading the disease.'[39]

The Star's editorial chose to side with the health authorities, calling Laing's warning prudent and urging 'any persons temperamentally inclined' to avoid taking 'a graver view of the matter'. The onus was once again placed on the parents to ensure

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36 *The Star,* 24 Nov. 1944.

37 *The Star,* 25 Nov. 1944.

38 *Ibid.*

39 SAB, GES 533 /2 /12B, 14 Dec. 1944.

that their children did not mix with large crowds, to contact the doctor if any suspicious symptoms were displayed, and to follow the general rules of health and hygiene 'with a strictness corresponding to the gravity of any particular visitation'. It warned that precautions were vital because of 'a malevolent evil lurking somewhere in our midst'.[40] The idea of 'a malevolent evil' ready to pounce on any child would have had the majority of parents on tenterhooks, and not only those of a nervous disposition. Naturally parents reacted to these mixed messages; one asked that the schools be closed:

> In common with other parents, I have read with considerable anxiety the articles on infantile paralysis. The statement by the medical officer of health says that it has not reached epidemic proportions in Johannesburg, but that the number of cases notified is increasing…How many children must contact this appalling disease before the authorities will consent to take this simple action? With the example of Durban and Cradock before us, are we to wait till all possible harm has been done?[41]

Nevertheless, the closure of schools was not a clear-cut decision during epidemics and was generally avoided, as medical evidence suggested that closed groups, such as schools and hostels, were less at risk to infection than exposure at open gatherings, such as parties. As the outbreak had not been confined to any one suburb, school-closure, 'as a single measure, without restrictions on other public and private activities

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40 *The Star*, 25 Nov. 1944.

41 *The Star*, 29 Nov. 1944.

where children and adults may congregate in numbers, would serve no useful purpose', announced Mr H.H.G. Kreft, Director of Education for the Transvaal.[42]

The authorities also requested that Christmas parties be cancelled despite the hardship imposed on children.[43] Isie Smuts, wife of Prime Minister Jan Smuts, set the example by canceling the Soldier's Orphan's party for over 1 000 children, which was to have been held in the Johannesburg City Hall, but the children were assured that toys would be distributed through their parents or guardians. The Crown Mines decided to discontinue their annual Christmas treat, primarily because of the difficulty in obtaining presents during war conditions.[44] Schools were instructed to cancel prize ceremonies or hold them outdoors. Should Armistice be declared while the schools were in session, a simple service, held in the school hall, was advised.[45] Parties in orphanages and hostels, however, could go ahead, 'provided nobody is introduced from outside'.[46]

Having lost the call for school closure, parents had to wait anxiously until 13 December, when the normal school term closed for the Christmas holidays. They were advised not to let children go to cinemas or swimming baths, and to avoid over-exertion. For many, restricting the children's movements was extremely difficult.

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42 *Rand Daily Mail*, 7 Dec. 1944.

43 *Rand Daily Mail*, 8 Dec. 1944.

44 *Rand Daily Mail*, 9 Dec. 1944.

45 *Rand Daily Mail*, 8 Dec. 1944.

46 *The Star*, 9 Dec. 1944.

Temperatures soared into the 80s for eleven consecutive days; Johannesburg's highest record for water consumption during a single day since 1941 was exceeded.[47] The swimming baths were overcrowded. One would expect that, within a week to ten days, allowing for the incubation of the virus, new polio cases would appear.[48] Sadly, this was indeed the case. In the week ended 17 December, there were 24 new cases of polio in Johannesburg, while numbers in the Union had dropped by 50 per cent.[49]

On 28 November 1944, a conference was held at the Johannesburg General Hospital to consider steps to be taken to deal with the disease in the Transvaal.[50] The acting director of the hospital, Dr Hugo, called together various representatives of the Union Department of Health, the Provincial Administration and local authorities, as well as the Pretoria Hospital. Hugo thought that 'a cooperative effort of all authorities concerned' would 'provide a satisfactory defensive barrage to meet this disease'.[51] The National Foundation for Infantile Paralysis (NFIP), founded in 1938 in the USA, was held up as a good example of the way 'war' against polio could be managed.

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47 *The Star,* 12 Dec. 1944.

48 J. Trueta, *Handbook of Poliomyelitis* (Oxford: Blackwell Scientific Publications, 1956), p. 16. Incubation of polio could take from three days up to three weeks.

49 *Rand Daily Mail,* 21 Dec. 1944. This report gives the figure, since July 1944, as 1560 cases in the Union. Note this discrepancy against the figure of 1380, given by ARMOH, 30 June 1945, p. 18.

50 *The Star,* 28 Nov. 1944.

51 *The Star,* 29 Nov. 1944.

Delegates at the meeting were especially impressed with the NFIP's pronouncement that 'no poliomyelitis victim must be allowed to be without medical care because of the lack of money'.[52]

As cases increased, so the shortage of hospital staff became a concern. Laing placed a notice in *The Star* seeking volunteers to help with the nursing of polio patients in Johannesburg. He required either partly trained and untrained nurses, or women who had some experience of children. A bonus amount would be added for nursing in the contagious wards.[53] The response was immediate. Within hours, sufficiently trained women had been found. Some married nurses were willing to return to the profession for a while; one firm in Johannesburg offered a trained nurse employed on its staff.[54] By 20 December, authorities declared that recruits were plentiful and that the names of qualified nurses would be taken for later consideration. It must have been encouraging to parents and authorities alike when so many nurses were prepared to respond to the needs of the polio patients, despite the risks posed by the disease.[55]

With the schools closing on 13 December for the Christmas holidays, important precautions were set in place. Cape Town made special arrangements to keep Transvaal visitors in isolation for at least a week after their arrival at the coast.

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52 *The Star,* 28 Nov. 1944.

53 *The Star,* 14 Dec. 1944.

54 *Rand Daily Mail,* 15 Dec. 1944.

55 *Rand Daily Mail,* 13 Oct. 1944.

The number of polio cases in Cape Town had dropped, and it was hoped that this measure would prevent any further infection.[56] In the Transvaal, however, many children remained at home: their parents cancelled the annual holiday rather than expose them to tiring journeys or possible infection.

The South African Railways (SAR) agreed to remove hand and roller towels altogether from passenger trains during the epidemic. It also arranged for floors of the carriages to be cleaned each day, and for the leather to be wiped down with a 1 in 40 disinfectant solution.[57] The SAR disallowed the visitation rights of black 'nurse maids', who previously were permitted to spend part of the journey in the compartment with their wards: 'not that this option was used that often', a spokesman for the Railways admitted. 'Only 280 permits had been granted for this privilege over the past year', he added, according to Western Transvaal System records.[58] The Department of Health did point out to the Railway Health Office, that 'the "non-European" cannot be regarded as the source of the infection of infantile paralysis; in

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56 W.K. Bettzieche, 'Polio, People and Apartheid: The South African Poliomyelitis Epidemics of the 1940s and 1950s with Special Reference to the Cape Peninsula' (BA Honours thesis, University of Cape Town, 1998), p. 35. The average incidence of polio in Cape Town 1944-1945 was 13.

57 *Rand Daily Mail*, 9 Dec. 1944; ARDOH, year ending 30 June 1945, p. 18.

58 SAB, GES, 533 163/2/12B, Letter of South African Railways to Secretary of Health, 9 Jan. 1945.

fact, perusal of the Department's weekly bulletins would show that 'approximately twice as many "Europeans" as "non-European" cases are reported'.[59]

Every notification from the health department underlined the importance of personal hygiene. Polio had singled out the middle class and wealthy, so something in this more sanitised environment needed to be examined as the possible carrier of the poliovirus. Some house-proud mothers developed an exaggerated passion for cleanliness, instilling peculiar ideas in their young children, such as the need to line the toilet bowl with toilet paper to prevent any splash-backs which might carry the virus. In public toilets, it was thought prudent to perch on top of the seat and to avoid any contact with the 'disease ridden seat'.[60] Kissing on the mouth was regarded as inadvisable, and children were discouraged from picking up anything off the street or touching balustrades. One polio survivor recalls that her mother would never discuss her illness with her, and she assumes that her mother felt responsible for allowing the virus into their 'spotless' home.[61] There was a strong element of shame in polio, both for the sufferer and the family.[62] Mothers – who were constantly reminded by the press, by family doctors and, no doubt, by neighbours and friends, that flies were the cause of disease – became fixated with the idea that if they allowed flies into their homes, they would be responsible for any ensuing illness.

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59 SAB, GES, 533 165/2/12, 19 Jan. 1945.

60 Interview with K. Sauer, 10 Apr. 2005.

61 Interview with E. Broido, 5 Aug. 2003.

62 This aspect of the disease will be discussed in Chapter Seven.

Although the support of the public was vital in combating the epidemic, the medical profession in the 1940s seemed reluctant to admit its limitations. It has been suggested that their 'use of technical language and their reference to colleagues in the United States served to close the medical community off from the public and positioned doctors as the gate keepers of scientific knowledge'.[63] Two 'distinguished Johannesburg doctors', writing to the press, suggested that both preventative and clinical decisions be placed wholly in the hands of professional medicine. They added:

> The belief on the part of the South African public that infantile paralysis is a mystery disease – a kind of V2 of illness – and that almost nothing is known about it, is not borne out by the facts.[64]

The doctors went on to explain the basic outlines of the disease, starting with the inaccuracy of the term 'infantile paralysis' itself, and pointing out how few of the cases actually had paralytic results. The high incidence of mild undiagnosed cases was a mere 'trifle', with symptoms similar to a mild attack of influenza. The addition of these 'harmless' cases to the statistics of the paralytic cases, they believed, 'distorted the view of the disease'; the population was largely immune. The article was aimed at informing the public, but it was also a ploy to downplay parental concerns. Medical science, they continued, had made great advances and was working on a means of prevention.

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63 Anon., 'Science, Civics, and Cripples: Polio in the Transvaal, 1944-1948', unpublished manuscript, pp. 17-19.

64 *Rand Daily Mail*, 11 Dec. 1944.

> A vaccine has been prepared from the virus and this has successfully protected rats against the induction of the disease. It is not unreasonable, therefore, to expect that such a vaccine for the protection of children against poliomyelitis will be prepared in the not distant future – in much the same way this has already been done against diseases such as smallpox, typhus, diphtheria, typhoid and tetanus.[65]

Polio was not like other diseases, as the doctors well knew, but parents were grateful for any mention of a possible cure no matter how misguided or inaccurate it was.[66] Independent action and thinking by lay persons were discouraged; quarantine, the 'distinguished doctors' believed, was 'a moot point', as the disease was so widespread and the modes of contact so manifold, that 'any attempt to isolate individuals would probably be ineffectual' and would 'tend rather to have the effect of producing, in children and parents, mental reactions of a neurotic nature towards disease in general'. Once again parental concern and anxiety was regarded as 'neurotic'.

There is little doubt that this article was aimed at refuting some ideas about polio which were 'currently circulating through the white community'. A suggestion has been made that the tone of the article also subtly separated medical knowledge from the ignorance of the masses, by the implication that medical professionals must

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65 *The Rand Daily Mail*, 11 Dec. 1944.

