

COPING WITH CRISIS

Medicine and disease on the Burma

Railway 1942 – 1945

G.V. Gill

Thesis submitted in accordance with the requirements of the University of Liverpool
for the degree of Doctor of Philosophy by Geoffrey Victor Gill.

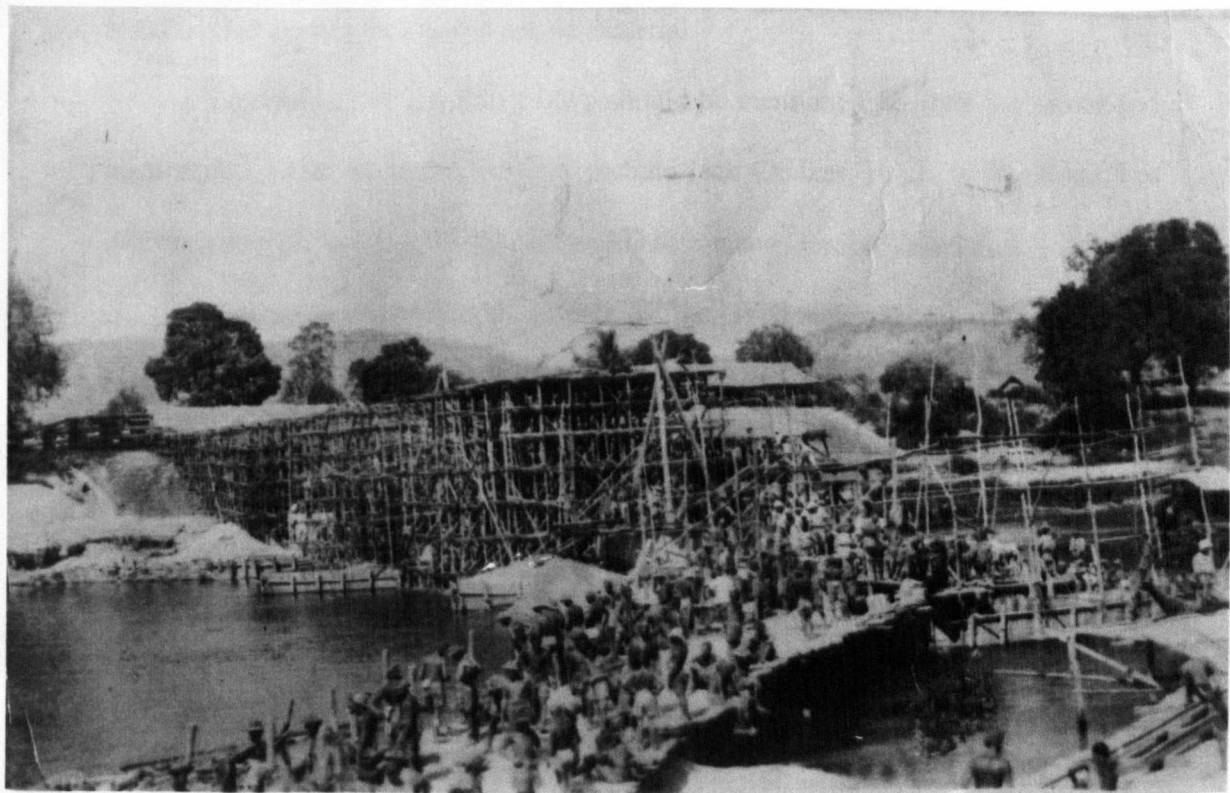
July 2009

DEDICATION

To the doctors and medical orderlies

who cared for the sick on the

Thai-Burma Railway, 1942–45



ACKNOWLEDGEMENTS

I am indebted to the late Dr Dion Bell, previously Reader and Consultant Physician at the Liverpool School of Tropical Medicine, who cared for hundreds of ex-Japanese POWs with skill and compassion. It was my association with him which inspired my interest in POW medicine. There are also a great many others to whom I owe thanks – my supervising team of Dr Nick Beeching and Professor Robert Lee especially; as well as my panel of mentors Dr David Laloo and Dr Sally Sheard.

Professor Arthur Marwick (Open University) and Professor Roger Swift (University of Chester) opened up history to me as an academic discipline. The staff of many archives deserve thanks, but especially Roderick Suddaby of the Imperial War Museum. Professor Peter Davies (University of Liverpool) also helped greatly with source material, and Dr Rosalind Hearder of the Australian War Memorial has been an invaluable adviser – particularly as her PhD thesis concerned Australian Far East POW doctors. Dr Nigel Stanley, a fellow British Far East POW historian has also directed me to much useful source material.

A number of ex-Far East POWs should be mentioned for their assistance and inspiration. There are many, but they include Jack Chalker, Hugh de Wardener, Les Martin, Steve Cairns, Harold Payne, Peter Dunston and Gordon Vaughan.

Finally, much gratitude is due to the Wellcome Trust, who supported sabbatical leave at the start of this project, and with a travel grant later to assist in visits to archives, home and abroad.

FOREWORD

In early 1942, some 100,000 Allied troops were captured by the Imperial Japanese Army (IJA) at the fall of Singapore – arguably Britain’s worst military defeat. Later that year, many thousands were transported north to Thailand (then Siam) and Burma to act as a workforce on the construction of the Thai/Burma Railway (sometimes known as the “Burma Railway” or the “Death Railway”). This was an ambitious, perhaps stupendous, engineering project designed to drive a railway through the jungles and over the mountains between Thailand and Burma. The line was completed at a cost of about 13,000 Allied prisoner-of-war (POW) lives – about a quarter of the 50,000 total employed on the project. The POWs were exposed to extremes of hard labour on a grossly insufficient diet, as well as a variety of serious tropical infections and infestations indigenous to the area. The POW medical officers usually had little in the way of medicines and equipment, and were faced with an enormous and frustrating medical task.

Though Japanese maltreatment of their prisoners has attracted media attention in general, and on the Thai/Burma Railway in particular (for example the film *Bridge on the River Kwai*), academic examinations of the Far East POW episode are rare. Indeed, there is a serious historiographic issue here – military defeat and captivity is generally less likely to attract the attention of historians. Thus, a recent book on 2nd World War defeat in the Far East is called *Forgotten Armies*.¹ The same is true of military medicine – Mark Harrison’s review of armed forces medicine in the 2nd World War is entitled *Medicine and Victory*² (ie **not** defeat), and includes only a few pages concerning medicine in POW life in Asia.

This is not to criticise Harrison’s excellent source book, as historians are faced with a distinct problem of primary source availability when studying army medicine in captivity. On the Thai/Burma Railway, for example, the discovery by the Imperial

Japanese Army of diaries and drawings kept by POWs was likely to result in execution. Unsurprisingly, contemporary source material concerning the medicine of captivity is problematic.

This thesis aims to uniquely examine disease and its management by British army medical officers on the Thai/Burma Railway. Using available source material – contemporary and recalled – it will attempt to objectively assess disease on the Railway, the way in which army doctors responded to this challenge, and also the medical sequelae of the experience. The enquiry will necessarily involve the relations the doctors had with IJA camp commanders, senior non-medical POW officers, and also the “rank and file” of POW men.

In different ways all these liaisons played their part in achieving what was a remarkable medical victory during imprisonment.

¹ C Bayly & T Harper. *Forgotten Armies. The fall of British Asia 1941-45.* (London, 2004)

² M Harrison. *Medicine and Victory. British military medicine in the Second World War.* (Oxford, 2004)

A NOTE ON RESEARCH METHODS

This thesis represents the results of an academic historical enquiry into medicine on the Thai-Burma Railway from 1942 – 1943. The author has both medical and historical qualifications, and it is hoped that the work will be of interest to both historians and doctors, as well as interested lay readers. The enquiry developed from the large clinical and medical research experience of the Liverpool School of Tropical Medicine, which cared for over 2,000 ex-Far East POWs (FEPOWs) during the 1970s, 1980s and 1990s. As well as leaving behind their fascinating stories, a number donated diaries, drawings and other artefacts from their POW days.

The majority of FEPOWs who attended the Liverpool School of Tropical Medicine had been imprisoned on the Thai-Burma Railway; and in view of the large presence of British prisoners on this project, the research enquiry reported here has concentrated on this area of captivity. A wide variety of archives were searched for primary source material, the most important of which was the Department of Documents at the Imperial War Museum, London. Others included the History of Medicine Library of the Wellcome Trust (London), the United Kingdom National Archive (London), the British Red Cross Archive (London), Archive of the National Army Museum (London), Royal Pharmaceutical Museum Archive (London), Royal Army Corps Museum (Aldershot) and the Australian War Memorial Archive (Canberra, Australia). Oral history interviews were also used, including some from the Sound Archive of the Imperial War Museum. Regarding secondary sources, relatively few academic historical works on the subject have been produced, and the next section will also critically examine the breadth and reliability of available sources.

A number of primary sources include records of diseases and death in the railway camps. Some of these are remarkably detailed, and represent rich sources of information. Particularly from a medical viewpoint, however, they do provide problems of accuracy and interpretation. The culture of meticulous record-keeping in the British Army suggests that the figures themselves are likely to be accurate. However, diagnostic (rather than numerical) accuracy is something of a problem. For example, without laboratory support (which was mostly the case), differentiating the causes of fever (malaria or dengue?), diarrhoea (amoebic or bacillary dysentery?) or body swelling (hypoproteinaemia or beriberi?) was difficult. Also, most disease records concerned patients admitted to the camp hospitals rather than those treated as “out-patients”. This means that the overall picture is somewhat biased in favour of the

relatively sicker hospital admissions. This source of error, known in modern epidemiological terms as “selection bias”, was not appreciated as an interpretive problem in mid-twentieth century western medicine.

The recording of hospitalised cases (some with fatalities) usually included absolute numbers, compared with total admissions. Strangely, proportionate data (the disease burden as a percentage of the admission numbers) was rarely, if ever, recorded. Calculating these rates can however be useful. An example is the mortality data at Tamarkan Hospital Camp in 1943 where 67% of deaths were due to dysentery (see Table 2, Chapter 3) ¹.

A more significant problem is assessment of proportionate disease burden compared with the total prison camp population. The difficulty here was that the numbers in each camp were in a constant and unpredictable state of flux, with prisoners moving in and out on a daily basis. Accurate figures were rarely available to the doctors compiling the camp hospital statistics. A notable exception was the extensive malaria survey by T Wilson and JA Reid, which accurately recorded attacks of malaria in various railway camps, expressed per 1,000 men per day ². The reason for this level of accuracy was that Wilson and Reid were non-military prisoners, brought to Thailand by the Japanese specifically to survey the malaria situation. They did not have to work as POWs, and were able to spend their whole time enumerating both malaria cases and the daily camp populations.

Despite these epidemiological limitations, the figures recorded by POW doctors remain a remarkable record of disease and death in these remote jungle camps. Their figures testify to the diligence, discipline and bravery of the men who practiced medicine in such difficult circumstances.

1. Archive of Brigadier Philip Toosey. Report by Major Arthur Moon. Imperial War Museum, IWM 93/14/7.
2. T Wilson and JA Reid. Malaria among British POWs in Siam (“F”Force). *Transactions of the Royal Society of Tropical Medicine and Hygiene* 1949; 42: 257-272.

A NOTE ON SOURCES

In the Forward to this thesis I have referred to the problem of military defeat and imprisonment in terms of source material. Good secondary source information on the Thai/Burma Railway has been uncommon, with the exception perhaps of the writings of the military historian Clifford Kinvig.² Over the last decade there has been more academic interest in events during 2nd World War imprisonment by the Japanese,² but the spectrum of literature remains limited – especially so from a medical history viewpoint.²

A variety of retrospective accounts of life on the Thai/Burma Railway have appeared over the years. Most of these are personal non-academic retrospectives, sometimes with a degree of bias – in particular perhaps a feeling between the lines (and understandably) of an “axe to grind” against Japanese maltreatment. Nevertheless, some of these (by non-medical authors) give a useful insight into the patient perspective during illness in captivity. As with secondary sources, medical retrospectives are few, but those of the British army doctors Stanley Pavillard and Robert Hardie are especially useful.²

Primary source material presents difficulties of a different sort. Many POWs sought to record events in captivity, but in most cases the discovery of diaries or drawings by the Japanese would result in serious reprisals as previously mentioned. Nevertheless, a number of records and diaries were kept – often hidden in ingenious places such as hollow bamboo crutches – and recovered after the war. Many are now housed in the Department of Documents at the Imperial War Museum, London. Amongst these are some remarkably detailed medical records and statistics, often collected and recorded in the most extreme of conditions. A particularly useful and perhaps surprising primary source is the extensive collections of “Railway Art” drawn or painted at the time by various POW artists including Leo Rawlings, Robert Hardie

and Stanley Gimson. Undoubtedly the most celebrated and important, however, was Jack Chalker – later to become a professional artist. As well as the most gifted of this group of brave men, Chalker was a medical orderly, and his hospital-based and clinical artwork provides a highly useful source for the medical historian.² The work of these artists is particularly inspiring since most of their materials (paint, charcoal, paper etc) had to be made from local natural materials.

Oral history records exist – mainly at the Sound Archive of the Imperial War Museum, London; but medical issues in these interviews are generally incidental. For the purposes of this research, specific directed interviews were carried out, but sadly the number of surviving Railway medical officers is very few.

A final source of material for the author was records and artefacts donated by ex-POWs to the Liverpool School of Tropical Medicine, either during the course of this historical enquiry, or when having medical assessments at the School. These have involved a unique original medical report from Linson (202 Km) Camp on the Railway, a “Jap Happy” (loincloth issued to POWs on the Railway by the IJA, and one of the original 6 inch nails used to hammer rail track to sleepers.

It is from this diverse, problematic, but often rich source-material that this thesis has been written.

¹ C Kinvig. *River Kwai Railway. The story of the Burma-Siam Railroad.* (London 1992)

² Examples include: R Havers. *Reassessing the Japanese Prisoner of War experience. The Changi POW Camp, Singapore 1942-45.* (London, 2003); and G Daws. *Prisoners of the Japanese.* (London, 1994)

³ So far, the only dedicated enquiry addressing medicine on the Thai/Burma Railway is a PhD thesis by Dr Rosalind Hearder: *Careers in Captivity: Australian Prisoner-of War Medical Officers in Japanese captivity during World War II.* (University of Melbourne, 2003).

⁴ SS Pavillard. *Bamboo Doctor.* (London, 1960); and R Hardie. *The Burma-Siam Railway. The secret diary of Dr Robert Hardie 1942-45.* (London, 1983)

⁵ J Chalker. *Burma Railway Artist. The war drawings of Jack Chalker.* (London, 1994)

ABSTRACT

In late 1942, the Imperial Japanese Army (IJA) moved a workforce of some 50,000 prisoners of war (POWs) from Singapore to Thailand and Burma. Their task was to build the infamous “Burma” or “Thai-Burma” Railway, running from Nong Pladuk in Thailand to Thanbyuzayat in Burma – over 400 km of mountainous and jungle terrain. The line was to support an invasion of India, though this never took place. Conditions in the railway POW camps, particularly those “up-country” were poor. Supplies of food were grossly inadequate, physical work hard and discipline harsh. Syndromes of malnutrition such as beriberi occurred, as did malaria, dysentery, devastating cholera outbreaks, and tropical leg ulcers which often led to amputation. Of the 50,000 POW workforce (mostly British, with some Australian and Dutch), 20% died.