66 J.R. Paul, *A History of Poliomyelitis* (New Haven and London: Yale University Press, 1971), p. 261. Due to the tragic failure of the Brodie and Kolmer vaccines in 1935 human vaccine trials were halted. 'The subject of human vaccination had received such a blow that attempts to reopen it in the decade following 1935 would have been regarded with horror'.

overturn public ignorance. The article concluded with the idea of scientific research as the 'heroic cure-all'.[67] The superior knowledge of the medical profession was emphasised by the announcement that both doctors had made a point of keeping informed about research developments in the United States.

The authorities needed to play down anxiety about the disease. They had very little choice. Twenty-five years after the 1918 epidemic, neither the source nor the cause of polio was yet understood. The only consolation was that all countries experiencing polio epidemics at this time were in the same boat. Authorities realised that it was vital to display a united front when handling polio.

The National Council for the Care of Cripples in South Africa held an executive committee meeting in Cape Town on 22-23 January 1945 to discuss the epidemic. It was suggested that during future polio epidemics, the Johannesburg Fever Hospital should work in close contact with the Transvaal Cripple Care Association, which in turn would liaise with the Johannesburg Municipality to establish orthopaedic clinics and after-care for convalescent polio cases. It was hoped that the Department of Public Health might subsidise the province for the supply of orthopaedic appliances. Another concern was that full use had not been made of orthopaedic nurses during the epidemic.[68] The Orthopaedic Surgeons Group, formed in July 1942, wanted a closer relationship with Cripple Care so that orthopaedic

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67 Anon., 'Science, Civics, and Cripples', p. 18.

68 Minutes of the Executive Council Committee Meeting held at the Council Chamber, Government Archives, Cape Town on 22 and 23 Jan. 1945 at 9.30 a.m.

surgeons could be involved with treatment in the early stages of the disease.[69] Such involvement of the various official bodies emphasised that the infrastructure begun in the 1930s was still intact and growing because of first-hand experience of polio.

Another essential requirement in facing polio was research into the disease. At the request of Dr Gear, local authorities throughout the Union were asked to complete questionnaires on notified polio cases so that a comprehensive profile of the disease could be drawn up which would help to investigate polio within the South African context. Details on the name of the patient, location, race, age and sex were to be supplied, as well as information concerning the outcome of the disease in each individual: death or recovery, and the degree of residual paralysis, if any.[70] Gear would then collate all the information to form part of a scientific study.

Citizens were also invited to become more proactive in order to compensate, in some way, for the overwhelming sense of uselessness during the epidemic.

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69 G.F. Dommisse, *To Benefit the Maimed*: *The Story of Orthopaedics and the Care of the Crippled Child in South Africa* (Johannesburg: The South African Orthopaedic Association and the National Council for the Care of Cripples in South Africa, 1988), p. 110.

70 SAB, GES, 533, 227 and 231/2/12 C; correspondence between Dr Gear, the Secretary for Public Health, and Johannesburg Public Health Department, 8 June 1945, 14 June 1945 and 22 June 1945.

6.4 'The Only Good Flies are Dead Flies'[71]

As we have seen in 1918, when the source of disease was not clear, blame was placed on familiar carriers of disease, in this case the fly.[72] The fly theory implicated the mother as housekeeper; if houses were clean they did not have flies. The fly's role in the spread of polio had been raised as early as the 1916 New York epidemic[73] and during the 1918 polio epidemic. Research in this area had continued in the interwar period. By 1943 articles once again linked the fly with polio. Researchers claimed to have observed the presence of the virus in flies collected at epidemic centres in the USA, and considered this as a possible avenue of transmission, similar to other excremental diseases such as enteric and dysentery.[74] Now Durban authorities, encouraged by local medical opinion, listed 'fly vectors, person-to-person contact and food-handlers' as the main channels of transmission and added polio to the list of fly-borne diseases.[75] In this way, they strengthened the fly debate for other provinces.

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71 *The Star*, 22 Dec. 1944.

72 'Poliomyelitis', *SAMJ*, vol. 18 (25 Nov. 1945), p. 375. Trask and Paul claimed scientific proof that flies were proven vectors and that it was as likely during an epidemic to trap the virus on flies as in sewage.

73 *Ibid*, p. 189. 'Flies that supposedly spread the polio germ by flying in only one direction, from the slums to the suburbs.'

74 Paul, *History of Poliomyelitis*, p. 293.

75 SAB, GES, 533 2/12/B, Control Programme, MOH, Dr G.H. Gunn, 12 Oct. 1944.

Although there were many aspects of polio on which medical men disagreed – the term 'infantile paralysis' being an example – 'right or wrong, they are agreed that flies are carriers of the disease'.[76] 'War on Flies' became the slogan as the next 'Swat the Fly Campaign' was announced nationally.[77] Radio talks, slide shows in cinemas, newspaper articles[78] and street posters were used to educate the people about the 'deadly nature of the common housefly and the need to eliminate it'.[79] Anti-fly ditties reinforced the message of fly annihilation. Fly swatters, traps, sprays and screens fitted to doors and windows, were promoted. The efficacy of DDT as a successful insecticide was broadcast. By marketing the image of the fly regurgitating on food in the family kitchen and leaving its excreta in 'flyspecks' on surfaces and walls, people were horrified to discover that 'a single buzzing *Musca domestica* can infect a whole household'.[80] The fly campaign intensified the association of dirt with disease. It enabled authorities to develop a specific approach to anti-polio work and provided a subject for research on the spread of polio. It also offered a broader explanation of the disease, as well as bringing in other specialists like entomologists. Psychologically it

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76 *The Star*, 12 Dec. 1944.

77 *Cape Argus*, 12 Dec. 1944.

78 *Sunday Times*, 5 Feb. 2006. *The 100th Year Commemorative Sunday Times Publication, Part One: 1906-1931*, p. 8. This publication efficiently comments effectively on the various anti-fly campaigns started by the newspaper as early as 1913; *The Star*, 14 Dec. 1944.

79 *The Star*, 12 Dec. 1944.

80 *The Star*, 26 Dec. 1944.

was an effective way to ‘bring down to size the epidemic by offering a visible and manageable target’.[81]

Various methods of fly control were discussed. Dr F.W.P. Cluver, a public health authority in Durban, thought that the fly-larvae should be targeted. This set in motion an animated debate on the subject of flies in *The Star*: ‘A female fly can, within one summer, have 18 million, million descendants and every one of them a potential carrier.’[82] ‘All the fly-paper, fly-sprays and swatters in the world would not lessen the risk of infection.’[83] In short, ‘flies can breed faster than humans can swat them’.[84]

Dustbins, in particular, were thought to be the favoured haunts of the fly for breeding purposes, as well as compost heaps and manure. It was suggested that these should be covered with soil and manure dug well into the garden. Two Johannesburg residents described fly-traps that they had designed: one lured flies with a bed of manure above a tin, which caught the larvae as they fell through; the other, designed by a mine compound manager, was a gauze trap attached to the dustbin’s lid. ‘The smell emanating from the dustbins’ lured flies through small gaps into the trap, which

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81 Rogers, *Dirt and Disease*, p. 57.

82 *The Star*, 22 Dec. 1944.

83 *The Star*, 26 Dec. 1944.

84 *The Star*, 29 Dec. 1944.

could be cleaned out once a month'.[85] A *Star* correspondent advised readers when swatting flies to 'aim half an inch behind a fly as owing to the construction of his legs, he has to take off backwards before he can fly forwards'.[86] 'Battle prose' was a characteristic of the 'Swat the Fly Campaign'. A *Star* correspondent, strongly 'anti-swatting', expostulated:

> Your correspondent is like a general who abandons all strategy and tactics in the belief that the war simply consists of killing as many of the enemy as you can. Such a general might find himself outflanked'.[87]

Yet another claimed that flies could be caught more effectively by switching on the bathroom light, closing all doors and windows, plunging the house into darkness and spray: 'drive flies into the lighted bathroom which was then sprayed cutting off the flies last line of retreat.'[88]

By-laws already existed to limit animals in the suburbs of Johannesburg. Now neighbours keeping cows, horses and poultry were blamed for the increase in flies. 'I would like to point out that the suburb of Highlands North is swarming with flies', one resident complained. 'Cattle graze beside our fences and horses are frequently

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85 *The Star*, 20 Dec. 1944.

86 *The Star*, 23 Dec. 1944.

87 *The Star*, 29 Dec. 1944.

88 *The Star*, 28 Dec. 1944.

paddocked in close proximately to our houses.'[89] Authorities were asked to ensure that each household rid the premises of the 'fly menace'.[90] A correspondent to *The Star*, Dr K. Chapman, thought the only way this could succeed was to have experts 'with mass-scale weapons like traps', used on a sufficiently large scale, to get the fly population 'on the run'.[91] Under the headings of 'Refuse disposal', 'Human excrement', 'Household refuse', 'Stable refuse' and 'Flies', Dr Eustace Cluver, Director of the SAIMR, explained rather elaborately the correct way to site privies 'where humans are aggregated together and where there is a danger of putriscibility of organic matter which could lead to the breeding of flies and spread of diseases'. He also offered a diagram of a fly trap for effective control.[92]

War-time restrictions, however, inhibited really effective measures against flies. Steel gauze was in short supply.[93] As a result, *The Sunday Times* advocated a more frivolous measure. During the Fly Campaign residents were encouraged to send dead flies, 'without the flypapers and sticky traps', to the municipal health department

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89 '*The Star*, 26 Feb. 1944.

90 *The Star*, 28 Dec. 1944.

91 *The Star*, 29 Dec. 1944.

92 E.H. Cluver, *Public Health in South Africa*, 4th edition (Johannesburg: Central News Agency, 1946).

93 *The Star*, 14 Dec. 1944.

to be weighed. A prize was awarded to the person who killed the highest number of flies.[94]

The issue of flies also raised the question of contaminated food, which became a further source of concern to both authorities and consumers. Food created a sense of intense vulnerability. The health authorities advised that milk be boiled and fruit and vegetables washed in potassium permanganate.[95] Even ice-cream was cited as a culprit, having 'been proved to be responsible for scarlet fever, typhoid fever and diphtheria'.[96] An individual, resentful of war-time restrictions, suggested that malnutrition, especially the lack of meat, was a contributory factor to polio: 'too long have the speculators run things because the Government does not keep on paying the subsidy for meat'.[97] Food neuroses fed into the racism of whites, never far from the surface. During the war there was a shortage of milk bottles, and householders supplied their own containers into which the milk was decanted. Milk delivery, according to 'Pro Bono Publico', was a contributing factor to 'the existing prevalence of epidemics' because of 'the milk delivery boy of filthy habits … who produces a dirty piece of wire from a pocket of a filthy pair of trousers and stabs his milk tops,

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94 *The Sunday Times*, 5 Feb. 2006.

95 Interview with B. Durlacher, 13 Aug. 2002.

96 *The Star*, 26 Dec. 1944.

97 *The Star*, 4 Dec. 1944.

placing the same piece of wire on the ground while he pours the milk' into the container.[98]

At a medical conference in Durban in 1946, Gear questioned the importance of flies as vectors of polio. He reasoned that one would have expected the incidence of the disease to be higher in fly-infested areas than was the case. In Johannesburg, the lowest incidence of cases was reported from the worst fly-infested suburbs. He also expected that incidence would be higher in areas where the bucket system of sewage disposal was used, yet this was not supported by any evidence.[99] The fly campaign might have encouraged a more pro-active approach in handling the epidemic, but failed to explain how and why the middle-class clean homes experienced the highest incidence of the disease. Cleaner homes and streets did not stop the advance of polio.

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98 *Rand Daily Mail*, 9 Dec. 1944.

99 J.H.S. Gear, 'Poliomyelitis in Southern Africa, with Special Reference to the Epidemics of 1944-1945' (Paper, 34th South African Medical Congress, Durban, 1946), pp. 14-15.

Chapter Seven

Treatment, the Polio Experience and Research during the 1940s

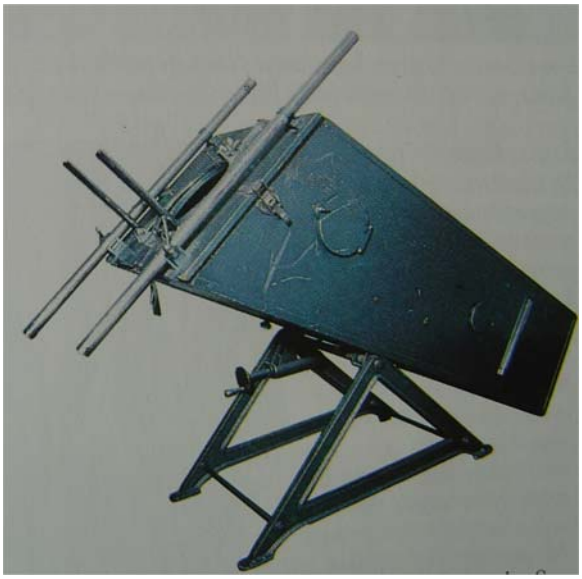
7.1 Use of the Iron Lung during the 1944-1945 Epidemic in Johannesburg

As the case load increased during December 1944, hospital facilities in Johannesburg were strained to their limit. An alarming aspect of this polio epidemic was the shortage of iron lungs, while the number of bulbar cases was higher than ever before. This form of polio causes respiratory and throat paralysis, which impairs breathing and swallowing and often results in death. The increased incidence of respiratory problems may have been due to the virulence of the imported virus strain from the Middle East.

During the epidemic, South Africa only had the 'Both' iron lungs donated by Nuffield, although other manufacturers, such as Emerson, were on the market.[1] A series of crises forced doctors to improvise. On one occasion, a doctor from Springs, with the help of three East Geduld Mine artisans, constructed a 'lung' from plywood for a critically ill child in the East Rand Hospital. This 'lung' was to 'piggy-back' on

[1] John Emerson had refined Drinker's device and cut the cost by half. Inside, the patient lay on a bed that could slide in and out of the cylinder as needed. The side of the tank had portal windows so attendants could reach in and adjust limbs, as required.

Illustration 7.1



The Both respirator, now in the Adler Medical Museum

Source: P. Joyce (ed.), *South Africa's Yesterdays* (Cape Town: Reader's Digest Association, 1981), p. 55.

'The chamber of the machine is made out of laminated wood and the head and end are supported by chromium plated brass tubes mounted on castors. The head of the machine is fastened by four quick-acting clamps'. The lever, below the chamber, adjusts the tilt of the machine'. The Both respirator or 'iron lung' was regarded as the most reliable and practicable machine available for mass production at the time of the Nuffield gift. The fact that it was lighter than machines made of metal made it more manoeuvrable.

Source: Medical Research Council, 'Breathing Machines and their Treatment', Report of the Respirators (Poliomyelitis Committee) *Special Report Series*, no. 237 (London: His Majesty's Stationery Office, 1939), p. 13 and 65.

the electricity supply of a Nuffield iron lung already at the hospital. Working through the night, the iron lung was completed within nine hours, sadly just thirty minutes too late to save the child.[2] A few days later the Nuffield lung itself was struck by lightning. Once again the Geduld Mines supplied personnel to replace the blown fuse in fifteen minutes. The sister in charge operated the pump manually while the drama unfolded. After these emergencies, the East Geduld Mines offered to install and maintain any future iron lungs at the hospital. This generosity of spirit, so evident

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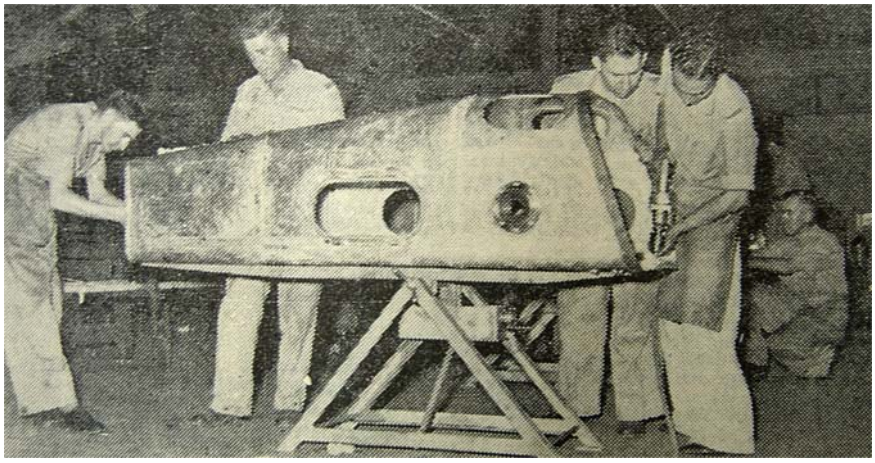
2 *The Star*, 14 Dec. 1944.

throughout the epidemic years, also came to the rescue of the doctor and his helpers while building a second, full-sized iron lung for the hospital. Within days of an appeal to the newspapers, a motor was donated, matching the specifics laid down by the doctor and his team.[3]

When three adult polio cases broke out in the ranks of the South African Air Force, in early December, Brigadier A.J. Orenstein requested that twelve iron lungs be built by South African engineers at Robert's Heights in Pretoria. The technicians stripped an iron lung and made over 50 drawings of the parts. Improvements were made and, by working day and night, the first lung was functioning within eight days and sent to the Boksburg Hospital for a needy patient. A week later a further eleven iron lungs were manufactured.

Illustration 7.2



Men of No. 1 Air Depot, Robert's Heights, at work on the 'iron lung'

Source: *Rand Daily Mail*, 19 Dec. 1944.

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3 *The Star*, 20 Dec. 1944.

The next emergency required an iron lung to be sent by air from Durban but bad weather delayed its arrival, forcing Orenstein to borrow respiratory equipment from the Rand Mine's rescue station.[4] Sir Ernest Oppenheimer stepped in to offer the province a gift of 30 iron lungs on behalf of the Transvaal branch of the Red Cross Society, Anglo-American and other mining houses, to be part of a pool available for any hospital as the need arose.[5] By centralising the stock of iron lungs, one expert team could manage the servicing, interchange of spare parts and supply.[6] To maintain uniformity, the 'Both' machine which had been highly recommended by the Respirator's British Research Council, was chosen.[7]

The iron lungs were usually placed alongside each other, adults and children together.[8] A teenager described how he witnessed the death-throes of the man alongside him as he lay in his own iron lung.[9] A twelve-year old remembered the

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4 *Rand Daily Mail*, 9 Dec. 1944.

5 *The Star*, 6 Dec. 1944.

6 SAB, GES, 533 234/1/12C, Correspondence between The South African Red Cross Society and Dr Allan, Secretary for Health, 26 Jan. 1945.

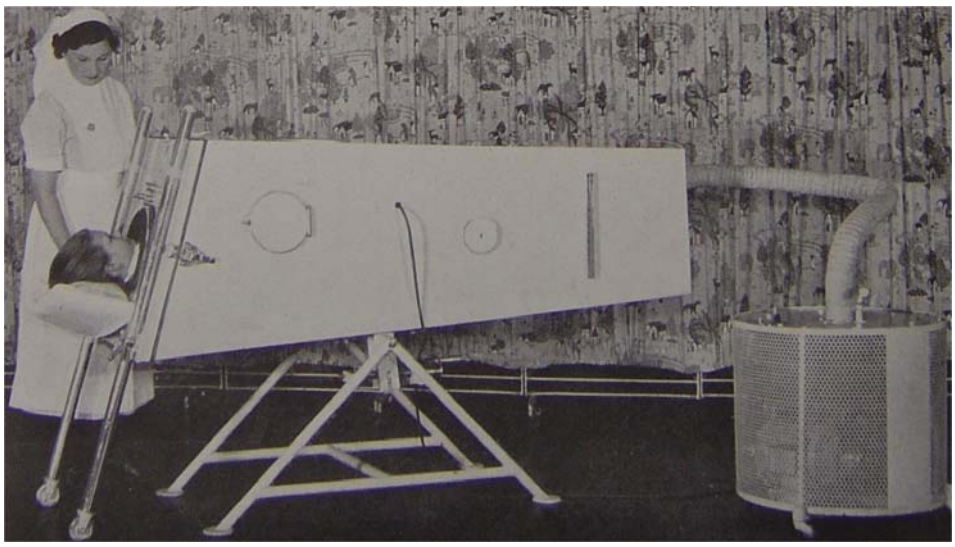
7 *Rand Daily Mail*, 5 Jan. 1945; technicians from the South African Air Force built these iron lungs.

8 Medical Research Council, 'Breathing Machines and their Treatment', Report of the Respirators (Poliomyelitis Committee), *Special Report Series*, no. 237 (London: His Majesty's Stationer's Office, 1939), p. 65. 'If there is one thing the study of epidemics of poliomyelitis teaches us, it is the value of centralising treatment'.

9 Interview, G. Thom, 28 Aug. 2002.

intense fear he felt when the iron lung was moved next to him, 'just in case'.[10] Other survivors remember the sound of the machine. A patient described 'the loud whine of the motor' like 'a thrashing machine with a cold'.[11]

Illustration 7.3



The Both lung

'The patient's head is supported on a pillow placed on a fabric sheet slung between two short metal rods fastened to the end of the cabinet. There are two small side ports allowing access to the patient. The pump unit is housed separately in a cylindrical perforated metal chamber mounted on three castors. A ½ h. p. motor drives the bellows through a reducing gear. The motor has a motor car fan belt and the bellows are constructed from a standard motor car tyre inner tube'.

Source: Medical Research Council, 'Breathing Machines and their Treatment', Report of the Respirators (Poliomyelitis Committee) *Special Report Series*, no. 237 (London: His Majesty's Stationery Office, 1939), p. 14.

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10 Interview with R. Steynberg, 8 Apr. 2005.

11 http://americanhistory.si.edu/polio/howpolio/ironlung.htm, accessed 6 June 2005.

> There was a tremendous psychological element at work in all of us in our relationship to the lung. The metal respirator assumed an almost animate personality and became the symbol of protection and security. The idea of leaving it would always make our hearts beat a little faster and bring an anxious lump into our throats. We were incomplete embryos in a metal womb.[12]

Whereas some polio survivors only needed to spend a short period in the respirator to assist breathing, a small number relied on it for the rest of their lives.[13]

Not all cases with breathing problems needed the iron lung. Respiratory complications could be alleviated by positioning the patient at an angle to drain the lungs (Illustration 7.4). The rocking bed was widely used overseas, although it is not clear whether there was one in any Johannesburg hospitals during the 1944-1945 epidemic. The bed, driven by an electrical mechanism, could be controlled to rock up and down through an arc ranging from five to 30 degrees a number of times per minute causing 'the weight of the abdominal contents to actuate the diaphragm'.[14] The rocking bed was mainly used in the weaning process of iron lung patients.