This thesis describes for the first time the spectrum of disease on the Burma Railway, and the ways in which doctors and medical orderlies coped with the burden of large numbers of sick POWs with malnutrition and tropical diseases, with minimal drugs and equipment. The enquiry has used predominantly primary sources including diaries, reports and drawings. The POW doctors were of varying specialty, experience and nationality. They used their skill-mix to their advantage, for example holding regular meetings to discuss individual cases or general treatment issues. Army discipline and command structure also helped maintain order in a potentially chaotic situation, and at least in some camps the Commanding Officers (CO) usefully supported the medical staff. An example is the “fly swatting” initiative at Tamarkan Camp by their CO, Colonel Philip Toosey, which greatly reduced the spread of dysentery. A surprising source of medical help was the “V” Organisation, a secret supply chain run by a sympathetic group of civilian internees in Bangkok, which smuggled drugs and medical equipment into many POW camps. However, arguably

the most important source of support for the POW doctors was the expertise of the “Civilian Army” in the POW ranks, which comprised artisans, tradesmen, mechanics and scientists. Camps developed workshops where distillation equipment, infusion sets and medical instruments were made from anything and everything.

Medicine on the Burma Railway has been described as a unique experiment into the effect of under-nutrition and tropical disease exposure on a huge POW workforce. The recorded observations of the railway doctors, as well as those who cared for the medical aftermath of their experience post-release, has provided new insights into many tropical conditions. In addition, this research has provided an intriguing and uplifting account of strategies of coping in situations of medical disaster with minimal resources.

LIST OF ABBREVIATIONS

AMD	Army Medical Department
BTM	Benign tertian malaria
CMO	Chief Medical Officer
CO	Commanding Officer
COPD	Chronic obstructive pulmonary disease
DHSS	Department of Health and Social Security
FEPOW	Far Eastern Prisoner of War
FMSVF	Federated Malay States Volunteer Force
IAMC	Indian Army Medical Corps
IJA	Imperial Japanese Army
IAMS	Indian Medical Service
M&B	May & Baker
MBE	Member of the British Empire
MD	Doctor of Medicine (thesis or degree)
MO	Medical Officer
MTM	Malignant tertian malaria
NCO	Non- commissioned officer
OBE	Order of the British Empire
PhD	Doctor of Philosophy (thesis or degree)
POW	Prisoner of War
PTSD	Post- traumatic stress disorder
RAAMC	Royal Australian Army Medical Corps
RADC	Royal Army Dental Corp
RN	Royal Navy
SSVF	Straits Settlement Volunteer Force

TA	Territorial Army
TDI	Tropical disease investigation
UK	United Kingdom
US	United States
USA	United States of America
VA	Veteran's Administration
VD	Venereal disease
VJ	Victory over Japan (day)
WO	War Office

CONTENTS

Chapter 1	INTO CAPTIVITY. A medical perspective on the fall of Singapore, 1942.	p 1
Chapter 2	ANATOMY OF A RAILROAD. The Thai- Burma Railway and its medical services.	p 37
Chapter 3	DISEASE, DISABILITY AND DEATH. The spectrum of illness and mortality on the Thai- Burma Railway.	p 86
Chapter 4	MAKESHIFT MEDICINE. Invention, innovation and ingenuity in treating POW disease.	p 137
Chapter 5	AFTERMATH. Post-war effects of the Far East POW experience.	p 197
Appendix 1.	The Nakom Paton Medical Society	p 229
Appendix 2.	The “V” Organisation	p 241
Appendix 3.	Bibliography of Secondary Sources	p 254
Appendix 4.	Bibliography of Primary Sources	p 259

CHAPTER 1

INTO CAPTIVITY

**A medical perspective
on the fall of
Singapore**

On Friday 13 February 1942, *The Straits Times*, the local newspaper of Singapore, conveyed a message to its readers from the colony's governor, Sir Shenton Thomas, "Singapore must stand, it SHALL stand".¹ It did not stand however, but though the island was to fall to the invading Japanese just two days later, the newspaper reports remained generally optimistic. For example, "Japanese suffer huge casualties in Singapore" and "Royal Artillery Gunners stick to their posts". Perhaps the worst news was that a liquor ban was now in force.

The next day, the newspaper was a little less positive, and conceded retrospectively that "yesterday was probably Singapore's worst day since fighting began".² Nevertheless there was still talk of the "city's new defence lines", and reports that several Japanese tanks had been blown up. On Sunday 15 February, *The Sunday Times* (Singapore) maintained that defence was being "stubbornly maintained" but advised residents to conserve water and "fill your bottles".³ In fact, it was later the same day that the Allied Forces in Singapore surrendered to the Imperial Japanese Army.

The somewhat over-optimistic view given by the press had not been shared by the British Army, who knew of the seriousness of the Japanese assault. On the 10th February 1942, General Sir Archibald Wavell (Commander in Chief of South-Western Pacific Command) sent a telegram to General Arthur Percival (Officer Commanding Malaya).⁴ He pointed out that the Singapore garrison greatly outnumbered the invading Japanese. "Our whole fighting reputation is at stake", wrote Wavell, "and the honour of the British Empire it will be disgraceful if we yield our boasted fortress of Singapore to inferior enemy forces". The seriousness of the situation was clear to both Wavell and Percival. The writing was very much on the wall, and only five days later there occurred what Winston Churchill later

described as “the worst disaster and largest capitulation in British History”.⁵ What had gone wrong?

Japan and the “Lightning War”

Japan’s entry into the 2nd World War was more complex than that of European participants in the conflict. As a mountainous island state, Japan’s economy in the early 20th century was highly dependent on trade, and this vulnerability probably led to imperialist and expansionist policies in the 1920s and 1930s. Subversive groups began to favour military rather than peaceful means of spreading Japan’s influence. These organisations gained significant support, and were responsible for the assassination of two Japanese prime ministers in the early 1930s. Attitudes of aggression were growing, the domestic economy was in recession, and the increasing population was creating a feeling of enclosure. These attitudes and issues led to wars with Manchuria and China, which broke out in 1931 and continued throughout the decade, mostly in Japan’s favour. A number of Japan’s incursions into China were associated with rape and violence – perhaps a precursor to future events; and also perhaps surprising as Japan’s record on the treatment of prisoners in previous wars had always been good.⁶

The beginning of the war in Europe in 1939 stimulated further Japan’s expansionist policies, and in 1940 a tripartite pact with Germany and Italy was signed, defining who would have the “spoils of war” after victory. Japan was allocated what was known as the “Greater East-Asia Co-Prosperity Sphere” – a huge tract of south-east Asia, the Far East, Oceania, and even Australia. This plan threatened the United States of America (USA) and its shipping routes, and diplomatic engagements took place between Japan and the USA during 1941, eventually breaking down in October

of that year with the Japanese attack on Pearl Harbour in Hawaii, ending American neutrality and forcing them into the 2nd World War conflict.

Following Pearl Harbour, Japan's military expansion into the Pacific area was dramatic and brilliantly successful. In a brief period between December 1941 and April 1942, they took over most of the Far East theatre of war – a period of conquest which became known as Japan's "Lightning War" or the "One Hundred Days" war. The catalogue of victories was awesome. Victory over the smaller Pacific Islands began with Guam and Wake. Hong Kong fell on Christmas Day 1941; and the Philippines were invaded also in December 1941, eventually capitulating in May 1942. Borneo, Sumatra, Celebes and Java were all taken in the first quarter of 1942. Burma fell in March. Singapore's fate was essentially being sealed as Thailand (then Siam) was taken, and the IJA swept down the Malayan peninsular in the first few weeks of 1942 (Figure 1)⁷.

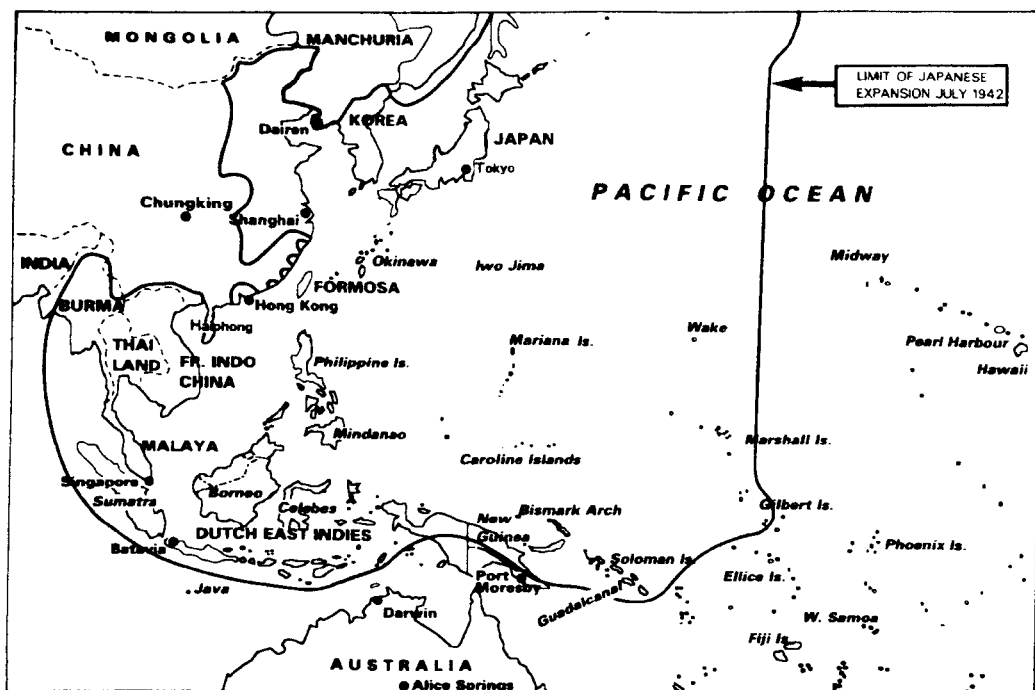


Figure 1. The south-east Asian and Far East theatre of war, showing Japanese conquests up to 1942⁷.

Malaya was invaded from Thailand (Siam) on 8th December 1942. The Japanese army was supported by an air strike force which attacked and sunk the British ships *Prince of Wales* and *Repulse* off the east coast of Malaya, the day after the invasion.⁸ The IJA advanced relentlessly, and by 26th December 1942 Kuala Lumpur was under attack by air. Victories at Kampar and Slim River made the route to Kuala Lumpur clear. In the capital, the British Administration was collapsing, and widespread retreat down the peninsular was beginning. There was an attempt at a “scorched earth” policy by the British. In Kuala Lumpur, this involved the time-consuming demolition of railway stock, and even the destruction of 51 million cigarettes and \$50,000 worth of whisky!⁹

The push to Singapore by the IJA was aided by a driven and efficient command. To speed the crossing of rivers, and reduce the need for troop-carrying boats, Japanese soldiers would sometimes swim with their kit held above their heads. This technique was used also at the final crossing of the Johore Straits between Malaya and Singapore Island. Bicycles were also extensively used to speed the Japanese, and reduce the need for motorised transport. The sound of the approach of hundreds of bicycles was described as like the humming of bees, with occasional clanking noises as some bicycles did not even have tyres, and were ridden on the bare metal wheel rims!¹⁰

The advance down the Malayan peninsula was arguably one of the most impressive attacks of the Japanese Lightning War, and the Japanese Commander in Malaya, General Masamobu Tsuji was rightly proud of the achievement retrospectively.¹¹ British historians later described it as an “epic achievement”.¹² In 55 days, Tsuji had advanced an average 20 Km per day and fought 95 engagements.¹³ By early February, his 60,000 men were assembling on the mainland side of the Johore Straits – facing the British garrison of some 120,000 across the water on

Singapore Island. Despite being outnumbered 2 to 1, the Japanese had the momentum of victory, and the smell of success.

The fall of Singapore

As early as late January 1942, forward battalions of the IJA were attacking the causeway linking Singapore to the mainland. The speed of the Malayan Campaign had certainly taken the Allies by surprise –invasion may have been expected, but not an advance of 500 miles from Thailand down the Malayan Peninsula in less than eight weeks. Reinforcements were, however, arriving daily by sea, and at the time of Singapore's fall it is estimated that there were well over 100,000 Allied troops in the colony. Unfortunately Percival chose to spread his troops thinly around the whole island perimeter, with guns mainly to the south and west of the island. At least retrospectively, concentration of arms on the causeway area may have seemed more sensible. Spread along a 9 mile front on the north of the island, the Allied troops could not prevent the Japanese from crossing the damaged causeway, or halt the multitude of 40-men landing crafts which crossed the narrow (half to 2 miles) straits (see Figure 2) ¹⁴. Despite as much resistance as possible, the lack of guns and ammunition was decisive, and Japanese troops landed on Singapore Island on 8 February 1942.¹⁵

Much has been written on the fall of Singapore, and the titles and subtitles of many secondary source material reflect historian's views of the event. Examples include "The Greatest Catastrophe of World War II",¹⁶ "Britain's Greatest Defeat",¹⁷ and "Japan's Greatest Victory, Britain's Worst Defeat".¹⁸ Generally, earlier books are more sympathetic to the British forces and command,¹⁹ and later texts more critical.²⁰ However, not all historians lay the blame entirely at Percival's feet,²¹ and an alternative view is that Singapore was never the impregnable fortress it was thought to

be, and that given the force and momentum of the Japanese attack, the fall of Singapore was inevitable.

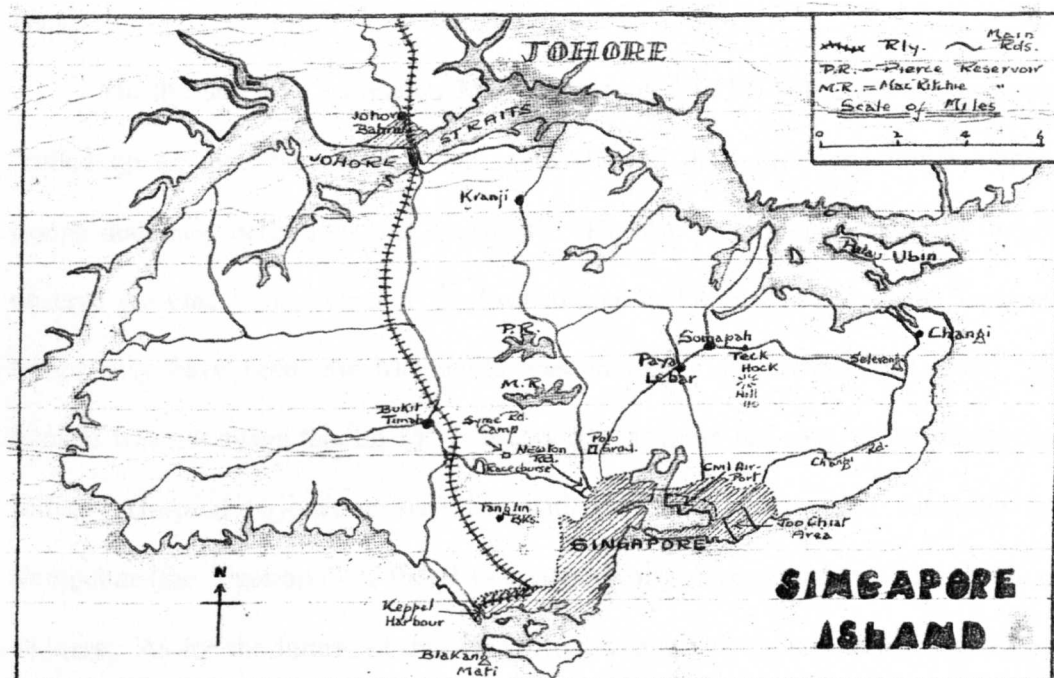


Figure 2. Map of Singapore Island – a pencil drawing during the siege by Capt R.M. Horner.¹⁴

Surrender on the afternoon of 15 February 1942 was preceded by 6 days of fighting on the mainland of Singapore Island. The optimism of reports in *The Straits Times* referred to earlier, was always misplaced,²² and the Japanese capture and control of the town's reservoirs proved to be decisive. With the water effectively switched off, and the threat of hand-to-hand fighting in the streets (with its consequent risk to civilians), Percival's capitulation was eventually unavoidable.