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12 D.J. Wilson, *Living with Polio: The Epidemic and its Survivors* (Chicago: University Chicago Press, 2005), p. 92.

13 P. Maylam, 'Some Reflections on the Life and Career of Christopher Gell', *The Annals of Grahamstown Historical Society*, no. 23 (1993), pp. 58-65. Christopher Gell is regarded as South Africa's longest-surviving iron lung patient.

14 Medical Research Council, 'Breathing Machines and their Treatment', p. 67.

Illustration 7.4

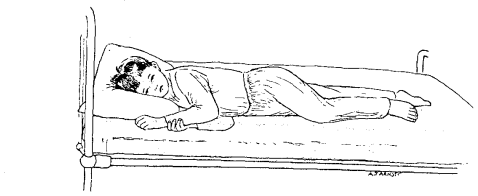

FIG. 10.

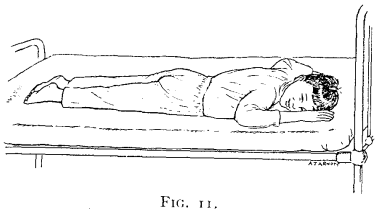

FIG. 11.

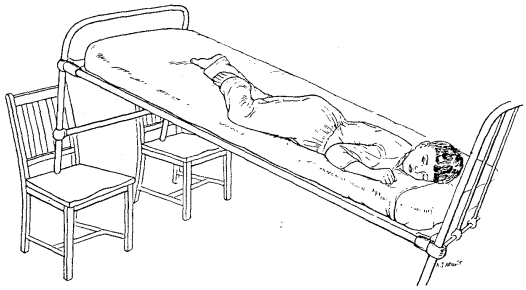

FIG. 12.

The polio bed

Source: W. Ritchie Russell, *Poliomyelitis* (London: Edward Arnold Ltd, 1956), p. 65.

Changes of posture were especially important in cases of respiratory weakness as they reduced the danger of pulmonary complications. A complete change of posture was desirable every two to four hours. Polio patients were especially sensitive to movement (hyperaesthesia) which increased if they were left in one position. Gentle passive movements to all the main joints and muscle groups needed to be done, day and night in order to reduce the development of tight muscles or spasm and help the patient's comfort.

Hand devices were available to assist breathing such as the Oxford inflator. Oxygen was delivered from a cylinder via a face mask with a stop cock valve. 'The lungs are inflated with oxygen at a suitable pressure, the stop cock is then engaged

which allows expiration to occur by passive recoil of the lungs.'[15]

As discussed previously (Chapter Five), bulbar cases could not be placed in the iron lung and might require a tracheotomy used in conjunction with intermittent positive pressure.[16] The tracheotomy was usually an emergency method to clear the airway of sudden life-threatening blockages if suction failed to do this. A tube was placed into the trachea through an opening made just below the thyroid cartilage of the throat. It not only opened the airway but provided easy access to keep passages clear by frequent suctioning.[17]

Nurses attending patients with breathing inadequacy had to be finely attuned to their respiratory needs which placed a great burden on the staff.[18] During the first few days of respiratory paralysis, patients needed to be treated on a one-to-one basis, attended by a doctor as well as at least one nurse. Suction, anaesthetic apparatus, intratracheal tubes and tracheotomy equipment all needed to be close at hand. A young Johannesburg nurse recalls the stress this imposed:

> One patient I will never forget was in an iron lung and it was a real performance to nurse him. Trying to juggle pressure, part care, suctioning, feeding and breathing was quite something. Fortunately for

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15 Medical Research Council, 'Breathing Machines and their Treatment', p. 19.

16 J. Trueta, *Handbook of Poliomyelitis* (Oxford: Blackwell Scientific Publications, 1956), p. 66.

17 *Ibid*., p. 83.

18 J.C. Ross, 'A History of Poliomyelitis in New Zealand' (MA thesis, University of Canterbury, 1993), p. 74.

me he had a couple of dedicated staff-nurses who took care of him and the nurses were only asked to help turn him, and fetch and carry. The sound of the motor haunted me.[19]

7.2 'Straws in the Wind': Polio Treatments in the 1940s

Serum, although rejected as ineffective since the 1930s, was again briefly considered as a possible treatment. Late in December 1944, a newspaper reported a government plan to collect blood from members of the South African Defence Force who had recovered from polio, in order to manufacture serum which might prevent the onset of paralysis in current patients.[20] However, various 'eminent' but unnamed medical authorities in Johannesburg[21] responded to this article with a collective statement issued to the local press.[22] 'Asserting their scientific authority and knowledge', they rebuffed any inference that South African medicine was in some way behind this report.[23] The idea of serum use had been instigated by an 'official announcement' published in Germany the previous July, to the effect that the only useful precautions

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19 J. Pearse, 'Recollections of a Nurse in Training (1956-60), Part Two', *Adler Museum Bulletin*, vol. 29, no. 2 (Dec. 2003), p. 17.

20 *Rand Daily Mail*, 27 Dec. 1944.

21 Author unknown: 'Science, Civics, and Cripples', p. 20.

22 *Rand Daily Mail*, 28 Dec. 1944.

23 Author unknown: 'Science, Civics, and Cripples', p. 20

against paralysis were injections of blood serum from recovered patients. The doctors were outraged that a suggestion from the 'enemy' should have been considered in the first place:

> Without further corroboration this German statement should, in our opinion, be regarded merely as a piece of wishful thinking or, perhaps, as indicative of a desire to do something spectacular without bothering about whether it is really useful or not.

Peter Allan, the Secretary For Health, was less hot-headed about serum in his statement on 'Acute Poliomyelitis': 'At best the convalescent serum could only produce a passive and therefore presumably short-lived immunity which would be of very limited application, while many doubt its usefulness altogether.'[24]

Various theories from doctors and the public on how to prevent paralysis – other than by the standard means of bed rest and immobilisation – were published in newspapers. Dr B.F. Samson, a Durban pathologist, thought that nerve cell degeneration could be counteracted with 'oxygen and an adequate supply of glucose, which helped the cells utilise oxygen'. His theory was based on evidence that the poliovirus 'prefers oxygen-free substrata for its activity'.[25] If applied shortly after paresis (weakening of the muscles), and maintained for three to four days, this might lessen the destruction caused by the virus. Sampson was somewhat hesitant, however:

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[24] SAB, GES, 533 2/12C, P. Allan, 'Acute Poliomyelitis (Infantile Paralysis)', circular 673, p. 11.

[25] *The Star*, 3 Jan. 1945.

> But where does all this get us? Even assuming it to be true, what benefit in treatment could be derived therefrom? The answer is that we are not in so good a position in this disease as to be able to disregard straws in the wind. No attack in treatment has been directed against a concept of this kind.[26]

Sampson seemed to sum up the sense of frustration felt by both medical science and practitioners alike during the 1940s, but as Rutty points out, time and time again, it was important to be seen doing 'something, anything', rather than nothing at all.[27]

During and even after the acute stage of the disease, muscle spasm was a painful condition and the analgesics used were often insufficient. As observed earlier, epidemics can attract unusual ideas about treatment which might even sway the most conservative and even-headed doctor. The level of desperation some felt watching a child in pain, slowly becoming paralysed or already immobilised, opened doctors to experiment with alternative medicine.[28] Poison, used by South American Indians for centuries, and tried on polio cases in New Jersey to control pain, was one such example. A substance, siphoned from a 'poison tree' had the ability to paralyse nerve endings and, if used in the treatment of 'infantile paralysis', the muscles relaxed and

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[26] Dr B.F. Sampson, 'A Suggested New Treatment of Poliomyelitis', *SAMJ*, vol. 18 (23 Dec. 1944), p. 421.

[27] This is a major focus of Rutty's thesis: C.J. Rutty, '"Do Something! Do Anything! Poliomyelitis in Canada, 1927-1962' (PhD thesis, University of Toronto, 1995).

[28] Interview with Dr X, 22 Nov. 2002.

brought pain relief.[29] An interviewee described a treatment with curare which appears to be the substance described above.

> One day the doctor arrived and explained that I would be treated by curare injections. He explained that this would apparently relax my taut muscles and somehow enable the affected muscles to improve and heal. For quite a while I was treated in this way. I'm not sure whether the treatment was given daily or at longer intervals. The injection would be given and within a minute or two all voluntary muscles in my body were completely paralysed. A special nurse remained with me and constantly checked my condition. This treatment was the most frightening and frustrating experience imaginable. I lay there totally paralysed unable to speak or bat an eyelid. Invariably an itch developed on my scalp or somewhere and I was powerless to scratch or rub. I was unable to tell the nurse of my problem and I lay there helplessly enduring this irritation for a few hours until my muscles gradually recovered. Luckily no one told me that curare was actually an Indian arrow poison and that it was not in favour with many doctors because an overdose could kill a patient. I was nothing but a guinea pig for this procedure which proved to be of no apparent benefit to me at all. I still

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[29] SAB, GES, 533 254/2/12A, *Die Transvaler*, 9 Oct. 1945. 'Die middel word van 'n gifboom gemaak wat die eienskap besit om senupunte te verlam. Die uitwerking hiervan op kinderverlamming is om die spiere te laat verslap en verligting mee te bring.'

> do not understand how my muscles coped with breathing and how my heart managed to continue beating on those occasions.[30]

Although there was little evidence as to the efficacy of some treatments 'doctors needed to convince themselves, their patients and their families that everything possible was being done'.[31]

We have seen that epidemics elicit responses from all levels of society. The lay public, united in fear and concern for their children, were keen to become involved in the 'fight against polio'. Earlier medical victories over other infectious diseases such as malaria, and the discovery of infection-fighting drugs, such as anti-biotics and 'magic bullets', used against venereal disease, engendered a sense of heightened expectation for medical expertise. 'It was a kind of implicit contract': medicine's explanatory power offered emotional reassurance which increased faith in medical ideas.[32]

Polio, the mystery disease, had broken that trust. Parents criticised doctors and the authorities. 'Since the epidemic began [medical authorities] have not been able to give the public a clear statement' about polio.[33] Yet we have seen that many

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30 Letter written by R. Steynberg, 8 Apr. 2005.

31 T.M. Daniel and F.C. Robbins (eds), *Polio* (New York: University of Rochester Press, 1997), p. 58.

32 C. Rosenberg,. *Explaining Epidemics and Other Studies in the History of Medicine* (Cambridge: Cambridge University Press, 1992), p. 285.

33 *Rand Daily Mail*, 13 Dec. 1944.

statements were made. The sad truth was that no one could explain the disease nor could anything stop it – once inside the human body, polio carried on its destructive work. Laypeople came forward to reassure parents. Some suggested alternative remedies which might help, others were sure that their own testimonies about polio would encourage parents not to give up.[34]

No matter how unusual lay comments were, the Department of Health appears to have replied to some letters from the public and rather diligently filed others. Dr Allen interviewed a German nurse, Sister Baumann, who had arrived in South Africa in 1939. She hoped to find a remedy for polio by experimenting on live cats. 'Her line', Allen wrote in the margin of the memorandum, 'is to cut various nerves and study the results to the spinal cord'. The fact that Baumann claimed that a respected Cape Town doctor 'had offered to co-operate with her' and that she was collecting funds towards her research could be the most plausible reason why this memorandum was even sent to records.[35]

A resident in Marquad claimed that 'donkey milk, taken every two hours while still warm', had cured several children of 'infantile paralysis'.[36] Another advised, in all seriousness (although she accepted that it sounded laughable), that 'Bel Gries,' mixed with cuttings of cat hairs and smeared on the skin, behind the neck to the small

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34 *The Star*, 20 Dec. 1944.

35 SAB, GES, 533 238/2/12, memo for record from Dr P. Allen to the Chief Control Officer.

36 SAB, GES, 533,109/2/12B, letter from D.J. Gouws to the Department of Health, 26 Nov. 1944.

of the back, had cured an infant of 'infantile paralysis', twelve years earlier. One needed to '[c]ombine this with 'Sinkpyn Spesifiek at the required dosage as set out on the bottle'.[37]

Doctors were in the unenviable position of having to use a similar, limited arsenal of medication in treating polio patients which had hardly changed from the 1918 epidemic. The eminent polio researcher, J.R. Paul, remarked: 'It is clear … that contemporary physicians, in their efforts to do something, had allowed themselves to drift into a posture of trying to treat the acute disease in a mood of desperation not of wisdom, let alone one based on scientific principles.'[38]

Fortunately an area of medicine that was beginning to develop was physiotherapy. A philosophy of rehabilitation emerged in the 1940s which emphasised 'normalising' people with disabilities to become productive members of society rather than to be 'institutionalised'.[39] In the 1940s, there were two opposing schools of thought regarding polio treatment. Sister Kenny advocated passive

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37 SAB, GES, 533 110/2/12A, letter from Mrs. G. van Niekerk, Randfontein, 27 Nov. 1944. 'Ek het 'n raad wat al die siekte van kinder verlamming genees het. Probeer dit op 'n persoon wat reeds kinderverlamming het, dan is ek seker die raad sal dit genees. Die raad is miskien belaglik, maar probeer dit maar. Smeer Bel Gries op 'n flennie lap, meng daarby kat haar (snipper oor Bel Gries) en slaan dit op van agter die nek af, tot onder by die kruis. Gee dan Sinkpyn Spesifiek vir die persoon soos dit op die bottle voorkom.'

38 J.H.S. Gear, *The History of the Poliomyelitis Research Foundation* (Johannesburg: Poliomyelitis Research Foundation, 1996), p. 8.

39 Wilson, *Living with Polio*, p. 71.

movement within the patient's pain threshold, while orthodox treatment preferred immobility and bracing for up to eight weeks to control contracture.[40]

As the Kenny method had been turned down by South African medical authorities, many polio victims were caught in the middle and subject to the treatment of the doctor in charge. An experienced British physiotherapist, Mrs Elizabeth Hasketh, who had worked extensively with polio cases in London before war-time bombing had forced her to relocate to South Africa, emphasised the need to begin treatment early on polio cases before muscle wastage took place. She felt that early intervention could see a 50 per cent cure rate. The demand for treatment was evident, she added. 'One has only to walk down a city street with one's eyes open and see children in an iron caliper' due to polio. Such children could, in many cases 'become an asset instead of a physical drag to a nation' with the timely intervention of therapy.[41] Echoing Sister Kenny, a doctor also supported this view, adding that experience had shown him that 'treatment should commence soon after the fever subsides'.[42] There were only 130 known physiotherapists in South Africa at this time;[43] Mrs Hesketh called physiotherapy 'the Cinderella of medicine' but she was encouraged that 'many leading physicians and surgeons' were beginning to regard

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40 *Ibid.*, p. 74.

41 *The Star*, 7 Dec. 1944, a letter written by Mrs Elizabeth Hesketh, a member of the London Executive Society of Physiotherapy, an opinion later supported by L. Erlank, 'Cripple Care in South Africa, *Physiotherapy*, vol. 4 (Sep. 1948), p. 8.

42 *The Star*, 13 Dec. 1944.

43 *The Star*, 22 Dec. 1944.

physiotherapy more favourably. It was, however, only available to those who could afford 'the generous fees',[44] while hospitals offered such treatment to the poor. It was middle-class patients who were excluded from financial help, other than the few who remained in hospital or who attended the Hope Convalescent Home and underwent private physiotherapy for long periods during recovery – and polio was primarily a middle-class disease.[45]

7.3 Living with polio

> No one came up with any cures or better alternatives to surgery. So shut up from the outside world, my life consisted of long periods in hospital and months encased in plaster of Paris. I was given insufficient time to physically and mentally rehabilitate myself between operations. As far as I was concerned most of the operations seemed little more than acts of cruelty.[46]

Although many were able to walk out of hospital, others endured months of agonising therapy before movement returned.[47] Some were never able to walk again unassisted, and needed braces, calipers or crutches, or were reliant on a wheelchair.

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44 *Ibid.*

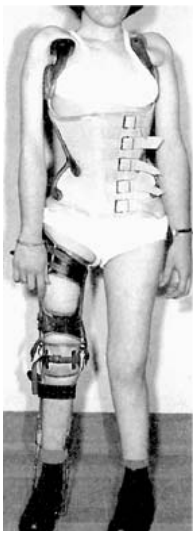
45 Most interviewees who contributed to this thesis confirmed that physiotherapy sessions were paid by their parents.

46 B. Michel, *Footnote to a Dream: Memories of a Musician's Journey through Adversity* (Johannesburg: B. Michel, 2002), p. 79.

47 Interview with G. Thom, 28 Aug. 2002.

Mobility was not a matter of will power, but a matter of how much damage the virus had done to the motor neurons in the early stages of infection and how successful the splinting or plaster casting had been in minimising deformities. If muscles had only been damaged rather than destroyed, improvement could be expected. Splints and plaster casts were temporary measures to maintain neutral muscle position, prevent later deformity and diminish pain, while braces or calipers were used to support structures in the body which had insufficient muscle control to allow satisfactory function.

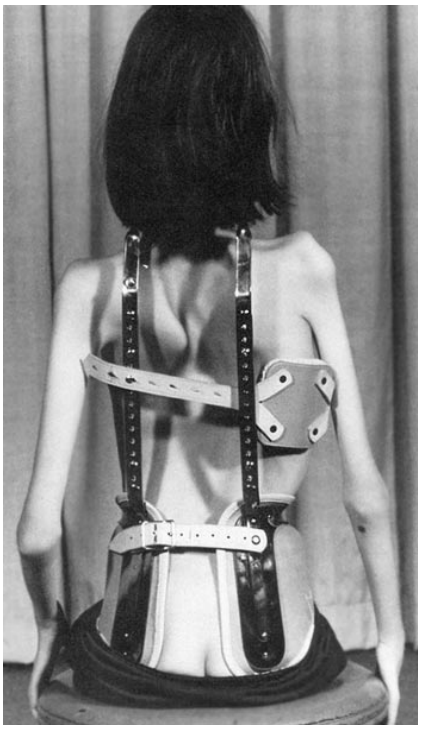
Illustration 7.5



Leg brace and corsette

Source:
http:/milwaukee.brace.nu/Polio/FrenchCombo.jpg

Illustration 7.6



A Milwaukee brace, used in the treatment of scoliosis of the spine

Source:
http://milwaukee.brace.nu/Polio/AtrophyMilwaukee.jpg

Learning to walk became the 'Holy Grail' of polio survivors,[48] but in order to get there it was necessary to learn to stand in braces, regain a lost sense of equilibrium and strengthen weakened muscles affected by the disease itself and months of inactivity. Crutches were made to measure as were calipers. Enid Foster, a Zimbabwean polio survivor, recalls having to place her legs on a large piece of brown paper while a technician made an outline of each leg and 'measured her from toe to buttock' for her calipers.[49]

Illustration 7.7

In the 1940s the knee lock was invented which radically improved calipers. 'Built into the rods on either side of the knee were little metal hinges. These were held rigid by spring -loaded catches which slid up, released the hinges and allowed the rods to bend … if the catches were correctly engaged, before standing up, they made a soft metallic click. It was a sound that governed my life'.
Source: Michel, *Footnote to a Dream*, p. 94

Child fitted with a caliper
Source: http://xserver1.its.mu.edu/images/healthbsp
Accessed 30 Oct. 2006

48 Wilson, *Living with Polio*, p. 85.

49 E. Foster, *It Can't Happen to Me* (Cape Town: Timmons, 1959), p. 86. Benni Michel was also 'measured on brown paper' and gives the name of the company who made his calipers as 'A.C. Miller and Company, Parktown, Johannesburg': Michel, *Footnote to a Dream*, p. 61.

These details then went to an orthopaedic technician who made the calipers.[50]

Orthopaedic boots were necessary to wear with the calipers.

Illustration 7.8

Boy with caliper and built-up boots

Source: Photostat given by W. Bettzieche

The specially crafted boots helped artificially equalise the length of the legs to make walking easier but with the knee brace this would be awkward. One senses the concentration this young boy is using to maintain his balance. Learning to fall was part of the curriculum for learning to walk.

Polio dramatically affected the growth points in the bones which could be corrected by operations to either lengthen or shorten bones in younger patients. Otherwise orthotic boots would be used for life.

Source: H. Bell, 'Poliomyelitis Post-Paralytic Treatment-Orthopaedic Aspect', *SAMJ*, vol. 24 (20 May, 1950), p. 384

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50 L. Erlank, 'Cripple Care in South Africa', *Physiotherapy*, vol. 4 (Sep. 1948), p. 8. Due to a shortage of technicians, the National Council for the Care of Cripples in South Africa funded a five-year training course for five orthopaedic technicians at the Government Limb Factory.

Being unable to walk was referred to as the 'iconic disability of polio';[51] learning to walk again was the benchmark many set for themselves before they would acknowledge that they had recovered. It could be a painfully slow process. After months of disuse, contracted joints needed straightening before braces could be fitted. Stretching was like 'the rack'.[52] Muscles were stretched until a full range of motion was achieved. Alan Marshall remembers his mother trying to straighten his contracted calf muscles which kept his legs bent at the knees. Daily, he was placed on the kitchen table and his mother pushed down on his knees with all her might.[53] The pain was unbearable.

Unless muscle exercises were carried out early in polio rehabilitation, contractures might become fixed with time and could only be loosened by months in plaster and through surgery. The limb was put into a full cast with a slot at the joint where wedges could be inserted to slowly force the muscles to release and the joint to move. Alternatively the leg would be put into a cast and then, by opening the cast at the knee, the leg was forced to straighten a little. The hole was then filled with plaster to hold the extension. This could take up to six weeks and the pain was constant. After a leg operation Benni Michel described how his ankle was realigned before being recast in plaster. The surgeon felt that an anaesthetic was unnecessary as the 'procedure was simple'. While Benni lay on the operating table, after the stitches had

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51 Wilson, *Living with Polio*, p. 85.

52 *Ibid*., p. 81.

53 A. Marshall, *'I Can Jump Puddles'* (Hawthorn: F.W. Cheshire, 1955), p. 17.

been removed and the leg cleaned, the surgeon placed Benni's foot against a wooden board that was strapped across his chest.