The last few days were marked by chaos and confusion. Many civilians and some troops searched for boats to leave the island. The somewhat farcical situation of impending defeat was compounded by the continued arrival of British troops – a battalion of the “Cambridgeshires” arrived as late as the 13 February, two days before the surrender.²³ The flurry of disorder was also reflected in the hospitals and clinics.

Dr Gordon Marshall, a captain with the RAMC (Royal Army Medical Corps) noted on the day before capitulation that “on this day we had a number of neurotic cases, not a pleasant sight, to see their rolling eyes and jumping and singing at every bang”.²⁴

On the day after surrender, Marshall recorded in his diary that the Japanese “rolled up on their bicycles they were all well disciplined and tough looking troops and their behaviour was excellent”. He also “ascertained that they would observe the Geneva Convention”.²⁵ Professional and well disciplined the Japanese troops may have been, but Marshall’s reassurances sadly proved inaccurate. He himself was not aware that on 14th February the Japanese had overrun the Alexander Military Hospital bayoneting staff and patients. In addition, after surrender the Kempeitai (the “gestapo” of the IJA) systematically massacred many thousands of Chinese. As for the future, of the Allied troops captured, about one-fifth would not survive the forthcoming 3½ years of captivity.²⁶

Doctors in Singapore – three stories

The majority of troops in Singapore were British in late 1941; but an influx of Australian, Indian, Canadian, New Zealand and American reinforcements brought the proportion to a little under 50% by late January. All the armed forces had their own doctors, and for the British, these were mostly medical officers of the Royal Army Medical Corps (RAMC). Some Royal Navy (RN) and Royal Air Force (RAF) doctors were also present, however, as well as representatives of the Indian Army Medical Corps (IAMC). Finally, expatriate doctors from Britain already resident in the area were often members of volunteer forces – notably the SSVF (Straits Settlements Volunteer Forces). As Dr John Black (an RAMC officer in south-east Asia during the 2nd World War) observed, they were “rather a mixed crowd”.²⁷

The experiences of these army doctors in the run-up to the fall of Singapore was similarly mixed. Dr Gordon Marshall (Figure 3) was an RAMC Captain who



Figure 3
Dr Gordon Marshall (Captain, RAMC) ²⁴

had sailed from Liverpool on 12th November 1941, arriving eventually in Singapore on 29th January 1942 – little more than 2 weeks before surrender (though as mentioned previously, the doctors and men of the Cambridgeshires arrived only **2 days** before surrender!). In his diary, Marshall comments on his first night in the Officer's Mess, as being ²⁸

... rather like a scene from a modern film. Officers coming in dirt-stained and bearded and greeting their fellow officers whom they considered had been lost. We heard stories of their journeys through the mangrove swamps, of men being lost, of the Japanese snipers in the trees, of the mosquitoes and ants, and the talk of units being surrounded and outflanked and having to continuously withdraw.

Interestingly, Marshall and his fellow medical officers received no posting orders the next day, and he walked into central Singapore with a colleague. They were picked up by another RAMC doctor who said that “for some time past they had been doing nothing”. After changing money and sending telegrams, Marshall had a “good long shandy” and lunch at Raffles Hotel, then returning to quarters.²⁹ Two days later he and his colleagues were sent to No. 1 Malayan General Hospital in

Selangor on the east side of Singapore Island (see Figure 2). Their departure was delayed due to “lack of transport”, and Marshall started work on a surgical ward (after being given “a choice of wards”) on 1st February 1941, the day before the Japanese crossed the causeway onto Singapore Island. Marshall recalled reading in the *Straits Times* that at this time the governor, Sir Shenton Thomas, had announced that the “fight for Malaya had ended and the fight for Singapore had begun”.³⁰

For two days he had “little to do as a doctor”. However over the next few days, the hospital was bombed three times. This included high-level and dive-bombing, and the hospital was also attacked by machine gun fire as the Japanese approached. Marshall was finally kept busy – “I got sick of blood and gore”, he wrote in his diary.³¹ After a few days, retreat was inevitable. They gathered what equipment they could, and drove to Singapore at breakneck speed to billets in the Singapore Cricket Club, where for the “first time for days I ate a decent meal and immediately afterwards fell sound asleep”.³² From then until capitulation Marshall worked in the nearby Victoria Theatre which had been converted to a field hospital, and was receiving casualties in large numbers. They set up a “Reception Room” to triage cases according to severity, described by Marshall as follows:

*I can still see the picture vividly. The less seriously wounded sitting in the theatre seats with the less serious medical cases beside them and of me being called to see a man having a rigor lying between the rows of seats, of the patients behind the stage, and the next day discovering a wounded Indian with a badly shattered arm hidden away in a dark corner behind the stage, scared to come out because of the bombing and machine gunning and shelling.*³³

This situation continued until surrender late on 15 February, though Marshall described two unusual jobs he was asked to do on the 14 February. First he attended a court of enquiry (involving a motor journey through Singapore) on “a major who had shot himself”. Then in the evening of that day he spent over four hours pouring gallons of whisky and gin down the drain, to prevent both “the Japs and our own

soldiers” getting drunk and rioting, and “possibly assaulting the women”.³⁴ One wonders whether the second of these jobs may have been more productive than the first! This propensity of the British Army to maintain protocol in the most adverse of situations was to continue throughout subsequent captivity – a characteristic which proved mostly advantageous.

Gordon Marshall’s diary reflects the inertia and disorganisation in Singapore, to be replaced by frenzied and chaotic activity following the IJA entry onto Singapore Island. Marshall subsequently spent the ensuing 3½ years as a POW in Changi Gaol on Singapore Island. He kept his secret diary throughout, and survived the experience.

In contrast to Marshall, the RAMC captain Dr Robert Hardie was originally an expatriate doctor who had moved from Britain to Kuala Lumpur in 1937 (Figure 4). When war broke out he became a medical officer in the Federated Malay States Volunteer Force (FMSVF).



Figure 4 Dr Robert Hardie ³⁵

After some ill health in 1941, he took leave to recuperate in Australia and New Zealand. With the Japanese entry into the war, he was ordered to return to Malaya. There were understandable transport difficulties, and eventually he took a troop ship from New Zealand to Australia, and from there a flying boat to Singapore, where he arrived on 13 January 1942, just over a month before surrender.³⁵ He reported to the FMSVF and found “a good deal of confusion and lack of clear policy or system”.³⁶ Eventually, Hardie was posted to Telok Paku on the extreme eastern end of the island, where his unit were on shore defence duties. Interestingly, in the midst of heavy bombing, and tending to the sick and injured, Hardie noticed the fine sunrises and sunsets from this area of the island’s coast – “... misty pinks and opals thrown across the clear pale blue of the dawn sky, and at sunset brilliant glowing expanses of crimson, orange, purple and green.” This pleasure was soon to end, as in early February he was transferred to the 3rd Volunteer Field Ambulance (his original unit in Malaya), helping to run a small hospital just to the north of Singapore city.³⁷

The hospital was now just a few miles from the advancing Japanese, and there was constant bombing and shelling. As Hardie reflected, they were now all “beginning to feel a sort of heavy hopelessness about the situation”.³⁸ Retreat into the city became inevitable; Hardie and his colleagues reached central Singapore on Wednesday 11 February to find “disorganised bands of weaponless and undisciplined men wandering about uncontrolled and demoralised, seeking shelter and food where they could.” “It was a melancholic and terribly depressing sight” he wrote, “Singapore was only too clearly doomed”.³⁹

During the last few days Hardie worked busily at a casualty clearing station in the city centre. These times were “hectic, nervous and weary”,⁴⁰ with mostly minor to moderate trauma cases. Like Marshall,⁴¹ Hardie experienced a number of anxiety-based cases – several patients with “shell-shock”, and “all degrees of nervous reaction

from hysteria and prostration, to mild shaking-up".⁴² Bombing, shells, frenzied activity and even looting on the streets went on as the final days of free Singapore passed.

*Then, on the evening of Sunday 15th February, an uncanny silence fell over the town. It was a relief from the racket of Bofors, field guns and bursting shells and aeroplanes. But it was a tragic silence. It was difficult to grasp what had happened but the fact was plain enough. Singapore had surrendered, unconditionally.*⁴³

After several months in Changi Goal, Robert Hardie was moved to the Thai-Burma Railway, where he served with distinction until the war ended in late 1945. Hardie was a gifted writer and talented artist, whose illustrated secret war diaries provide a unique insight into POW life and medicine. His experiences will be returned to later.



Figure 5
Dr Stanley Pavillard (Captain, SSVF)⁴⁴

Stanley Pavillard (Figure 5), like Hardie, was also in south-east Asia before the Japanese invasion. An Edinburgh medical graduate, he went to Malaya in 1940 “to do his bit” in a rather unusual way. In his remarkable book *Bamboo Doctor* he explains that “there had been long queues of doctors trying to get into the Navy and the Air Force, and service in the Army had appeared likely to involve a certain

amount of walking (I do not like walking!)”.⁴⁴ In the end, he “lost all love for filling in forms and waiting in queues”, and applied for a civilian post in Penang which counted as war work since the job came with a commission as medical officer to the Penang Volunteer Force. Here, he enjoyed pleasant work in the local hospital, a large house to himself, and a swimming pool. The idyllic expatriate life continued for most of 1941, but in December was interrupted by the advancing Japanese. Pavillard began a difficult 500 mile journey down the peninsula to Singapore, in the company of retreating Allied troops and streams of civilian refugees. On the way, he stopped at several hospitals to help the hard-pressed staff deal with troop injuries, eventually arriving in Singapore and joining the 1st Straits Settlement Volunteer Forces (SSVF) as medical officer on 19 December 1941. Having escaped from the fierce up-country fighting, Pavillard was perturbed and surprised by the complacency in Singapore. On Christmas Day he had lunch at the Tanglin Club, and “sat and listened to hilarious laughter, and wondered how many of these people had been up-country and seen the fighting”.⁴⁵

In these days Pavillard’s main medical work was dealing with bombing casualties – both military and civilian. He describes a soldier who lost his left testicle from a bomb fragment flying between his legs, and dryly observed that the man was “not so unfortunate” as he was evacuated to India, and “although firing on one cylinder only, he never became a prisoner of war”! More seriously, Pavillard saw a young Chinese girl who had “most of her left shoulder and chest blown away, exposing her still beating heart”.⁴⁶

Pavillard’s work was interrupted for a few days in early February when he was hospitalised himself with a probable bleeding peptic ulcer. He returned to work at the Singapore General Hospital, which at this time had 700 beds but over 3,000 patients. The death rate was enormous and even burial was a problem, both because of the

numbers, and the fact that most of the city's graveyards were now in Japanese hands. A huge pit was dug in the hospital grounds – “the common grave of uncounted hundreds, of all colours, all races and all religions”.⁴⁷ The medical staff were now working almost continuously, and the situation was not helped by the water supply now being cut off. It went on remorselessly until at 4 pm on Sunday 15 February, news of capitulation was announced on the radio.

*We sat there twitching and staring at one another in that nerve-racking silence, broken only by occasional shattering screams. The battle for Singapore was over, but it went on and would go on for many years to come as a nightmare in the minds of those who suffered it.*⁴⁸

Stanley Pavillard, or “Pav” as he became more widely known, was to be transferred from Changi Goal to the Thai-Burma Railway later in 1941. He was a charismatic and inventive doctor, who fortunately survived the experience and after the war returned to his family home in Las Palmas on the Canary Islands where he practiced medicine. He was awarded an MBE for his services as a POW, and was seen at POW reunions for many years: a larger-than-life character who always wore a panama hat and dark glasses. The latter however, were to protect his eyes, which were irreversibly damaged by malnutrition in captivity. Like Robert Hardie, we will return to Stanley Pavillard's experiences later.

“A mixed crowd” of doctors

The term “rather a mixed crowd” was actually specific terminology for the Royal Army Medical Corps (RAMC). In his memoirs of RAMC medicine in south-east Asia, John Black recalls it being used by regular army officers as a derogatory term for the RAMC.⁴⁹ The reasons for this attitude can be well-illustrated by an experience of Dr Stanley Pavillard's, shortly after he reached Singapore in December 1941 after his flight from Penang. As a “Straits Volunteer”, Pavillard had no formal

military training, yet he found that “the army was crying out for doctors to join the RAMC, and offered them promotion to captain after a year’s service or less - some doctors were able to fiddle very quick promotion indeed”.⁵⁰ It is perhaps not surprising that career army officers regarded many medical officers as unprofessional, ill trained, and not deserving of their elevated rank.

The RAMC was born in 1898, developing from the “Army Medical Department” (AMD). The “Royal” warrant was important, as it gave army doctors substantive ranks, and made them equals to other non-medical soldiers. But equality of relationship did not occur; the military historian Mark Harrison noted that despite the royal warrant, combatant officers “continued to look upon military doctors as their social inferiors and medical arrangements were seldom a priority”.⁵¹ Presumably, the “mixed-crowd” jibe had origins as far back as the RAMC itself!

Recruitment to military medicine was difficult for much of the early 20th century, largely due to poor pay and prospects; but improvements occurred in the late 1920s. These were not enough however, and at the outbreak of war the RAMC was over 200 doctors short of its ideal workforce.⁵² The situation was aided by medical conscripts and doctors from the Territorial Army (TA); but in distant and difficult situations such as Malaya, medical officers from the various volunteer forces were needed to supplement the army personnel.