> Grasping my knee with both hands he pulled firmly towards him so that my ankle would remain in the required position for the time required for the plaster to set. The severity of the pain exceeded any other I had known. I couldn't believe that this was actually happening to me … it seemed to carry on forever.

Illustration 7.9

Post-operative foot plaster
Source: Photostat received from W. Bettzieche

Although her foot has been operated on, this young Hope Home pupil might face an operation for another polio deformity, 'knock knees', Genu Valgam. This deformity is usually a result of 'incorrect immobilisation during the acute stage of the disease and over-extension of the knee' which develops as the child grows.

Sources: H. Bell, 'Poliomyelitis Post-Paralytic Treatment-Orthopaedic Aspect', *SAMJ*, vol. 24 (20 May 1950), p. 385; Dr G.T. du Toit, 'The After-Care of Convalescent Poliomyelitis Cases', *SAMJ*, vol. 19 (9 June 1945), p.193.

In order to muffle his screams someone placed a wad of gauze over his face. 'I

reflected that even animals are tranquilised prior to painful surgical procedures'.[54] Sadly for Michel, the operation, like most reconstructive and corrective operations he had undergone, was a failure. 'My "pistol-grip" ankle was still "dropped"'.[55]

Illustration 7.10

Post -operative leg plaster

Michel remembers the boredom of hospital and spending his time making puzzles. At the Hope Home schooling continued even if one was recuperating from an operation.

Source: Photocopy supplied by W. Bettzieche; Michel, *Footnote to a Dream*, p. 76.

Illustration 7.11

54 Michel,

55 *Ibid*, p.

The wheelchair as an alternative to crutches

‘Standing encased in steel and leather braces and expected to drag ones paralysed limbs along’ was exhausting. ‘With the braces and crutches, I faked it; with the wheelchair, I lived’.
Source: Photostat supplied by W. Bettzieche; Wilson, *Living with Polio*, p. 115.

Once the full range of motion had been restored, muscle strengthening exercises began. Foster described how the Guthrie-Smith apparatus helped once she had passed the painful acute stage of polio.

> She [the physiotherapist] placed a narrow, fitted sling behind my head, attaching it to the ropes with steel hooks; next the broadest sling was levered under my buttocks, another round my ribs, one round each elbow and wrist and two round each leg. Gently easing the cleats, she tightened the ropes until my head was clear of the mattress, then my legs, then my arms and chest and finally my hips.

Illustration 7.12

The Guthrie-Smith apparatus

'I was swinging freely, suspended a few inches above my bed and feeling as comfortable as if I were lying in a hammock. She showed me how to rotate my body from side to side, in a snake like movement. A few other types of exercises and I was lowered again'.

Foster had the apparatus fixed to the ceiling in her bedroom at home and was able to exercise on her own, first one leg then the other, keeping it up for hours each day. Gradually the muscles began to strengthen.

Source: Photograph supplied by W. Bettzieche.
E. Foster, *It Can't Happen to Me* (Cape Town: Timmons, 1959), p. 98.

Water was a wonderful aid to the physiotherapist and polio patient. The sense of freedom was a happy release after weeks of bed rest, although it was not uncommon for patients to fear leaving the safety of their bed. Enid Foster, a non-swimmer,

needed ‘to fight her hydrophobia and polio’.[56] An ordinary swimming pool was used for exercising polio cases.[57] The question was asked why the various mineral water springs in the Union were not put to use, ‘some eminently suitable for the establishment of a centre specifically catering for cases of infantile paralysis’, but this idea was never seriously considered.[58]

Illustration 7.13

Treatment in the bubble bath at the Children’s Hospital

Source: photograph supplied by W. Bettzieche

Illustration 7.14

Water therapy at Tuskegee Institute, Alabama, 1946

Source: http://americanhistory.si.edu/polio/howpolio/rehab.htm, accessed 21 Apr. 2005.

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56 Foster, *It Can’t Happen to Me*, p. 160.

57 Interview with C. Webster, 25 Nov. 2003. Cilla was sent to the Open Air Convalescent Hospital in Durban and said that she had to ‘swim’ every day as part of her therapy.

58 *The Star*, 3 Jan. 1945.

The polio experience and its treatment were highly individualistic. Many polio survivors were too young to recall the acute phase of the illness, and some have fond memories of life on the ward and friendships made. 'It was not all tears and agony. Looking back, I am astounded at how adaptable a child is. It was strange going home. I remember the new dress my mother made for the occasion. It wasn't easy living with calipers and crutches but, when you are young, you adapt.'[59]

The cultural values of the 1940s seem to have influenced the view some polio survivors adopted about their situation. Patients have pointed out that methods of treatment were seldom explained to them and they were expected to be stoical. 'We weren't allowed to feel sorry for ourselves. There wasn't time for that.'[60] The cultural values of the 1940s made people feel ashamed if they complained too much. Children who cried 'were ostracised as "babies" by other kids', while overworked nurses could become indifferent or abusive.[61] 'It was a culture of denial and suppression.'[62] Yet the enormous efforts of doctors and nursing staff, who coped with large numbers of patients during an epidemic, were noticed. 'When you can't do anything for yourself, you quickly learn to behave and not annoy the nurse. She did everything for you, she

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59 Interview with E. Broido, 19 Aug. 2002.

60 Wilson, *Living with Polio*, p. 99.

61 *Ibid.*, p. 49.

62 *Ibid.*, p. 99.

moved you when you ached, and scratched you when you itched, and you made sure you didn't get her mad.[63]

Illustration 7.15

Self-portrait in bed with polio by John Percival

A depiction of 'the usual casting process', on what appears to be a Robert Jones abduction frame, designed to lessen strain placed on ligaments and muscles. The artist captures the straight-jacket-like treatment, spread-eagled and naked, in total subjugation to the disease while his anxious mother sits at his bedside. The ornate detail on the bed suggests that he was treated at home; the second figure is possibly a nurse on her daily rounds.

Source: M. Shell, *Polio and its Aftermath: The Paralysis of Culture* (Massachusetts: Harvard University Press, 2005), p. 47.

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63 Interview with G. Thom, 28 Aug. 2002. A. Cameron remembers the pressure staff were under at the Fever Hospital during the 1948 epidemic. She was with a group of six girls who were put into an office for lack of space: interview with A. Cameron, 25 Aug. 2002.

Once discharged from hospital, it was not always easy to reintegrate into the family unit. Polio also dramatically affected those closest to the survivor. Siblings could feel excluded and resentful because of the changed family routine. Parents felt guilt and remorse, sometimes blaming themselves 'for allowing the disease to happen'. M. Goldfain, a Delmas farmer, remembers that his children had played near a seeping septic tank. 'My wife and I always wondered whether that was how they contracted polio or from recent inoculations.'[64] After rushing his eldest daughter to the Fever Hospital, he left his wife at her bedside to return for his twin boys who were ailing. For the Goldfain family, the 1944-1945 epidemic was life-changing. The little girl died within three days and the boys were severely paralysed, although they regained some degree of movement. 'My wife never recovered, she had a nervous breakdown and was admitted to Tara [a hospital for emotional disorders in Johannesburg]. The farm was sold so that the boys could receive therapy in Johannesburg.'[65] Driven by guilt or emotional pain, some parents never came to terms with the changes polio inflicted upon their child. Benni Michel's father could not come to terms with his son's disability and became abusive. 'Since I was a physical cripple I felt that unless I steered clear of my father he would reduce me to a mental cripple too.'[66] Other parents refused to speak about the illness.[67]

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64 Interview with M. Goldfain, 27 Aug. 2002.

65 *Ibid.*

66 Michel, *Footnote to a Dream*, p. 123 and p. 81.

67 Interview with E. Broido, 19 Aug. 2002.

And yet, once past the agonising trials of the disease, many excelled at what they chose to do later in life. It started with small victories over body and mind. 'Polio, I was to discover, is full of minor triumphs … the joy of being able to make the smallest movement, after a period of immobility, is indescribable.'[68]

Others, however, refused to speak about the illness.[69] 'Polio paralysed and withered limbs and twisted torsos…young men and women had to find ways to surmount their internalised sense …de-formed, dis-eased, dis-abled, dis-ordered, ab-normal and …in-valid.'[70] There was perhaps something in addition to early physical disability, hospitalisation and isolation that resulted in some survivors becoming sensitive to criticism and failure. But evidence also suggests that the prevailing social and medical culture – 'the culture of denial and submissiveness' – drove individuals to overcompensate. 'If the doctor suggested that you could not do something, you wanted to prove him wrong'.[71]

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68 Foster, *It Can't Happen to Me*, p. 27.

69 Interview with E. Broido, 19 Aug. 2002.

70 Wilson, *Living with Polio*, p.119.

71 J.H. Smith, 'Fear, Frustration and the Will to Overcome: A Social History of Polio in Western Australia' (PhD, Edith Cowan University, 1997), p. 391.

7.4 Dr James Gear, 'that Hallmark of a Genius'[72]

In December 1944, James Gear and his team successfully transferred the poliovirus to a monkey.[73] This success launched Gear's future research programme into polio which would become extremely successful in South Africa and abroad. As the war was drawing to a close and having experienced the need first hand to become involved in polio research, Gear thought that it would be worthwhile to investigate the disease as it occurred in South Africa. The Virus and Rickettsial Diseases Research Unit of the SAIMR headed this research in collaboration with the State Health Department, the Johannesburg and Germiston Health Departments and the Fever Hospital.[74]

It was evident that in tropical and subtropical countries, polio did not give rise to extensive epidemics. The disease occurred sporadically and the age at which cases

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72 J.H.S Gear, 'Some Highlights of Medical Technology in Southern Africa', Presidential Address: The first South African Scientific Congress of the Society of Medical Laboratory technologists of South Africa, *The S.A. Journal of Medical Laboratory Technology*, vol. 14, no.3 (1968), p. 15. Gear described a scientist as someone with: 'Luck … a fanatical interest in what he was doing and that hallmark of genius, never-ending patience and an infinite capacity for taking pains. He also had an expectant mind, tuned to the possibility of success, a seeing eye and an understanding heart', all qualities Gear possessed in abundance and which were recognised and valued by fellow scientists both local and abroad.

73 J.H.S. Gear and R.M. Yeo, 'Studies in Poliomyelitis', *SAMJ*, vol. 20 (11 Aug. 1945), p. 262.

74 J.H.S. Gear, *The History of the Poliomyelitis Research Foundation* (Johannesburg: Poliomyelitis Research Foundation, 1996), p. 16.

were most commonly seen was lower than in the more highly developed countries of the temperate latitudes. Dr Albert Sabin (who eventually developed the oral polio vaccine), had found that, during the Second World War, American soldiers serving in tropical countries had a much higher incidence of paralytic attacks than indigenous people. In South Africa, during the 1944-1945 epidemic, a similar pattern between black and white cases was noted. Although Gear doubted the accuracy of the black figures in South Africa, he had nevertheless noted similar epidemiological trends in other African countries where records had been carefully kept.[75] In all these regions, the incidence of paralysis among the white population was clearly much higher than among black communities.