British military doctors in Singapore at the time of surrender were thus of hybrid origin – regular and conscripted RAMC doctors, TA medics, volunteer force doctors (FMSVF and SSVF), and medical officers of the Indian Medical Service (IMS).⁵³ Their training and experience also greatly differed. The IMS and volunteer forces doctors, by virtue of the fact that they had been resident and working in tropical countries for variable (sometimes long) durations, had direct experience of tropical infections not seen in Europe – for example dysentery, malaria, typhoid etc. The

Dutch army doctors had similar advantages, since most had worked in the Dutch colonies of south-east Asia for some time before the war. RAMC medics, however, lacked this experience. Some, but by no means all, had been sent on brief tropical medicine courses prior to leaving Britain, but these were not always of great practical use. Dr John Black was sent to Edinburgh, where he “learned a lot about the mouthparts and the sexual organs of mosquitoes, but little about mepacrine (for the prevention of malaria), nor indeed much of practical tropical medicine”.⁵⁴

Black regarded the course as “pretty useless”, but felt that equivalent courses at the Schools of Tropical Medicine in Liverpool and London were “excellent”. The Liverpool School ran 2-3 week courses for RAMC officers from 1940 to 1943, and there were considerable numbers of both courses and students (see Table 1). The War Office paid the School 1 guinea per week for each officer – less than half of the true costs, leading to some antagonism between the School and the War Office.⁵⁵

Table 1. Tropical medicine courses for RAMC officers at the Liverpool School of Tropical Medicine 1940-1943⁵⁵

Year	Number of courses	Number of officers
1940	5	144
1941	15	549
1942	15	657
1943	13	509
Total	48	1,859

Though the members attending these courses (total 1,859) appear impressive, most were held after the fall of Singapore. Bearing in mind that RAMC doctors sent to Singapore and Malaya would have left Britain in late 1941 at the latest (and many

much earlier), and also that a number of these early trainees would have been deployed in the African and Middle East war theatres; these brief tropical courses had been mostly unavailable to the doctors who were about to work on the Burma Railway.

Changi POW Camp

The surrender of the “Fortress City” may have been a shock to the Allies in Europe, but the Japanese were similarly surprised at their relatively straightforward capture of over 100,000 enemy troops and several thousand enemy-origin civilians. The maltreatment of Allied POWs and civilian internees which was about to begin was at least initially and in part a logistics and supply issue, since the IJA had no idea that such huge numbers of Allied soldiers would surrender. At the capitulation ceremony, after agreeing to unconditional surrender, Percival had asked Tsuji, “I wish to receive a guarantee of the safety of the lives of the English and Australians who remain in the city”. Tsuji had replied, “You may be sure of that. Please rest assured. I shall positively guarantee it”.⁵⁶ The irony and shallowness of this assertion was to be quickly demonstrated.

Changi Camp was the main place of internment for POWs on Singapore Island. It lay on the extreme east of the island, and is the site of the modern airport for Singapore (see Figure 2). It had been mainly an Allied garrison area bordering the sea, but was to become one of the best known POW camps of the 2nd World War. It had a rapidly fluctuating population, since it was to a large extent a “staging post” for POWs in transit elsewhere, and was mostly left by the IJA to be run autonomously by the British and Australian officers.⁵⁷ The march from Singapore to Changi occurred mainly on Tuesday 17 February. Indian troops were separated from the British and Australians, but the volunteer forces were included. Changi was 15 miles from

Singapore city, it was a very hot day and all were carrying heavy loads – essentially every individual's personal possessions, and for the doctors a good deal of available equipment. About 3,000 civilians also followed. Some officers, including occasional medical officers, did get road transport. Robert Hardie walked part of the way, but was then picked up by a limousine and arrived “in style”. He recalled the civilian lines as a “painful sight” – the women and children went by bus, but many of the men were elderly and some “stout and sagging”, carrying cases or pushing carts in the hot sun, “humiliated, hot and weary”.⁵⁸

Changi was a vast tract of peninsula land with sea on three sides, and barbed wire fences on the other. By late February 1942 its prison population was 45,562 – by British standards more of a sizeable town than a prison! The area contained Changi Gaol (initially used to house civilians), but the whole area extended well beyond this, and the term “Changi POW Camp” is probably more accurate than “Changi Gaol”. The numbers in the camp were to decline – particularly later in the year when forces were moved to the railway project in Burma and Thailand. Thus, by October 1942, the population had fallen to 15, 744. However, there were rapid week-by-week fluctuations as POWs arrived in (for example Dutch from Sumatra and Java), and out (to the Burma Railway, Taiwan and Japan). Changi was thus very much a transit camp, though a proportion of British and Australian troops did stay there for the remaining duration of the war.⁵⁹

The British and Australian military command structure remained intact at Changi, and the IJA tended to filter orders down through their officers. Daily programmes emerged of work in the morning (constructing latrines, ovens etc; water and wood collection; and attending to vegetable gardens), and constructive entertainment and recreation in the afternoons (including sport, entertainment and

lectures).⁶⁰ The latter became so varied and structured as to be known as the “University of Changi”. The routine is illustrated by a typical doctor’s day.⁶¹

<i>6.30 am</i>	<i>Sick parade</i>
<i>7.15 am</i>	<i>Breakfast. Porridge (of ground half-roasted rice). Sometimes a trace of sugar, occasionally a sip of tinned milk. Tea.</i>
<i>8-9 am</i>	<i>Sweeping, washing clothes and self; shaving.</i>
<i>9.30 am</i>	<i>Medical inspection, room dressings. Barrack visit – sick and sanitation. If back early, chess, reading and writing.</i>
<i>12 noon</i>	<i>Lunch. Rice, perhaps with a little ghee or rissole (rice, rice bread, trace of meat possibly). Afternoon classes, reading, sleeping, darning, sewing, chess.</i>
<i>5 pm</i>	<i>Evening meal. Rice; thin tinned veg or fruit gravy. After walk and talk. Occasionally poker.</i>
<i>8.30 pm</i>	<i>Lights out.</i>

It was a tedious and repetitive existence. Troops were frequently moved out on working parties, particularly for repair work in Singapore City, or unloading boats in the docks. Some groups were semi-permanently moved to the Havelock Road Gaol in Singapore. The medics and the orderlies tended to stay in camp. Classes, sport and societies flourished. A Rover Scout Troop was formed, and several football teams – including one representing 197 Field Ambulance of the RAMC (see Figure 6).

Behind the rather leisurely existence, mostly free of Japanese contact or direct discipline, there were two serious medical problems emerging. The first was a dietary issue. As can be seen from the daily schedule of activity above (and it is interesting that details of food made up much of the diary), the diet was predominantly based on rice. This was also poor quality rice – “polished” and free of the husks which contain

small but important amounts of B vitamins. The diet was basically short of calories, protein and vitamins. Serious malnutrition syndromes were bound to ensue.



Figure 6. The football team of 197 Field Ambulance, RAMC (Roberts Hospital, Changi Gaol, Singapore, 1942). (Liverpool School of Tropical Medicine records).

The second issue concerned the consequences of overcrowding, lack of piped water and rudimentary sanitation. This resulted in diarrhoeal diseases – in particular dysentery. This is a particularly severe form of gastroenteritis characterised by the passage of blood with the faeces. It is either “bacillary” due to a bacteria of the *Shigella* species, or “amoebic” due to the protozoan parasite *Entamoeba histolytica*. In the early days of Changi, dysentery cases were nearly all bacillary – the most chronic and debilitating amoebic form was to be a particular problem in the railway jungle camps in the months and years to come. In Changi, however, bacillary dysentery occurred soon after the captured troops moved in. Without running water,

either pit latrines were used or existing latrines flushed with sea water (an inadequate system, and toilets were often overflowing).⁶²

As Changi POW camp became more organised, the main hospital was centralised on the old Roberts Barracks, and became known as “Roberts Hospital”. It rapidly became a massive establishment with 2,500 beds, serving the population of nearly 50,000 in the first 4 months or so of Changi’s existence.

Changi medicine

Roberts Hospital opened on 26 February 1942. Operating theatres were organised and the first surgery was performed on 2 March (a soldier with a badly fractured leg). As well as lack of piped water (which was restored about a month after the hospital opened), a major problem was an absence of nurses, and many of their duties had to be taken on by medical staff or untrained “medical orderlies” from the ranks. Overcrowding was also a significant issue – 550 beds were available by 24 February, but four days later there were 1033 patients.⁶³ This over-capacity coupled with enormous admission rates became the norm, and virtually every POW was at some time a patient in Robert’s Hospital. In the first few weeks the commonest problems were injuries and trauma from the last few days of hostilities, but soon dysentery appeared and within a few weeks diseases of malnutrition began to present. Malaria and diphtheria were less frequent, but nevertheless difficult problems. As well as these relatively exotic conditions, the standard medical and surgical problems of any group of nearly 50,000 persons also occurred – chest infections, peptic ulcers, appendicitis, skin problems, dental disease etc. The two major problems of dysentery and nutrition, however, deserve more detailed consideration.

Dysentery. Of the 39,416 admissions to Roberts Hospital in its first year of existence (17 February 1942 – 16 February 1943), 41.6% were due to dysentery and other diarrhoeal diseases.⁶⁴ Not surprisingly with these numbers, a dedicated area (the “Dysentery Wing”) was set-aside for these patients. There were 12,749 admissions due to definitely diagnosed dysentery (as compared to non-specific diarrhoeas and gastroenteritis), of which 12,258 (96%) were bacillary and 491 (4%) amoebic.⁶⁵

Table 2. Dysentery admissions and deaths at Roberts Hospital, Changi (February 1942 – February 1943) ⁶⁵

	Month	Admissions	Deaths
1942	February*	243	Not known
	March	2739	8 (0.3%)
	April	2325	37 (1.6%)
	May	1304	32 (2.4%)
	June	749	16 (2.1%)
	July	847	12 (1.4%)
	August	854	17 (2.0%)
	September	941	18 (1.9%)
	October	1145	24 (2.1%)
	November	520	22 (4.2%)
	December	329	4 (1.2%)
1943	January	530	4 (0.7%)
	February**	223	1 (0.4%)

* 19th February onwards

** 1-14th February only

Dysentery was an unpleasant illness – a particularly severe form of gastroenteritis with blood and mucus in the stools, which were passed with great

urgency and frequency. A distressing feature was the symptom of “tenesmus” - a feeling of still wanting to pass faeces even after a full evacuation. Bacillary dysentery usually resolved after 4 or 5 days, but with poor nutrition it could last longer, and recurrent attacks were common. Amoebic dysentery lasted longer, and sometimes became chronic, and associated with significant weight loss and debility. Though morbidity was high, mortality at Changi from dysentery was low – in the first year 1.4% for bacillary and 2.2% for amoebic.⁶⁶ The admissions with mortality, month by month, are shown in Table 2. There was a major peak in March to May 1942, following which admissions fell, as public health measures (fly control and faeces disposal) took effect. The smaller surge of cases in October was due to an influx of sick POWs from Java. Table 2 also shows the mortality rate as a percentage of admissions. This was generally a very commendable 1 to 2%. There was slight peak of 2.4% in May 1942 and a more marked one of 4.2% in November 1942. These peaks were towards the end, or a little after the main two epidemics. The original records did not calculate the proportionate mortality, so no comment at the time was made. It may be that the epidemics included particularly severe cases that could have suffered later complications with delayed mortality. The later peak of admissions (largely due to cases from Java) could also have included more cases of amoebic rather than bacillary dysentery (with higher mortality). As well as changes in time, there was some nationality-based variability. Thus, mortality amongst Australians was a little lower than the British (0.7% versus 1.5%), possibly due to their less overcrowded quarters.⁶⁷

The diagnosis of dysentery could usually be made clinically, but differentiating prolonged bacillary from amoebic dysentery could be difficult. The Dysentery Wing had a laboratory led by Captain EH Wallace of the Indian Medical Service, which undertook microscopic examination of stool specimens⁶⁸ – more

sophisticated stool culture techniques were not available. There was also a “Sigmoidoscopy Clinic” run by Major Hutchin. Modern sigmoidoscopes are flexible, narrow, fibroptic instruments; but in the 1940s, they were large, metal and rigid tubes – their use undoubtedly adding to the discomfort of the dysentery itself. Nevertheless, direct visualisation of the colon and rectum was diagnostically useful, especially for amoebic dysentery.⁶⁹

Modern treatment of dysentery is relatively straightforward. As well as supportive treatment, including fluids and rehydration, there are highly effective antibiotics – ciprofloxacin for the bacteria causing bacillary dysentery and metronidazole for the protozoa *E.histolytica* causing amoebic dysentery. In 1942 treatment was less satisfactory. Oral fluids or intravenous saline for more serious cases were used. For bacillary dysentery, sulphapyridine (“M&B 693” – M&B standing for “May and Baker”, the manufacturers) was effective. This “sulpha” drug had not long been available, and was the forerunner of the modern antibiotics which appeared in the post-war years. It was unfortunately not universally used in the early POW days – partly due to variable supply, and partly due to lack of experience on the part of the doctors. It was noted that relapses of bacillary dysentery were common, but that “the relapse rate of patients who have had M&B 693 is practically nil”.⁷⁰ A number of drugs were used for amoebic dysentery, of which emetine was probably the best (though still not highly effective), and shortages were frequent. Relapses were common, and the influx of Dutch POWs from Java in late 1942 (see Table 2) were particularly affected by the amoebic form of dysentery.

As well as increasing use of M&B, the control of the early severe dysentery epidemic was helped by simple public health manoeuvres organised by the medical officers. Fly control measures were instituted (including “fly-proof” latrines), as well as personal hygiene measures such as encouragement of hand washing.

Malnutrition. The typical Changi diet, based almost entirely on unpolished rice, has been referred to earlier. Though diseases due to severe malnutrition (scurvy, beriberi etc) were outside the clinical experience of most of the medical officers, they were aware from the early days of imprisonment that the severely restricted and vitamin deficient diet was bound to cause problems. Analyses of the content of the diet were therefore undertaken, using scales to weigh individual portions, and textbooks which gave the average content by weight of individual foods. The food supply for the first year of captivity is shown in Table 3.

Table 3. Diet content (g/day) per individual in Changi, February 1942 – February 1943 ⁷¹

	February-June	July-September	October-November	November-February
Rice	500	500	550	550
Meat or fish	50	50	50	50
Flour	50	50	-	-
Vegetables	100	100	300	300
Milk	15	-	-	-
Tea	5	5	3	5
Sugar	20	30	20	20
Salt	5	10	5	5
Oil	5	10	5	25

Note In addition 100 sheets of “latrine paper” and 200g soap were issued per month. Also 40 cigarettes per month were given until September 1942

The individual dietary content analysis of this food allowance by month of captivity is shown in Table 4. It can be seen that the diet was almost exclusively

carbohydrate-based, with insufficient protein and fat. Vitamin B and particularly thiamine (vitamin B₁) was severely deficient. Vitamin A and C intakes were also assessed, and apart from the first few months, were adequate. The calorie content (varying between about 2,100 to 2,600) was adequate for prisoners allocated no particular work duties, but once work parties were organised the provision became too low, and weight loss resulted. This dietary analysis is useful in that the results predict accurately the types of syndromes of malnutrition which occurred. Vitamin A deficiency (night blindness) and scurvy (vitamin C deficiency) were rarely seen, but the whole spectrum of vitamin B deficiency syndromes were encountered. Weight loss and chronic moderate protein deficiency led to general debility, and prolonged recovery from infections (particularly dysentery).

The dietary content information in Table 4 can be compared with normal requirements, for which there is now good available information. Food intake (particularly of calories and vitamins including thiamine) increase with levels of exercise. This was variable at Changi, but most men were involved in reasonably vigorous work parties at least intermittently. A current recommended calorie intake for moderately active young men (aged 18-34 years) is 2,900 calories, significantly in excess of the Changi intake, which (from Table 4) ranged from approximately 2,100 to 2,600 calories⁷². Protein intake was also low, ranging from 33 to 53g/day, compared with a recommended intake of 72g. Vitamin B in general, and thiamine in particular, also has requirements which are energy-dependent. Units of measurement have changed since the 1940's, making direct comparisons with modern recommendations difficult, but the Changi diet generally contained only about 50 to 70% of ideal requirements.

A close look at Table 4 shows slight improvements in some of the dietary constituents in the latter part of 1942. This corresponded to the arrival of Red Cross

supplements, which arrived in August, and were sadly gone just before Christmas.

Table 4 **Analysis of daily dietary intake at Changi by month**
March 1942 – January 1943⁷³

	Calories	Carbohydrate (g)	Protein (g)	Fat (g)	Vitamin B (iu)	Thiamine
1942 March	2119	481	49	21	115	0.196
April	2088	428	43	16	113	0.194
May	2253	458	47	18	171	0.275
June	2305	459	53	22	219	0.345
July	2353	482	49	19	156	0.235
August	2536	524	47	18	146	0.205
September	2441	499	33	18	141	0.205
October	2461	512	44	19	147	0.212
November	2608	512	44	35	147	0.212
December	2542	506	44	29	126	0.184
1943 January	2335	483	37	21	133	0.208
Normal requirements	-	-	100	100	200	>0.300

- Notes:
1. g = grams, iu = international units
 2. Thiamine is measured as “thiamine: non-fat calorie” ratio

However it was recorded that “their value in checking the outbreak of deficiency diseases was inestimable”, and “the marmite and nicotinic acid especially did much to save life”.⁷⁴

The spectrum of B vitamin deficient syndromes seen at Changi is shown in Table 5. These diseases first appeared in early March – within a month of the imposed POW diet. Numbers rose to “epidemic” proportions and peaked in May. Thereafter, numbers subsided somewhat, though continued at lower levels. The

reduction was probably due to control measures introduced by medical staff (which will be discussed later), and the arrival of Red Cross supplies as referred to earlier.

Table 5. B vitamin deficiency syndromes seen at Changi, 1942⁷⁵

	Syndrome	Deficient B vitamin
1	Beriberi – “wet” (cardiac) – “dry” (neuropathic)	Thiamine (B ₁)
2	Wernicke’s encephalopathy	Thiamine
3	Stomatitis/glossitis/cheilitis	Riboflavin (B ₂)
4	Scrotal dermatitis (“Changi Balls”)	Riboflavin
5	Retrobulbar neuritis	Riboflavin
6	Spastic diplegia	Riboflavin
7	Pellagra	Nicotinamide (B ₃)

Overall, there were 1501 nutrition-related admissions to Roberts Hospital in the first 12 months of its existence, with a crude population prevalence rate of 3.6%, and case mortality of 0.8%.⁷⁶ Compared with dysentery these numbers are low, but there is an important difference in the two conditions. Unless unusually mild, almost all cases of dysentery would result in hospitalisation. In contrast, only the most severe nutritional syndromes would be admitted (eg significant “wet” beriberi, spastic diplegia, Wernicke’s encephalopathy). The vast majority of POWs suffered tingling or painful (“happy”) feet and some degree of “Changi Balls”; but were managed as out-patients in the medical clinics of Roberts Hospital.

Some of these conditions need explanation. Thiamine deficiency (beriberi) can cause damage to the heart muscle, leading to heart failure characterised by swelling (or oedema) of the body – hence its colloquial name of “wet beriberi”. Nerve damage can also occur, mostly manifest as pain or tingling in the legs and feet

("dry beriberi"). The pain was unpleasant, particularly at night when it would frequently awaken sufferers, who would then walk around in the night shaking and stamping their feet to try to relieve the pain. It became known as "happy feet", "burning feet" or "electric feet". Rarely, thiamine deficiency damaged the brain stem areas controlling eye movements - a condition known as "Wernicke's encephalopathy". Two other neurological syndromes were thought to be due to riboflavin deficiency - these were retrobulbar neuritis (damage to the optic nerves causing blurred vision) and spastic diplegia (spinal cord damage causing lower limb weakness and inco-ordination). Inflammation of the mouth, tongue and lips (stomatitis, glossitis and cheilitis) were also due to riboflavin deficiency, as was the peculiar syndrome of scrotal dermatitis. Widely known as "Changi Balls", this was swelling, excoriation and weeping of the scrotal skin with understandably significant distress and discomfort. Finally, nicotinic acid (nicotinamide) deficiency could cause pellagra - usually leading to dermatitis in light exposed areas (especially the neck and hands)⁷⁷, as well as (sometimes) diarrhoea and delirium.

In Changi, peripheral neuropathies ("dry beriberi") occurred early, with heart failure ("wet beriberi") somewhat later. Wernicke's encephalopathy was seen mainly in men recovering from severe bouts of dysentery. Indeed, this link between dysentery and nutritional syndromes was to be re-emphasised in the Thai/Burma Railway camps yet to come. For treatment, thiamine tablets were variably available, but spoons of marmite were frequently used - often with great success. Appeals to the IJA to improve the diet generally fell on deaf ears, though a supply of yeast tablets was given in the spring of 1942. Vegetable gardens were started by the POWs when the dietary deficiencies became apparent. The soil was poor, and sprayed urine (50% diluted in water) was used as fertiliser. Faeces was avoided as it would attract flies, risking increased dysentery transmission. Yeast cultures were prepared, and grass

extracts made to provide further vitamin supplementation to the diet. These measures were undoubtedly useful, since beriberi occurrence dropped from May-June 1942 (before the Red Cross supplies arrived in August).

As well as these major problems of dysentery and beriberi (and associated nutritional syndromes), there were many other numerically less important clinical challenges. Singapore was a malarial area, though fortunately most was the more benign strain caused by *Plasmodium vivax*, and additionally the Changi locality was of relatively low intensity of transmission. Nevertheless, 497 cases were admitted to Roberts Hospital during the 12 months following its opening, with 3 deaths.⁷⁸ Malaria control measures had been active on Singapore Island prior to hostilities, and were usually aimed at draining and spraying stagnant pools where mosquitoes bred. These measures ceased in January 1942 with the approach of the Japanese, and consequently malaria cases were most frequent in the first 3 months of imprisonment, following which greatly improved control was achieved. This was aided by a specific local branch of the RAMC – No. 6 Malarial Field Laboratory, who worked in conjunction with a civilian malarial engineer.⁷⁹ Malaria was treated with quinine at Changi, and was generally in reasonable supply. Interestingly, over 60 years later, quinine remains an important and highly useful antimalarial drug.

Diphtheria was another problem disease. This was a bacterial infection, globally common at the time. It could cause a severe pharyngitis or skin ulcers (“faucal” and “cutaneous” diphtheria respectively), and also sometimes released a toxin causing nervous system dysfunction. Transmission in Changi was increased by overcrowding and poor nutrition, and there was a particular epidemic in August and September of 1942. Overall there were 1135 cases throughout the first year with a 4.9% mortality.⁸⁰ In these pre-antibiotic days, there was little in the way of effective treatment, but nevertheless this is a remarkably low mortality. Diagnosis was

probably accurate, as diphtheria was a disease well-known to all British doctors at the time. It may have been that a number of cases were mild, or that some patients had partial immunity from previous attacks of the disease.

Roberts Hospital of course treated a vast spectrum of other diseases as in and out-patients. There was even a unit treating venereal disease, though their work rapidly declined within a few weeks of captivity! There was an active dental unit with 16 dental officers which, though working under great difficulties and with limited resources, received “nothing but words of appreciation”.⁸¹

Conclusions

The military doctors in the battle for Singapore found themselves often for the first time in a situation of serious war medicine, with overwhelming numbers of casualties. Their military background was very variable, and they included career army doctors, recent conscripts, and local members of volunteer forces. After capitulation and imprisonment, their medical challenges rapidly changed from almost exclusively trauma, to tropical diseases and nutritional deficiency syndromes. Dysentery, malaria and beriberi became their everyday work – and for many these were conditions outside their clinical experience. They also had to work with limited resources – vitamin tablets and injections were particularly in short supply. There were some examples of early mistakes due to lack of clinical experience with their new clinical workload – the reluctance to use sulphapyridine (M&B) in severe bacillary dysentery cases is an example. However, the evidence is that they rapidly adapted to their new caseload, and achieved excellent clinical outcomes under very difficult circumstances. For example, the mortality rates for dysentery, malaria and beriberi in the first 12 months of captivity (1.5%, 0.6% and 0.8% respectively) represent excellent results. These were due to innovative medicine (for example grass

tracts as vitamin supplements), active preventive approaches (such as fly and mosquito control), good disciplined organisation of medical services and meticulous record keeping. The lessons of medicine in Changi were to prove vital in the next few months, as many doctors were moved up-country to the Thai-Burma Railway project. Here their expertise and resourcefulness would be put to considerably more difficult tests than at Changi.

The Straits Times, 13 February 1942

The Straits Times, 14 February 1942

The Sunday Times (Singapore), 15 February 1942

Telegram from Wavell to Percival, 10 February 1942. Imperial War Museum Department of Documents (IWM) 66/218/1

This comment of Churchill's has been widely quoted – see ICD Dear & MRD Foot, *Oxford Companion to the 2nd World War*. (Oxford, 1995)

L Rees. *Horror in the East*. (London, 2000). pp13-47. Interestingly, Rees entitles this chapter "The China Solution"

C Kinvig. *River Kwai Railway*. (London, 1992) p15.

See: A Warren. *Singapore. Britain's greatest defeat*. (London, 2002); M Tsuji. *Japan's Greatest Victory, Britain's Worst Defeat*. (New York, 1993); C Bayly & T Harper. *Forgotten Armies. The Fall of British Asia 1941-1945*. (London, 2004); and Rees.

Bayly & Harper, p124

Warren, p155

See: Tsuji. As Chief of Operations and Planning Staff in Malaya, Tsuji's memoirs give an interesting first person perspective of the campaign.

Bayly & Harper, p130

Ibid, pp 130-131

RM Horner. *Singapore Diary*. (Gloucestershire, 2006). p31

Warren, pp 221-235

P Thompson. *The Battle for Singapore. The true story of the greatest catastrophe of World War II*. (London, 2006)

Warren

Tsuji

F Owen. *The Fall of Singapore*. (London, 1960); and N Barber. *Sinister Twilight. The fall of Singapore*. (Glasgow, 1968)

- 20 Thompson; Tsuji; Warren; and Bayly & Harper.
- 21 C Kinvig. *Scapegoat: General Percival of Singapore*. (London, 1996)
- 22 *The Straits Times*, 13 & 14 February, 1942
- 23 Bayly & Harper, p132
- 24 GK Marshall. *The Changi Diaries. Singapore 1942-45*. (Surrey, 1988), p 6
- 25 *Ibid.* p7
- 26 Warren, pp271-287
- 27 J Black. *Rather a Mixed Crowd. Military medicine in India and south-east Asia 1944-47*. (York, 2003)
- 28 Marshall. pp2-3
- 29 *Ibid.* p3
- 30 *Ibid.* p4
- 31 *Ibid.* pp4-5
- 32 *Ibid.* p5
- 33 *Ibid.* pp5-7
- 34 *Ibid.* pp6-7
- 35 R Hardie. *The Burma-Siam Railway. The secret diary of Dr Robert Hardie 1942-45*. (London, 1983)
- 36 *Ibid.* p16
- 37 *Ibid.* pp16-17
- 38 *Ibid.* p17
- 39 *Ibid.* p18
- 40 *Ibid.* p19
- 41 Marshall. pp2-3
- 42 Hardie. p19
- 43 *Ibid.* pp19-20
- 44 SS Pavillard. *Bamboo Doctor*. (London, 1960). p2
- 45 *Ibid.* p17
- 46 *Ibid.* p17-18
- 47 *Ibid.* p29
- 48 *Ibid.* p30

- 49 Black. See also: JSG Blair. *Centenary History of the Royal Army Medical Corps (1898-1998)*. (Edinburgh, 1998)
- 50 Pavillard. p14
- 51 M Harrison. *Medicine and Victory. British Military Medicine in the Second World War*. (Oxford, 2004). p8
- 52 *Ibid.* p30
- 53 For details of the origins and history of the Indian Medical Service, see: Black. pp50-56
- 54 *Ibid.* p3
- 55 HJ Power. *Tropical Medicine in the Twentieth Century. A history of the Liverpool School of Tropical Medicine 1898-1990*. (London, 1999). pp192-193
- 56 Tsuji. p218
- 57 There is a reasonably wide literature on Changi Goal, though nothing concentrating on medical aspects. See: RPW Havers. *Reassessing the Japanese Prisoner of War Experience. The Changi POW Camp, Singapore 1942-45*. (London, 2003); D Nelson. *The Story of Changi, Singapore*. (Perth, 1973); T Kitching. *Life and Death in Changi*. (Perth, Scotland, 1993); and Marshall. James Clavell's *King Rat* (London, 1962) is a work of fiction, but Clavell was a Changi POW himself and the book gives interesting reflections on the subculture of survival in Changi.
- 58 Hardie. p20
- 59 Havers. p11
- 60 *Ibid.* p28
- 61 Hardie. p22
- 62 Stanley Pavillard himself developed dysentery a few days after reaching Changi and described the horrific sanitation problems. He fortunately obtained some sulphonamide treatment ("M & B 693" tablets) from an RAMC captain who had been a medical missionary in Africa, and had seen plenty of dysentery! See: Pavillard. pp38-39
- 63 Changi Medical Reports 1942-43. IWM Misc 19 (373) p10
- 64 *Ibid.* pp12-13
- 65 Annual Report Dysentery Wing, Roberts Hospital for the period 17th February 1942 to 16th February 1943. (In: Changi Medical Reports 1942-43). Note these appendices to the Changi Medical Reports are not numbered.
- 66 Changi Medical Reports 1942-43. p13
- 67 Dysentery Wing Laboratory, Roberts Hospital. Annual Report for the period 17 February 1942 to 16 February 1943. In: Changi Medical Reports 1942-43.
- 68 Dysentery Wing Report, Changi Medical Reports 1942-43.
- 69 *Ibid*
- 70 *Ibid*
- 71 Changi Medical Reports 1942-43

- 72 RS Gibson. *Principles of Nutritional Assessment*. (Oxford, 1990). Appendix A, pp604 - 605
- 73 Changi Medical Reports 1942-43
- 74 *Ibid*, p8
- 75 Annual Report – Roberts Hospital for the period 28 November 1942 – 13 February 1943. In: Changi Medical Reports 1942-43
- 76 *Ibid*, p15
- 77 WR Lang. Vitamin deficiencies in ex-prisoners of war in Japan. *New Zealand Medical Journal* 1946; 45: 296 – 307
- 78 Control of Malaria in POWC Changi. In: Changi Medical Reports 1942-43
- 79 *Ibid*
- 80 Changi Medical Reports 1942-43
- 81 Report on the Dental Services in No1 POW camp, Changi, from 15 February 1942 – 26 February 1943. In: Changi Medical Reports 1942-43

CHAPTER 2

ANATOMY OF A RAILROAD

**The Thai-Burma Railway
and its medical services**

“Tomorrow night the general is coming to dinner and I am arranging a ‘do’ for the occasion..... I’ve got a good menu together: tomato soup, braised beef and potatoes, doughnut and cream.....”. This diary entry reads like an extract from the journal of an army officer sitting in his regimental quarters in England. In fact, it was written on 21 May 1942 in Changi by Captain RM Horner (widely known as “Little Jack” Horner).¹ Though Horner also mentioned that he had needed some enterprise for the occasion (extra purchases in Singapore on ration parties, the doughnut made from wheat and rice flour, bread baked by the Field Bakery using accumulated flour rations), the entry nevertheless demonstrates the degree of stability and accord which was achieved in Changi by mid-1942.