An analysis of the age distribution of paralytic cases shows that, in the tropics, the majority of cases occurred in children under five years of age, while in Canada, New Zealand and Australia, there was an increasing number of cases among young adults. Gear also noted that an epidemic in Malta in 1942, involving servicemen and Maltese children, recorded an elevated mortality rate of 19.3 percent for men in the services, in contrast to 3.5 per cent for the indigenous children. He concluded that the virus responsible for the epidemic was evidently an indigenous strain. Over the following three years, polio spread, most likely as a result of the war-time traffic, to the USA, which experienced its worst epidemic since 1916, to South Africa, Mauritius, Madagascar and St Helena, and to Australia.

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75 J.H.S. Gear and L.M. Rogers, 'Studies in Poliomyelitis: Poliomyelitis in Northern Rhodesia', *SAMJ*, vol. 20 (9 Nov. 1946), pp. 670-73.

Unlike the USA, which depended on imported monkeys for research, South Africa had a plentiful supply of vervet monkeys which were suitable for polio research.[76] Fortunately most farmers regarded the *Cercopithecus oethiops pygerythrus* as a pest. Dr R.M. Yeo, ex-administrative officer of the South African Medical Corps (SAMC), arranged for monkeys to be sent from the Eastern Cape, where Dr C. Harington, then Superintendent of the SAIMR in Port Elizabeth, knew several farmers. In addition, Dr S. Annecke, Director of the Malarial Research Institute in Tzaneen, and his team were able to supply monkeys. A vervet monkey colony was established at SAIMR in an old stable vacated by horses which had been moved to new stables at the Institute's property at Rietfontein. A room was also set aside for polio work in the SAMC's laboratory.

The first aim in elucidating the picture of polio in South Africa was to determine the distribution of the virus in the community and its method of spread. In February 1945, during the epidemic, there was an outbreak of polio in a small children's home in Johannesburg. One child contracted polio, but Gear and Yeo were able to test whether others, in the group of eight children, were carriers of the poliovirus by injecting a solution of specimen faeces from each child into several monkeys, at staggered intervals over two months. Evidence showed that silent infections were present in only two healthy contacts and that this infection persisted

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[76] Tests were carried out on a monkey in December 1944 using part of the spinal cord of a 38-year old fatal polio case. Within ten days the monkey showed signs of paralysis. 'Studies in Poliomyelitis', *SAMJ*, (11 Aug. 1945), p. 262. The vervet monkey was susceptible to the three methods of transference of the virus: intracerebral inoculation, via the nose and intraperitoneal inoculation.

for at least a month; the rest were clear of the virus. What was not previously realised, and something which Gear and his unit established, was that 'for every paralytic case of polio there were at least five to ten non-paralytic cases and even more silent, symptomless infections, all capable of spreading the disease'.[77] It also explained why the public health measures adopted to prevent the spread of infection, such as the isolation of cases and family contacts, the closing of schools and prohibition of children in public places and gatherings had been largely ineffective in spreading the disease.[78] Another instance which underlined these finding was the case of a young boy, a brother of a paralytic case, who left Johannesburg to stay with relatives in the country to escape infection. Within two weeks, the relatives' own four children were infected, one of whom developed paralytic polio.[79]

The report also carefully described how each monkey was anaesthetised before inoculations were given, fitted with a numbered belt for easy identification and placed alone, in numbered cages, 'to eliminate the possibility of cross infection'. Tests were also run to determine the distribution of the virus in Johannesburg and to detect any non-human sources and their role in spreading the infection. 'Samples of water,

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77 M. Malan, *In Quest of Health: The South African Institute for Medical Research 1912-1973* (Johannesburg: Lowry Publishers, 1988), p. 227.

78 Gear and Yeo, 'Studies in Poliomyelitis', p. 262.

79 Malan, *In Quest of Health*, p. 227.

sewage, several batches of flies and bird droppings, including from the European swallow, were collected and tested but the results were negative in every case'.[80]

The unit's next objective was to trace the transmission of the virus from its source into the community. A profile of the contacts could be built up without the masking effect of silent carriers so prevalent during an epidemic. An infant girl of 19 months suddenly developed polio through no apparent link.[81] Her home was in the northern suburbs of Johannesburg, relatively isolated from neighbours, on a large plot where animals grazed. The house was unscreened and a short distance away from a municipal sewage purification plant. There were two other children in the family, six and eight years of age. The infant girl was admitted to the Johannesburg Fever hospital, with bulbar polio. Within three weeks she began to recover. In the meantime, shortly after her diagnosis, her eight-year old brother spent the night at a friend's house where he also attended a birthday party with 14 other children. Two days later his legs showed a sign of paresis (muscle weakness) and polio was confirmed. Eight days after this, his friend also became ill and died within two days, from respiratory complications. The dead boy's sister also contracted polio and developed paralysis of both legs. The unit then tested eight of the other party guests and found that one child had suffered an abortive attack of polio, four were well but excreted the virus, and three were clear. Gear concluded that personal association with cases or carriers of the

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80 Gear and Yeo, 'Studies in Poliomyelitis', p. 262.

81 J.H.S. Gear and B. Mundel, 'Studies in Poliomyelitis: The Study of an Outbreak of Poliomyelitis Occurring in a Suburb of Johannesburg', *SAMJ*, vol. 20 (9 Mar. 1946), pp. 106-110.

virus clearly played an important role in the spread of the infection.[82] These early investigations helped Gear to piece together a model of how the poliovirus was transmitted; earlier research thought that any link between the victims of the disease was mostly random. Eleven years later, Gear's results were still relevant to polio work and his diagrams were used as an illustration in Trueta's textbook.

Illustration 7.16

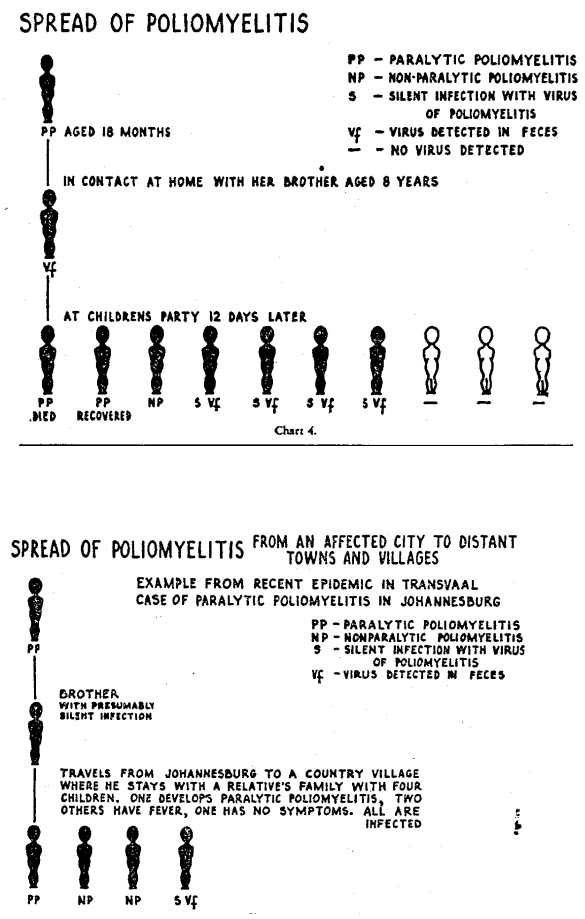

Diagram showing the dispersal of the poliomyelitis virus among contacts

Source: J. Trueta, *Handbook of Poliomyelitis* (Oxford: Blackwell Scientific Publications, 1956), p. 7.

82 *Ibid.*, p. 110.

Table 7.1

Racial Distribution		**Water Supply**	
European	308	City Supply	246
Native	135	Borehole	76
Indian	17	River	30
Coloured	16	Fountain	28
		Well	23
Sexual Distribution		Tank	16
Male	245	Spring	11
Female	231	Dam	4
		irrigation	3
Distribution of cases		Rail Supply	2
Town	344		
Farm	106		
Location	18		
Railway siding	4	**Sewerage**	
Small holdings	3	Water-borne	54
Native Compound	1	Pail	19
		bucket	17
Type of Residence		Pit	5
Good House	263	Vacuum Tank	4
Native Hut	94	Septic Tank	3
Poor House	64		
Flats	14		
Hotel	7		
Mine House	1		
Mine Compound	1		
Mental Hospital	1		
Boarding House	1		

Sample of the summary of analysis of returns from 476 cases of poliomyelitis, 1944-1945

Source: J.H.S. Gear, 'Poliomyelitis in Southern Africa, with Special Reference to the Epidemics of 1944-1945' (Paper presented at the 34th South African Medical Congress, Durban, 1946).

During the 1944-1945 epidemic, Gear was supplied with as much information on the polio cases as possible. Completed questionnaires from around the country were sent to him to analyse. Although he only received half the number of forms sent out, he felt that 'the number was sufficiently large and representative to give a

complete picture of the epidemic as a whole'.[83] The name, race, age, sex, details on recovery, residual paralysis or deaths on 476 cases were collated.[84] The questionnaire included information on home conditions, what food had been eaten prior to infection and even how it had been prepared. In his usual meticulous way, Gear examined what kind of pets and livestock were kept, the nature of the water supply and sewage systems, and whether individual households had been exposed to insects – endeavouring to understand what might have contributed to the spread of the disease. Gear presented a paper on his findings at the Durban Medical Conference the following year.

7.5 Other Explorations into the 1944-1945 Polio Epidemic

Doctors elsewhere in the Union wrote papers about their experiences with the epidemic, giving details on a cross-section of cases, discussing the diagnostic signs and symptoms, lumbar-puncture results and the progress of the disease up to the convalescent stage.[85] They, too, attempted to speculate on the transmission of polio.

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83 J.H.S. Gear, 'Poliomyelitis in Southern Africa, with Special Reference to the Epidemics of 1944-1945' (Paper presented at the 34th South African Medical Congress, Durban, 1946), pp. 10-19.

84 SAB, GES, 533, 231/2/12A Letter from Gear to the Secretary of Health, 22 Jun. 1945.

85 M.W. Kaplan, 'Epidemic Poliomyelitis in Durban', *SAMJ*, vol. 19 (24 Feb.1945), pp. 55-7; M.H. Finlayson and J.F. Wicht, 'A Case of Suspected Poliomyelitis', *SAMJ*, vol. 19 (24

Dr J. Henson seemed adamant that the polio vector, in the recent outbreak of the disease in Springs, was the fly. 'It has been shown beyond all doubt that flies can carry the virus from such sources as exposed faeces or where the only apparent source of infection was refuse bins. In addition, the summer heat and cows grazing nearby had exacerbated the fly problem. 'Most of the cases could have ingested foodstuffs contaminated by flies.'[86] Significantly, Henson thought that a major predisposing factor to polio in the area was the new and relatively non-immune generation of children living in rural Springs. The last known polio cases had been 20 years earlier.