Horner’s dinner party went off well, and he recorded that “Becky was very appreciative”.² “Becky” was Lt Gen MB Beckwith-Smith DSO, MC; and he and nine others had sat down to dine with “Little Jack”. This was of course a relatively unusual event, but such well-planned occasions helped relieve the everyday boredom and niggling low-grade hunger which were the curse of Changi life. The IJA continued their general policy of leaving allied POW officers to run the camps, and even in April 1942 one Changi POW wrote that “it is not always easy to realise that we are prisoners... although there is wire fencing it is so far away from sight that there is not a continual reminder of our lack of freedom”.³

Though there had been some disharmony in the first few weeks between British and Australian officers (in particular over the organisation of medical services),⁴ this rapidly settled and both armies (perhaps particularly the British) rigidly maintained their own command structure and discipline, whilst co-operating closely.⁵ The level of autonomy and independence afforded the Changi inmates gave them what Havers considered to be a “crucial degree of self-determination”, which prevented the philosophy of passivity common in other POW camps.⁶ Changi was

indeed a unique institution, and for those soon to move out to other harsher camps, the contrast was to be marked and the transition difficult.

Leaving Changi – destination uncertain

The stability of Changi was to be considerably disrupted late in 1942, as POWs were transported north to Siam (Thailand) to work on the Burma Railway. The destination (and purpose) was of course unknown, though rumours circulated widely. The Japanese themselves fuelled rumours that the men were to be moved to healthy highland areas of Malaya, with more abundant food and Red Cross facilities.⁷ Other stories did include (more accurately) railway work in Siam, but these were still tempered by descriptions of excellent supplies of fish, meat and vegetables – indeed a “land of plenty”.⁸ In the early days of the exodus from Changi (mid to late 1942), POWs were ordered to take maximum equipment with them – including kitchen gear and even regimental musical instruments.⁹ An early group to leave Changi (“F” Force) received the following almost farcical orders from the IJA before departure¹⁰ :-

- Food in Singapore was short, but was much better up-country.
- They were not to be a working party.
- Some sick men would be included, as they would have a better chance of recovery.
- There would be no marching apart from short distances.
- Transport would be provided for sick men and baggage.
- Bands and their instruments would go.
- Gramophones, blankets and mosquito nets would be provided at the camps.
- Tools and cooking gear should be taken.
- Canteen facilities would be provided.
- A medical party would be included

The irony of these orders was to become rapidly apparent to the men of F Force, who suffered the harshest conditions on the railway project – little more than 50% of them survived to return to Changi about a year later in an appallingly

emaciated condition. Perhaps unsurprisingly, many of the later groups leaving Changi were advised to take “personal gear only”.¹¹

Some men looked forward to leaving Changi – perhaps lured by the Japanese promises, the rumours of a better life, and (probably most importantly) an escape from the boredom of Changi. The majority, however, faced the move with apprehension, having become used to the relative stability of Changi, and were concerned over conditions up-country.¹² In fact, relatively few British POWs (probably less than 10% of those captured at the fall of Singapore) were destined to spend their entire captivity in Changi Camp. As early as May 1942, major groups of POWs (known as “Forces”) were transferred from Changi to various locations in south-east Asia and the Far East. The Forces were designated by a letter of the alphabet, and during an 18 month period between mid-1942 and late-1943, 11 such Forces (A to L, excluding I) left Changi (see Table 1); involving total POW numbers of over 23,000.¹³ Not surprisingly, this exodus had a major impact on the day-to-day operation of Changi. The large numbers of deported POWs were in general relatively fit, and many of them had useful skills from their civilian days. There were immediate effects in Changi on running the hospital, kitchens and gardens etc; so much so that for the first time officers had to help with pulling carts of firewood and tending to the camp vegetable gardens.¹⁴

The Forces which left Changi to work on the Burma Railway were Forces A, D, F, H, K and L. Their composition, destination, and dates of leaving Changi varied enormously, and are shown in Table 1, which particularly shows that the main exodus occurred in early 1943¹⁵.

Table 1. Forces of POWs leaving Changi Gaol 1942-43, and their destination

1942 (6,500 POWs)	
A Force	Burma
E Force	Borneo
H Force	Thailand
1943 (16,700 POWs)	
B Force	Borneo
C Force	Japan
D Force	Thailand
F Force	Thailand
G Force	Japan
J Force	Japan
K Force	Thailand
L Force	Thailand

- A Force (3,000 POWs), left Changi for Burma May 1942.** This Force was entirely Australian, and included a medical party of 15 MOs and 127 orderlies. They sailed for Burma on 14 May 1943, in what was the first of the notorious “hellships”, with POWs packed in the holds in a “slave trade” manner. Dysentery broke out, and the MOs had little to help with the situation. Disembarkation occurred at various stages on the Burmese coast, and the Force was joined by contingents of British and Dutch POWs transported from Sumatra. The prisoners worked intermittently on road building, but in September were transferred to Thanbyuzayat – the base camp for the Burma end of the railroad.

- **H Force (3,000 POWs), left Changi for Thailand May 1942.** H Force comprised 2,340 British and 660 Australian POWs, and left Changi on 5 May 1942. The Force also contained a small number of Dutch, and also a medical party. In common with other groups moved to Thailand, they were transported by cattle rail-truck to Bangkok, and on to Banpong, the Thailand terminus of the railway.
- **D Force (5,000 POWs), left Changi for Thailand March 1943.** This was a large force of 2,780 British and 2,220 Australian POWs, and left Changi between 14 and 18 March 1943. It included a medical party. The Force proceeded by rail to Banpong and was then scattered up the Thai side of the railway. One group went as far as Three Pagodas Pass on the border between Burma and Thailand, and were out of touch with the rest of the Force for over a year.
- **F Force (7,000 POWs), left Changi for Thailand April 1943.** This was the largest Force moved to the railway project, comprising 3,660 Australians and 3,340 British. A medical party was included with 30 doctors and 300 support orderlies. F Force was to suffer the harshest of conditions, and their story will be discussed later in this chapter. They were force-marched from Banpong to the Thai/Burma border camps with little food or shelter, and were then set to work in the most primitive of jungle camps. Dysentery, cholera and malaria took a high toll and by August 1943 25% had died, and by December 1943 the figure was 40%. The remnants of the Force were returned to Changi in early 1944 – the last arriving by April. Their condition shocked both the prisoners and guards in Changi – nearly 50% did not return.
- **K and L Forces** These were small entirely medical units, sent in mid-1943 to Thailand to support the beleaguered medical services there. K Force left in June 1943 with 30 MOs and 200 orderlies. L Force left in August 1943 and consisted

of 15 MOs and 100 orderlies. Both forces were predominantly British, with smaller numbers of Australians.¹⁶

These then were the Allied POW parties which were to build arguably the most ambitious wartime engineering project ever. As with the Sumatran POWs who joined A Force, other groups of prisoners from elsewhere reinforced the workforce – including POW's from Java and East Timor. In addition, a huge group of local “coolie” labour was recruited (about 100,000 in total). Overall, there were probably about 160,000-180,000 men (prisoner and “coolie”) working on the line during its construction.

Transport from Changi was varied, but always uncomfortable. The Australian A Force was transported by sea to Burma, crammed in the holds of ships that bore no outward sign of carrying prisoners and were thus at great risk of being torpedoed by allied submarines and aircraft. This was to occur with tragic results on later transport routes, particularly between Singapore and Japan.¹⁷ Apart from A force, however, all other POWs were either marched or taken by lorry from Changi to the station at Singapore. There, men were packed into cattle trucks made of steel, about 20 x 8 feet in dimension, and carrying approximately 27 men (there were about 20 trucks on each train, which transported 500-600 men) – see Figure 1. The journey took 4-5 days, and there was no food or water (or lavatory facilities) until occasional halts were reached. The trucks were like “ovens during the heat of the day, and iceboxes at night”.¹⁸ Those POWs who kept diaries could not do so during the journey, but later recalled their experience vividly. Jack Chalker called the trucks “black holes”, but also had positive memories of local Malays waving to them as they passed, giving friendly “V signs”.¹⁹ Captain “Little Jack” Horner interrupted his diary for 9 days during the up-country journey, and writing at Banpong on 22 May 1943, he recorded that “the

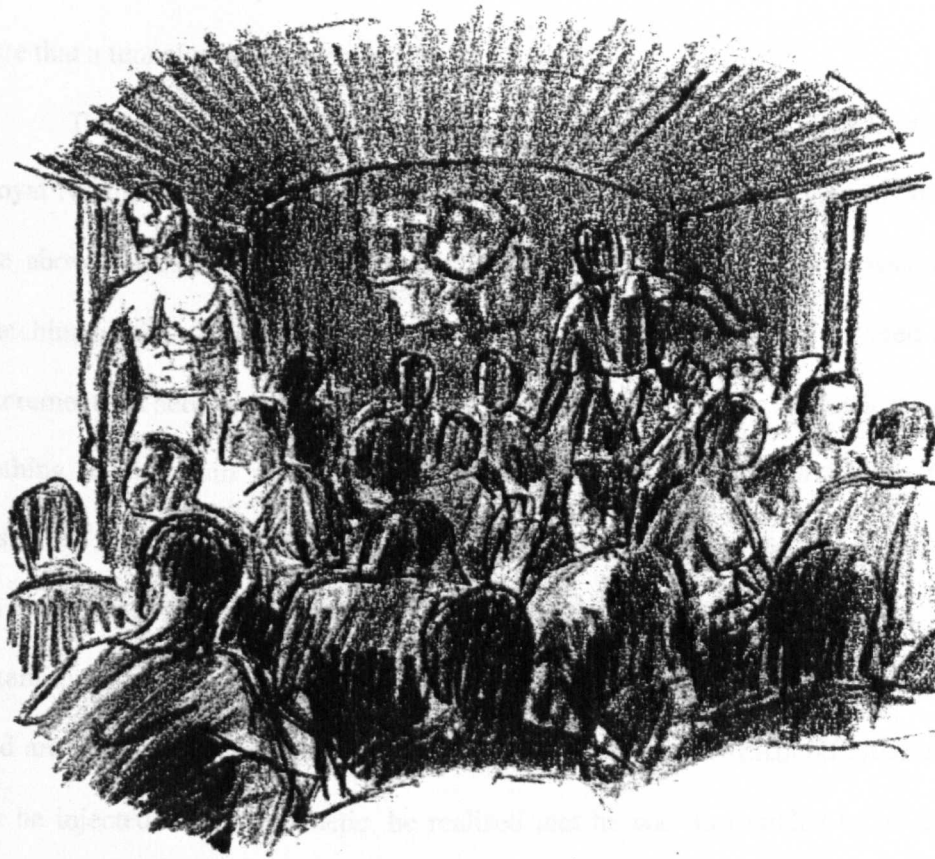


Figure 1. A sketch of the interior of one of the cattle trucks used to transport POWs from Changi to Thailand (drawing by Stanley Gimson, December 1942 - source IWM 55/328/1).

discomfort had to be experienced to be believed". As well as the heat and overcrowding, he mentioned the constant vibration as "horrific".²⁰ Len Toseland recalled that "for 4 days and 4 nights we were quite near to suffocation".²¹ Dysentery broke out, and the associated stench and faecal incontinence made conditions in the trucks even worse. Bowel emptying on the move became a well-rehearsed procedure; Toseland wrote that "the man in need would move backwards to the edge of the doorway, then he would drop his trousers and stoop, at the same time, clasping the hands of a friend who would face him.... I am left wondering what the local Malay and Thai people thought as they watched a row of bums going by".²² Jack Chalker's interpretation of the same procedure was that it required three friends – one each to

hold your arms whilst you hung over the rail track, and a third to look ahead to make sure that a tunnel was not approaching!²³

The journey was not entirely without its amusing moments. Reg Burton of the Royal Norfolk Regiment remembered a POW with dysentery emptying his bowels in the above manner as the train passed a station. A Japanese officer was standing watching on the platform, only to have his highly polished jackboots covered in slimy excrement! There were roars of laughter from the POWs, but the officer could do nothing as the train was not stopping at that station, and rumbled on into the distance²⁴. Captain Eric Martin of the Royal Army Dental Corps (RADC) was called on to help a prisoner with toothache at one of the night stops in southern Thailand. Examining the man, he found a badly decayed molar with a root infection. A chair and arc lights were found, and he began an extraction under difficult circumstances. As he injected local anaesthetic, he realised that he was surrounded by an audience comprising approximately 300 local Thais, 200 fellow POWs and 30 Japanese guards; all fascinated by this potentially entertaining spectacle. It was a difficult extraction, but Martin eventually pulled the tooth. Turning to the audience, he held the molar in the forceps on high to tumultuous applause (including from the Japanese guards). Martin commented later, "If you know of any dental surgeon who has done such a public extraction I'd like to know!"²⁵

Building the railway - why and how?

The nightmare rail journey eventually ended at Banpong – the southern end of the projected 413 Km railway line to the Burmese coast. Here it became painfully apparent that the POW's destination was not a rest camp, with plentiful food and a temperate climate. Having arrived "very dirty, very smelly and very low in spirits",²⁶ the men were marched to this totally inadequate camp, both in terms of size and

facilities. In comparison, Changi was luxurious. Banpong was also to be a brief staging post and within a few days of arrival most POWs were marched into the interior to begin work on the railway.

The Thai/Burma Railway was planned by the Japanese as a route into Burma to supply a future attack on India. No rail or road links existed through the high and inhospitable jungle areas between the two countries, and the long and dangerous sea route around the Malayan peninsula was the main route of supply to Burma. The idea of an overland link was not new – it had been considered by the British as long ago as 1885, but never carried out. The Japanese had been considering the project from early in the war, though official approval was only granted in June 1942 (interestingly, after A Force left Singapore by ship for Burma).²⁷ The route decided on was to use river valleys (in the absence of roads), initially following the River Mae Khlaung from Banpong to Nong Pladuk and on to Kanchanaburi. The River Kwae Noi (a tributary of the Mae Khlaung) came down from the north-west at this point, and the line was to follow this river to the Burmese border at Three Pagodas Pass. From there the line went on to Thanbyuzayat, which was on the existing Ye to Moulmein line of the Burmese Railway.²⁸ Considering the terrain, supply difficulties, and monsoon weather conditions, it was as Kinvig describes “planning the impossible”.²⁹ Nevertheless, the route had been at least partially reconnoitred (with an estimated completion time of 2 years), and IJA “Railway Regiments” were placed at either end of the proposed line. A number of the officers of these regiments were experienced railway engineers, and they also had several civilian engineers seconded for the duration of the project.³⁰

The description thus far, and in the story to follow, requires map orientation. Many maps of the railway line have been produced. The definitive one was drawn by the Japanese engineers and reproduced in English after the war. It gives the names

and completion dates of the various camps on the line, as well as details of the battalions and commanders involved.³¹ A reproduction is shown in Figure 2 and though it contains invaluable detail, it is difficult to examine and orientate.