In 1946 Gear followed up on the sewage link to polio, initially to locate the poliovirus in the Cydna sewage works in Johannesburg and then to examine the distribution of the virus during the process of sewage purification, which passed through five stages. To begin with, raw sewage flowed into settlement tanks from which raw sludge was drawn off into tanks to digest for 30 days. The settled sewage flowed onto sprinkler filter-beds and the effluent from here flowed into humus tanks. At this stage the effluent was discharged into streams or rivers and used for land irrigation. Some effluent was further purified through a sand filtration process and then used for irrigation. Samples taken from each stage were injected into monkeys to see whether the disease developed. The results showed that the poliovirus was present in sewage until the final stage of purification by sand filtration. Considering that the effluent, before the purification stage, was used for irrigation of cultivated lands, Gear

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Mar.1945), pp. 101-103; J. Henson, 'An Epidemiological Study of the Poliomyelitis Outbreak in Springs, 1944-1945', *SAMJ*, vol. 19 (24 Nov. 1945), pp. 422-26.

86 Henson, 'Poliomyelitis Outbreak in Springs', p. 426.

warned that all produce grown in such conditions would be suspect, especially vegetables such as lettuce, which is usually eaten raw. He thought that it was remarkable that the poliovirus was still entering the sewage two months after the last recorded polio case in the vicinity. This meant that the poliovirus was still active, most likely in silent infections.[87]

Gear's early work into polio is significant for several reasons. Such studies had never been done on the disease in South Africa and were thus groundbreaking. He realised that one needed to concentrate on how the virus behaved during an epidemic in order to understand it better. By focusing investigations on the poliovirus within the community, Gear was able to push polio epidemiology beyond the earlier studies which concentrated on the disease in Westernised conditions. The South African context offered Gear a unique opportunity to investigate the racial incidence of the disease extensively. His prediction that black communities would become more vulnerable to polio as their living conditions improved was to be borne out in later epidemics.

Gear was one of the 'new generation' polio explorers who recognised that prophylactic vaccinations, so successful in controlling and preventing other viral diseases like smallpox and yellow fever, was the way forward, but he was realistic about the time scale involved. 'It must be confessed, in conclusion', he declared at the Durban conference, 'that much work remains to be done before we can control and

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87 B. Mundel, J.H.S. Gear and D. Wilson, 'Studies in Poliomyelitis: The Distribution of the Virus of Poliomyelitis in a Sewage Purification Works in Johannesburg', *SAMJ*, vol. 20 (22 Jun. 1946), pp. 336-338.

prevent this cruel, crippling disease … However there is every reason to hope that the desired vaccine will be evolved.'[88]

[88] Gear, 'Poliomyelitis in Southern Africa', p. 22.

Chapter Eight

Conclusion

A study of the early epidemics in Johannesburg is important as it provides a basis for the understanding and treatment of polio at a time when little was known about the disease. This period in polio's history could so easily be relegated to a back shelf marked the 'Floundering Years', particularly when compared to the later glorious period of success when news of a prophylactic vaccine made headline news and the front page of *Time* magazine.[1] By the end of the 1950s, the reality of a vaccine was to defuse, to some extent, the overwhelming sense of helplessness which dominated the early epidemics.

People were in the dark about almost all aspects of polio during the period with which this thesis has dealt. Very little was understood about the disease itself. Knowledge that the poliovirus had been discovered as early as 1908 was of limited value, and though this informed polio research, it offered little help to those who had to live through the epidemics and the experience of the disease. For many in Johannesburg, the reality of the 1944-1945 epidemic was completely novel, while it reminded an older generation of their first experience of polio and their dread of the unknown, which was so much part of the 1918 epidemic. The reality of polio on the streets of Johannesburg gave rise to tensions:

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1 *Time*, 29 Mar. 1954.

health authorities did not know how to prevent the spread of the virus; doctors were filled with a sense of foreboding, as there was nothing they could do to stop the virus from multiplying inside the body; the general public became distraught as daughters, sons, school friends, neighbours, mothers and fathers were struck down by the disease within the very heart of the community. A terrifying aspect of polio is that it operated within the sanitised environment of the home, away from the familiar sources of disease, such as squalor and filth. Ironically, the more modern approach to living, with running water, water-borne sewage and improved diet, had been carefully prepared by years of public-health schemes aimed at improving the lot of children. Polio showed up the limitations of medical science at the time. Still glorying in recent successes against malaria, yellow fever and typhoid, medical authority over disease was brought to its knees by the smallest virus yet discovered, which resisted the 'magic bullets' and infection-fighting drugs which were new to the arsenal of modern medicine.

Health authorities and doctors in Johannesburg could only operate within the boundaries of their understanding of the disease at the time. The Medical Officer of Health (MOH) of Johannesburg resorted to using every means available to contain the spread of the virus. Quarantine measures, which had already been proved by others to be ineffective, were put in place within the municipal boundaries. Fly control measures were introduced once it was believed that the fly could be a vector of polio. During the 1944-1945 epidemic, the Health Department insisted on weekly records of new cases, despite inaccurate figures, in the hope that the numbers would soon indicate an end to the epidemic. But the MOH of Johannesburg also tried to play down the presence of the

epidemic by not publishing records for a short period and advising parents that children should live normal lives, a misguided move that did not defuse anxiety. Yet, in the end, the trial-and-error approach to the early epidemics helped Johannesburg health officials build up a more effective polio policy.

Doctors also followed a trial-and-error approach. Diagnosis of the disease was difficult as the symptoms of polio were similar to those of other childhood diseases. For years, the main portal of entry was believed to be the nose, and nasal sprays were used in an attempt to prevent the virus from entering the central nervous system. Serums were supposed to arrest the virus by boosting the body's immune system with anti-bodies from other polio survivors. Doctors suspected that the intestine was also involved in the disease, but were unsure of what role this played. Thanks to the generous gift of Lord Nuffield, doctors in Johannesburg at least had an assortment of breathing machines to help with patients who developed respiratory problems. Such cases were doomed during the 1918 epidemic, but, other than the bulbar cases, most respiratory difficulties usually responded to treatment. Pain control and a policy of bed rest remained the core of treatment common to both early epidemics. The timely intervention of Sister Kenny and her 'new method' broke the stranglehold of immobility as the main treatment, and made life a little more bearable for the polio patients in future outbreaks. New areas of specialisation such as physiotherapy and orthopaedic surgery also helped treat polio patients, and Johannesburg was fortunate to have several surgeons with overseas orthopaedic training. Cripple care, initiated by wartime needs, became available to polio patients and Johannesburg's Hope Home provided care and schooling for many of

Johannesburg's polio cases throughout the polio years.

The impact of war on the early epidemics is important. Each outbreak was caused by a virus or viruses imported from war zones, which were virulent enough to cause the disease to break out of its endemic state and assume epidemic proportions, infecting thousands. Wartime conditions were responsible for the rapid transmission of the virus and siphoned off vital medical personnel into war service. The fact that South Africa did not accept the Kenny method could be partly due to the financial demands of the war, although this decision was also influenced by the views from overseas and the fact that her method was not scientifically based. The psychological impact of war directed the way that polio was viewed on the domestic front. This comes through in the use of 'battle rhetoric' in local Johannesburg newspaper articles, medical reports in the *SAMJ* and the letters sent to the editor by concerned citizens of Johannesburg. Although the idea of disease as the enemy is not new, the wartime epidemics seem to have imposed an emotional overlay on the way people interpreted polio.

The idea that polio was the number one enemy of childhood continued for years during the fight against polio. Polio was a hidden enemy, unseen by the naked eye, it attacked suddenly, often without warning, and its random choice of victims followed no clear battle formation which could be understood and stopped. What made polio so terrifying was the fact that it targeted innocent healthy children and young adults; polio's ground troops and main source of transmission were the thousands of unidentified cases who were unaware that they had been infected. Polio tested the trust that people placed in medical science, it profoundly tested family relationships and brought into question the

way in which health authorities were viewed as guardians of public health. Above all, so many individuals were robbed of childhood aspirations and dreams by the disease as it changed their lives and the lives of those closest to them.

As epidemics returned, polio shifted beyond infants to older age groups, and spread from whites to all groups in the country. The number of cases among blacks grew proportionately during 1944-1945, and was to increase further in the subsequent decade. Johannesburg remained the city with the highest number of cases. In 1945, white cases were ten times higher than those among blacks. One important avenue for future research, in order to gain a more complete picture of polio, is to explore the disease on a national level, and in particular how it affected blacks.

The first-hand experience of polio gained during the early epidemics in Johannesburg prepared the community for future outbreaks, and, despite the level of apprehension and dread, there were positive repercussions. The emphasis laid on ineffective quarantine methods was reviewed and fine-tuned where possible. Improved methods of pain control were developed by doctors at the Johannesburg Children's Hospital based on observations made during these two epidemics. Ordinary doctors became researchers, contributing to the knowledge of polio as it occurred in areas close to Johannesburg, in Natal and Cape Town. And, perhaps most importantly, a new leader, James Gear, responded to the medical crisis of wartime polio by emphasising the need for systematic and detailed research. With Gear's decision to continue in polio research at the SAIMR, Johannesburg became the centre of polio research. With Gear at the helm, and a plentiful supply of monkeys, polio research was to develop rapidly after 1945. It was at

the instigation of Gear that plans for specialised laboratories were taken seriously after a new and even more serious epidemic struck Johannesburg during 1948, and plans to build the Poliomyelitis Research Institute were finalised.

Despite their fear, Johannesburg's parents – one of the groups hardest hit by epidemic polio – developed an 'epidemic mentality'. It was the determined spirit of war-time, combined with intense frustration, fear and the threat the disease posed to their children, which united the community of Johannesburg. One of the biggest fund raising events ever held in Johannesburg, started in 1948 to raise money to build the Poliomyelitis Research Institute, succeeded because of this united front and determined effort to conquer the threat of polio.

One could argue, since the early epidemics in Johannesburg were separated by a gap of 26 years during which polio receded, Johannesburg experienced two 'first' epidemics, with all the drama, confusion and suffering such events command. The later 1944-1945 epidemic received more attention in polio literature, while the 1918 epidemic remained cocooned in time, its part in the history of polio in Johannesburg largely ignored because of incomplete records.

In 1949, the long-awaited breakthrough in polio research was made by American researchers, J.F. Enders, T.H. Weller and F.C. Robbins, who cultivated the poliovirus in

'non-nervous tissue'[2] which directly accelerated vaccine research.[3] After 40 years of battling the disease in the gloom of unknowing, the first polio vaccine was developed in the USA in 1954. Gear's groundbreaking research based on the 1944-1945 epidemic and later work on developing a South African vaccine played a significant part in the world-wide fight against polio.

In South Africa, meanwhile, the epidemic in 1944-1945 highlighted how little was known about the virus: its physical and biochemical properties had not yet been clearly defined; its method of spread was still uncertain; and culturing the virus needed a great deal of time and work. The SAIMR did not have accommodation for such research, nor could their resources undertake such a large financial commitment. The government, at this stage, declined to become involved so money would have to be found from other sources.[4] In May 1948, an appeal committee was set up in Johannesburg under the chairmanship of the mayoress, Mrs E. Gordon, and the Poliomyelitis Research Appeal Fund was launched to fund the establishment of the Poliomyelitis Research Foundation. A new and vital phase in the polio story in Johannesburg, as well as in South Africa more broadly, would thus begin.

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2 M. Marais, *In Quest of Health: The South African Institute for Medical Research 1912-1973* (Johannesburg: Lowry Publishers, 1988), p. 234.

3 J.R. Paul, *A History of Poliomyelitis* (New Haven and London: Yale University Press, 1971), pp. 373-394.

4 Marais, *In Quest of Health*, p. 232.

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