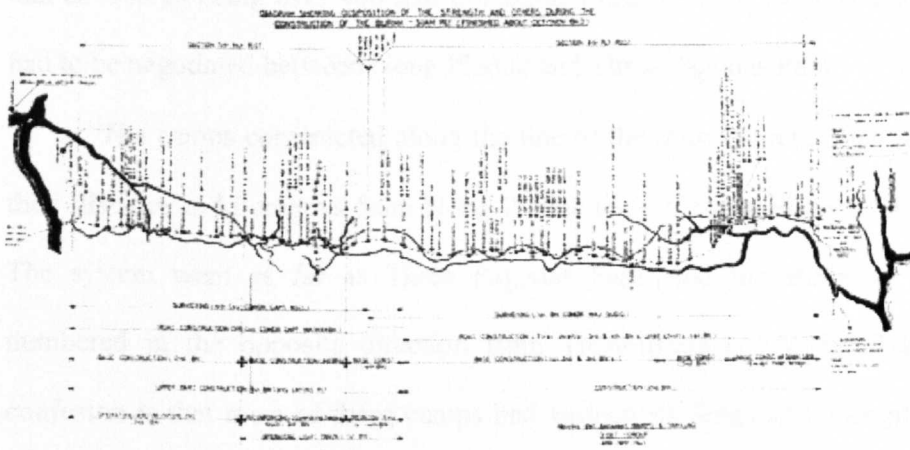


Figure 2. The Japanese engineer's map of "Construction of the Burma-Siam Railway"³¹

Of the simpler maps, Figure 3 shows a map hand-drawn in 1978 by Ewart Escritt – a captain in the 54th Infantry Brigade.³² Escritt later became an Oxford academic and during his time on the railway he learnt both spoken and written Japanese. Thus, Escritt has added interesting technicalities such as "Chungkai's real

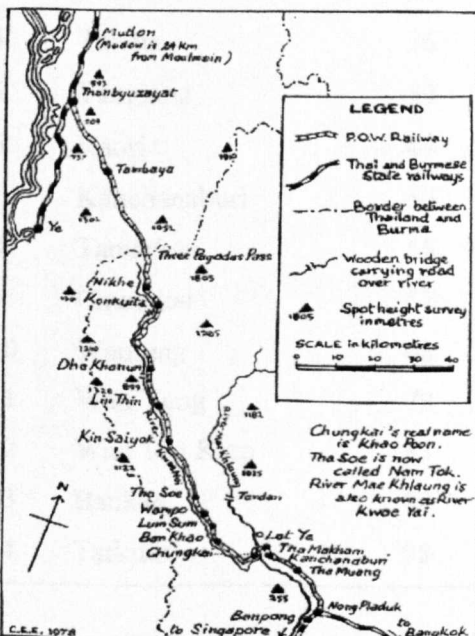


Figure 3. The Escritt map of the Thai-Burma Railway³²

name is Khao Poon". The map also shows the pre-existing Thai and Burma railways, demonstrating that the new POW-built rail ran from Nong Pladuk in Thailand to Thanbuyuzayat in Burma. Escribano also includes scattered spot heights which show that as well as being over 400 Km in length, a rise of some 1550 metres (4,800 feet) had to be negotiated between Nong Pladuk and Three Pagodas Pass.

The camps constructed along the line of the railway were often referred to by their distance in kilometres from Nong Pladuk (which was therefore "0 Km camp"). The system went as far as Three Pagodas Pass, and the Burmese camps were numbered in the opposite direction from Thanbuyuzayat. A significant cause of confusion is that most of these camps had various spellings and corruptions of their names. The individual camps, with their distance from base and common alternative names are shown in Tables 2 to 5³³.

Table 2. Thai-Burma Railway Camps. Thailand side 0 to 100 Km³³

	Camp	Km	Alternative Names
1	Nong Pladuk	0	Non Pladuk, Nong Pladur
2	Ban Pong	5	Bam Pong, Banpong
3	Rukke	13	Ruke, Rikki
4	Tarsua	26	Talua, Taruar
5	Tamuang	39	Tamuwan, Tamuan
6	Kaori	47	Kurran
7	Kanchanaburi	50	Kanburi, Kamburi
8	Tamarkan	55	Tamakan, Tamarkand
9	Chungkai	57	Chunkai
10	Wanlung	68	Wanlan
11	Wan Yeng	78	Wun Yeng
12	Wan Tao Kien	83	Wantakin
13	Bankao	88	Ban-Kaow, Rangkao
14	Tarkilen	98	Tarkiren, Tarkilin

The 0 to 100Km Thai section contained what were later to become the “base camps” – larger and relatively better equipped (particularly from a medical viewpoint), and used for receiving the sick and injured from up-river. Beyond 100 Km, on the Thai side, the concentration of camps increased as the difficulty in railway construction became greater, due to remoteness and the difficulties of the terrain. Examples of this (Table 3) are the Wampo, Tarsao, Tonchan, Konyu, Hintock and Kinsaiyok group of camps; each group within a few kilometres of each other in particularly difficult areas of construction. For example, the three Wampo camps were separated by only 2 kilometres (113-115 Km), but were involved with especially challenging bridge and viaduct building.

The last 100 Km on the Thailand side took the line up to the Thailand/Burma border at Three Pagodas Pass (Table 4 and Figure 4). These camps were very remote, and many, particularly the Sonkrai group of camps near the border, had the highest mortality rates on the line, particularly from cholera epidemics. During such an outbreak at Sonkrai, on a good day there would be five cholera victim cremations, but on a bad day “thirty or even more”.³⁴ This stretch of the railway also demonstrates the extreme difficulty with the variation in names of the railway camps. This is apparent throughout in Tables 2 to 5, but perhaps the last 100 Km of the Thai section shows this particularly well. Thus, in Table 4 the alternative names for Takanun (218 Km camp) are given as Takunun, Tarkunun and Takuan; but in fact there were others – for example Takanoon, Thai Khunan, Tha Kunan, Dha Kanun, Tarkandon and Akanoon.³⁵ This variability of nomenclature has not surprisingly caused considerable confusion in the documentation of Thai-Burma Railway history. Additionally, though the list of camps in Tables 2 to 5 is relatively exhaustive, there remain some minor camps omitted. For example, the small 201 and 205 Jungle Camps on either side of Linson Camp (203 Km), are not included in Table 4.³⁶

Table 3. Thai-Burma Railway Camps, Thailand side- 100-200 Km³³

	Camp	Km	Alternative names
1	Aruhira	108	Arhill
2	Wampo South	113	Viaduct camp
3	Wampo	114	Wampo Central, Wang Pho, Whampo
4	Wampo North	115	
5	Wanyai	125	Wampo Bridge Camp
6	Tarsao	130	Wang Yai, Wun Ye
7	Tarsao North	133	Tarsa, Tarsau, Taso, Nam Tok
8	Tonchan South	135	
9	Tonchan	138	
10	Tonchan North	139	Tochan, Tonsha
11	Tampi	148	
12	Konyu River	149	Tam Pei, Tampii
13	Konyu No. 2	153	Kanu 1, Kanu
14	Hintock	155	Kanyu 2
15	Hintock Road	157	Hin Tok
16	Hintock River	158	
17	Kinsaiyok 3	162	
18	Kinsaiyok 2	168	Sai Yok Jungle Camp
19	Kinsaiyok 1	172	Saikoku
20	Matona	175	Kinsyok, Kingsayok
21	Rintin	181	Bhatona
22	Kuei	185	Rin Tin, Rinten, Lin Tin
23	Kuishi	192	Kui Ye, Kui Yong
24	Wopin	194	Quir Ichi
25	Linson	196	
26	Hindato	198	Lin Thin
27	Quema	200	Hindat, Indato Kwiema

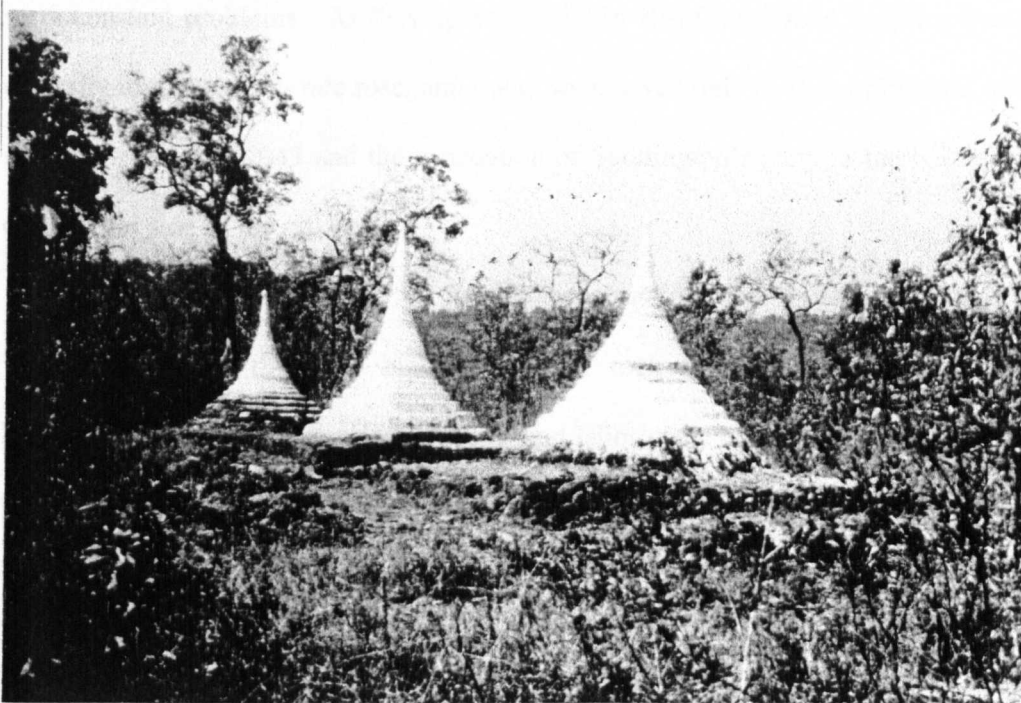


Figure 4. The “Three Pagodas” which marked the watershed between Burma and Thailand (photograph taken in 1974 by Professor Brian Maegraith of the Liverpool School of Tropical Medicine. Maegraith was instrumental after the war in beginning medical investigation and treatment of returning FEPOWs)

The Burma stretch of the line and its camps are shown in Table 5. The rise from Thanbuyuzayat to Three Pagodas Pass was a little less than that from Nong Pladuk; being about 1210 metres or 3,760 feet. The distance was also shorter (about 120 Km), but the workforce significantly smaller – essentially A Force with its Sumatran reinforcements and the supporting “coolie” labour gangs. Indeed, the difficulty of terrain was significant, as can be seen by the concentration of camps in Table 5 – 25 camps in 116 Km of railway track. Conditions were also poor, and Stanley Saddington (who was part of the Sumatran group of POWs brought to the Burma side of the railway) described life at 18 Km Camp as “squalid and drab” and plagued by rain and body lice.³⁷ Conditions worsened as Saddington and his other POW colleagues moved up the line. At more distant camps they worked from dawn until dusk, or sometimes even after dark; and tropical ulcers, malaria and beriberi

were constant problems. As they approached 114 Km Camp, food supplies became critically low, the death rate rose, and many were saved only by the completion of the railway in October 1943 and the evacuation of Saddington's party to the base camps on the Thai side of the railway.³⁸

The logistics of the actual railway construction were predictably difficult. The line required dynamite blasting through rock to construct cuttings, bridge building with wood cut from local forests, and laboriously built embankments to carry the line over lower stretches of land. The rails and sleepers were obtained by "cannibalising" branch lines in Malaya and Burma, and when the line was complete, engines and trucks were similarly taken from local rolling stock.³⁹ Laying the line on a daily basis (once the ground was prepared) involved a survey party marking out the rail course, large groups of "sleeper-carriers" and "line-carriers" putting the sleepers and rails into position, followed by the "spike gang" and "spanner men" who secured the rail lines to the sleepers.⁴⁰ (Figure 5). The gauge of the track (separation of the



Figure 5. Building the railway. An Australian POW group of "line carriers" about to place a line on the previously laid wooden sleepers (contemporary – and probably secret – photograph from the collection of Brigadier Philip Toosey, courtesy of Professor Peter Davies).

Table 4. Thai-Burma Railway Camps, Thailand side 200 to 300 Km³³

	Camp	Km	Alternative Names
1	Linson	203	
2	Brankassi	208	Pran Kassi, Pramkassi
3	Bangan	214	Bangon
4	Takanun	218	Takunun, Tarkanun, Takuan
5	Nomchanyai	229	Namayon, Namajo
6	Tamajo	235	Tamajoe
7	Kuikonta	237	Tamajo Wood Camp
8	Tamrongphat	244	Tamarun Phat
9	Krian Krai	250	Kreung Krai
10	Konkoita	262	Konkuita
11	Krikonta	268	Krikunta
12	Taimonta	273	Tarmonta
13	Niki Niki	277	Shimo Nike
14	Niki	281	Nieke, Nikhe
15	Lower Sonkrai	288	Lower Songkrai
16	Sonkrai	290	Songkrai, Songuri
17	Upper Sonkrai	293	Upper Songkrai, Kami Songukrai
THREE PAGODAS PASS			

rails) was one metre, and Stanley Saddington recalled that this was regularly checked by a metre-gauge.⁴¹ It was expected that 1 Km of track would be laid each day, though during the busier periods it was often more. Throughout this laborious work, and with disease and malnutrition taking an increasing toll on the POW workforce, the Japanese engineers (mostly non- military) adopted a detached attitude to the POWs – leaving their “welfare” to the IJA and Korean guards and regarding the prisoners as a “means to an end”.⁴² Some of the feats of engineering were truly

remarkable, as shown by Jack Chalker's painting of the construction of Hintok Cutting (155 Km) in late 1942 and early 1943 (Figure 6). Here, a largely Australian

Table 5. Thai-Burma Railway Camps, Burma side 0 to 116 Km³³

	Camp	Km	Alternative names
1	Thanbyuzayat	0	Thanbyuzahat, Tuang Bazaar
2	4 Km Camp	4	Kando, Kendau
3	8 Km Camp	8	Wagele, Wegare
4	14 Km Camp	14	Tatakao, Tettake
5	18 Km Camp	18	Labao, Hlepauk
6	25 Km Camp	25	Bonjiran
7	30 Km Camp	30	Repo, Retpu
8	35 Km Camp	35	Tan Yin, Taunin
9	40 Km Camp	40	Bekitan, Pukutan
10	Anaquin	45	Anakwin, Anarkwan
11	Tambaya	50	Tanbaya, 50 Km Camp
12	55 Km Camp	55	Khonkan, Konnaoi
13	Taungzan	56	Taunzan, Tanzun
14	Lonshi	64	Ronsi, Longsi
15	70 Km Camp	70	Mezali, Mesali
16	75 Km Camp	75	Meiloe, Milo
17	80 Km Camp	80	Tarden, Takilin
18	85 Km Camp	85	Aperon, Apalon
19	Lawa	90	
20	Kyondan	95	Kyandou, Kangan
21	100 Km Camp	100	Anganen, Auganon
22	105 Km Camp	105	Aunganaung
23	Payatonsu	108	Payatibsy
24	Chungara	114	Changara, Chaungena
25	116 Km Camp	116	

THREE PAGODAS PASS



Figure 6. Jack Chalker’s painting of the Hintok Cutting (155 Km) or “Hellfire Pass”. Several lives were lost blasting through the solid rock.⁴³

workforce hacked and blasted the line through solid rock. The project took until mid-1943 to complete, and reinforcements from D and H Forces were brought in (as well as several elephant gangs). The work was desperately hard and dangerous, and several lives were lost. For the POW’s, the cutting became widely known as “Hellfire Pass”.⁴³ A further example of callous but remarkable construction was the Wampo viaduct (114 Km), also known as the “Pack of Cards Bridge” (Figure 7). The latter name was because the bridge fell down three times during its construction! It is believed that 31 men died due to falls from the structure during its building, and that beatings and maltreatment took the death toll to 60 POWs.⁴⁴ The stories of the Hintok Cutting and the Wampo Viaduct (and many other construction areas on the line) are

harrowing, but represent incredible engineering feats considering the remoteness of the area, nature of construction materials, and lack of mechanised help.

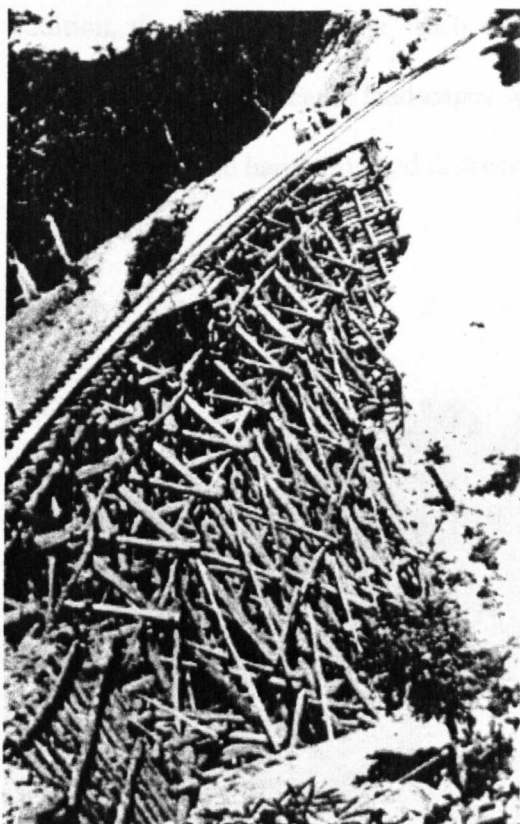


Figure 7.

The Wampo Viaduct (114 Km) or “Pack of Cards Bridge”. Its construction is said to have claimed 60 lives⁴⁴ (secret contemporary photograph from the collection of Brigadier Philip Toosey, courtesy of Professor Peter Allan).

The camps along the railway varied greatly in size and amenities, but all were based on the “Atap hut” – a bamboo construction with a roof of loosely thatched grass. The larger base camps such as Kanchanaburi and Tamarkan had considerably better facilities than the more remote up-country camps such as the Sonkrai group near the Burmese border. A point frequently forgotten by writers of both primary and secondary sources concerning railway life is that the line went through areas of outstanding natural beauty. Thus, Captain FS Robinson described Wanlung Camp (68 Km) as “pleasantly situated”, and Kinsaiyok Camp (172 Km) as “very pleasantly situated on the river.”⁴⁵ Captain C Lyons, an RAMC medical officer on the railway, related an event on one of the long marches up the line when the POWs encountered a “cloud of the most beautiful butterflies ... some were very, very large, the size of big birds ... there was every conceivable colour one could think of... you literally walked

through them.” Lyons ended his description, “I’ve never seen anything so beautiful in my life”, before going on in his diary to discuss tropical ulcers and cholera.⁴⁶ In addition, the “Railway Artists” such as Jack Chalker and Robert Hardie frequently drew and painted the scenic landscapes which surrounded them (Figure 8), as well as depicting the more harrowing and distressing aspects of POW life on the railway.⁴⁷

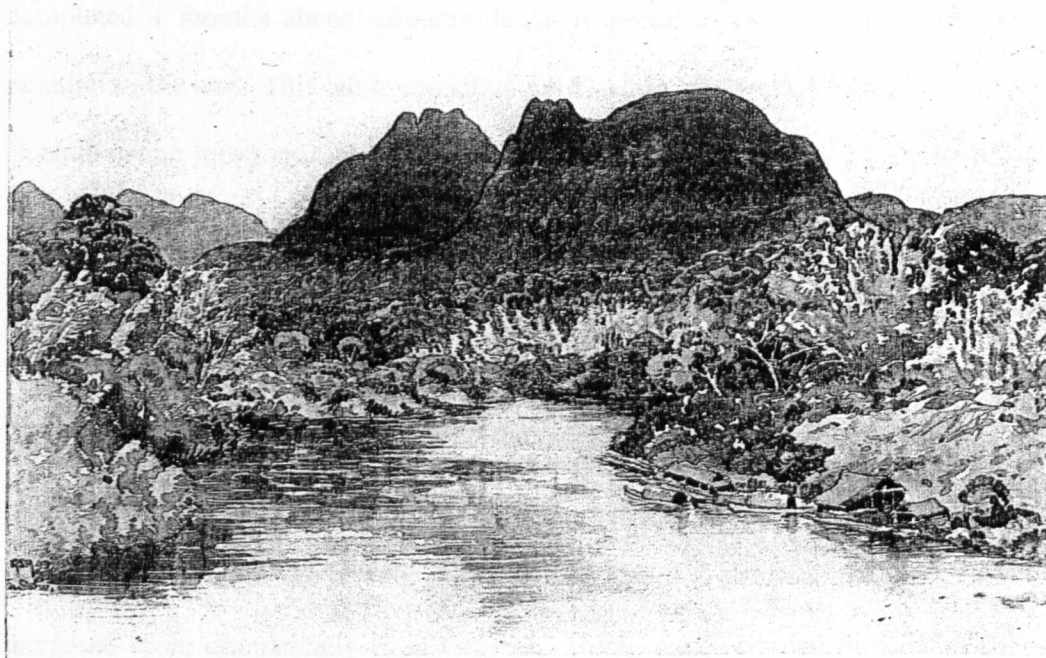


Figure 8. Beauty surrounding misery. Dr Robert Hardie’s sketch “River and hills at Tarsoa, 1943”.⁴⁷ Hardie was one of a small but important group of railway artists who recorded conditions on the line at great risk to themselves. Hardie’s artistic materials consisted of a child’s paintbox bought in Thailand, and surrounding natural pigments from plants and soil.

The Railway Project – an overview

The building and maintenance of the Thai-Burma Railway was complex; and experiences of individual men, regiments, “Forces” and camps were variable. Some broad patterns do emerge, however, and events can be divided by time periods as follows:

1. **May to October 1942** This corresponds to the arrival of the early Forces from Changi and elsewhere at both ends of the planned railway route. The Japanese army and engineers collected equipment for movement inland, ready to start construction after the monsoon had abated in November 1942.
2. **November 1942 to October 1943** Railway construction began in late 1942 as the rains abated, but in February 1943 the IJA command ordered construction to be completed 4 months ahead of schedule, in response to Japan's declining strategic position in the war. This led to the infamous "speedo" or "worko" period of 8 months (including the monsoon season) until the line was completed on 17 October 1943. Mortality was high during the speedo as conditions of work and nutrition deteriorated; particularly so in the up-country camps such as Sonkrai (manned by the luckless F Force who had marched in from 0 kilometres under terrible conditions).⁴⁸
3. **October 1943 to April 1944** With the railway complete, the up-country sick were returned to camps lower down the railway (both in Thailand and Burma). This process had begun in the middle of the "speedo" period (from about May 1943) but increased more dramatically from October. Some were returned directly to Changi (such as many F Force survivors), whilst others returned to the emerging base camps. These work camps close to the start and end of the railway expanded into hospital units; and included Chungkai, Nakom Paton and Tamarkan on the Thailand side; and Tambaya in Burma. The numbers of patients were huge – for example in late 1943 Chungkai had 2,500 patients and Tambaya 1,250. The state of the sick POWs arriving at the base camps from up-country shocked even the inmates hardened by speedo. At Tamarkan, the commandant Phillip Toosey recorded that "the sick were in appalling condition, approximately 75 percent of the parties were stretcher cases and men frequently arrived dead".⁴⁹

4. *May 1944 to August 1945* From mid-1944 the base camps were further strengthened, and POW numbers up country further declined as men were needed now only for track repairs and maintenance. More prisoners were moved back to Changi, and some from there to Japan. As the tide of the war turned, allied bombing attacks on the railway occurred, sadly with some POW casualties. Increasingly sensitive to their fading war hopes, the IJA further consolidated the base camps and improved facilities. Nakom Paton, for example, had about 10,000 patients from mid-1944, becoming something of a “show hospital”. The officer’s hospital camp at Kanburi was also allowed Red Cross teams to visit – albeit to see selected areas and selectively well nourished men.

Throughout railway construction and afterwards, POWs and their officers faced problems other than overwork, nutrition and health. In this remote area with effectively no Red Cross access, the men were cut off entirely from home news – either letters from friends and family, or on the current state of the war effort. Some secret radios were constructed, at great danger to both the individuals concerned and to their camps in general, as widespread reprisals from the Japanese often followed discovery. Brynmoor Roberts of the Royal Signals recalled that “almost every camp ... had a wireless set”. Cannibalised radio sets had been brought up from Changi and reconstructed on the railway, frequently hidden in a false bottom to a water carrier (“they cut the water bottle in half and soldered a false bottom, with the wireless set in the bottom”).⁵⁰

This lack of external news was in contrast to the experience of POWs in the European theatre of war. Also different was the absence of escape possibilities, indeed Stanley Saddington’s railway POW experiences are entitled *Escape Impossible*.⁵¹ Surrounded by hundreds of miles of mountainous jungle, and with India as the nearest friendly country; the culture of “escape committees”, tunnels and

disguises which were common in POW camps in German-occupied Europe, was not a realistic option in Thailand or Burma. Nevertheless, there was one audacious and almost successful escape attempt, recorded in James Bradley's book *Towards the Setting Sun*.⁵² Ten men escaped from Sonkrai Camp during the cholera outbreaks, on 5 July 1943. It was as well-planned as possible, though obtaining adequate supplies of food and medicine was difficult. The plan was to march west "towards the setting sun" through the jungle, hopefully meeting the Burmese coast at or near to Ye. The group simply walked out of the camp in the early morning; as Bradley observed "there was no wire netting round any of the camps, as the Japanese knew that the jungle alone was enough to deter any escape attempt and, of course, our skin colour was against us".⁵³ The party underwent extraordinary hardships during their march, and five died en route before the survivors reached a village on the coastal plain of Burma close to Ye. They were given food and shelter, but later handed over to the Japanese. After a lengthy trip under guard through Burma and Thailand, they were returned to Singapore and were incarcerated in the infamous Outram Road Gaol. Almost a year later, they faced an IJA Military Trial and were of course found guilty. However, the presiding judge gave them each a bag of sweets, told them to take care of their health, and sent them to the hospital wards at Changi!⁵⁴ How Bradley and his colleagues escaped summary and immediate execution without trial is uncertain. One factor is that, at least initially, the Japanese found it hard to believe that the POWs could possibly have made the journey that they did, and assumed that they were enemy soldiers who had parachuted into the area, and their status was therefore of serving soldiers rather than war prisoners (an important distinction to the Japanese). The intervention of Major Cyril Wild was also important – when the men were returned to the railway camps, Wild used his fluent Japanese to plead the cause of Bradley and his colleagues with the IJA. Finally, there is also no doubt that

Japanese justice and discipline was always arbitrary and unpredictable. Bradley also attributes their luck to being tried in Singapore rather than on the Railway. He regarded the IJA as very “susceptible to their environment”. In the more civilised environment of Singapore “they behaved towards us in a civilised manner”, but at the jungle camps on the Railway they “appeared to lose this veneer of civilisation, and almost revert to the laws of the jungle”, becoming unpredictable and ruthless.⁵⁴

This last account of Bradley’s summarises the issue of Japanese discipline on the Thai-Burma Railway – often harsh and ruthless, but frequently variable and erratic.⁵⁵ Contrary to popular belief, systematic torture was not regularly practised by the Japanese. Their main form of abuse was to flaunt the Geneva Convention (of which, to be fair, they were not a signatory), or any other principles of common decency, and force their prisoners to undertake forced labour with grossly inadequate food and medicines. However, corporal punishments were frequent, and no POW escaped the occasional “clout” or often a more systematic beating, frequently for simply forgetting to bow to a Japanese soldier. More serious offences could lead to a spell in a cramped solitary confinement cell (often known as the “no good house”), or being forced to stand with a heavy stone held above the head. A more sadistic punishment was to tie a POW to a stake and place a tin filled with stones or water around the neck, pulling the head down. Attempts to raise the head resulted in the jagged top of the tin cutting into the chest.⁵⁶ The IJA often operated a race-related policy over punishments and this particular torture was used more frequently against Chinese, local Thais and other Asians. Conversely, it was the Korean guards who frequently displayed more sadistic responses to POW “misdemeanours” than the Japanese soldiers themselves.

There was particular fear of the Kempeitai (the Japanese secret military police). This group used unashamed tactics of terror and torture, and they were active

throughout Japanese occupied territories including the Burma Railway.⁵⁷ An example of their activities and tactics occurred in Tamarkan Camp when a system of covertly buying food from nearby traders was discovered. The Kempeitai were brought in and there followed a period of several days' interrogation and torture. Eventually, the Kempeitai disappeared, along with several POWs who were never seen again. During this episode, "everybody in the camp ... were living on the edge of their nerves ... you never knew who was going to be interviewed ... or interrogated."⁵⁸

This chapter will now take a more in-depth look at two major facets of the Railway experience – the up-country camps during the "speedo" period, and the development of the base hospital camps post-speedo.

Sonkrai and the up-country camps

It was the unfortunate F Force which was destined to march through the monsoon-drenched jungles from the Thailand railway base to the remote up-country camps near the Burmese border. Their story represents the worst of railway conditions, and serves as a useful yardstick against which to measure other aspects of existence on the Thai/Burma Railway. The Force which left Changi comprised 7,000 men (about half British and half Australian) with 30 medical officers. Much of the following account is from contemporary records by Captains P Coates and R Neild,⁵⁹ and also by Major Cyril Wild⁶⁰ - a man to attain legendary status in F Force, both amongst POWs and the IJA guards (who called him *nemuranu se no takai otoko* or "the tall man who never slept").⁶¹ Wild had lived and worked in Japan in the pre-war years, he spoke the language fluently and understood the Japanese culture and temperament totally. He was aware, for example, that "western logic was intellectual whereas Japanese logic was temperamental".⁶²

When F Force arrived at Banyong, it became clear that they were to face a

significantly long march into the interior, and a lot of their equipment (including medical kit) had to be left behind.⁶³ Captain Harry Silman of the RAMC recalled that “we happily transported lighting sets, pianos and other musical instruments” to Thailand, but that these were “soon dumped along the way during the dreadful march north.”⁶⁴ Retrospectively, he noted, “it seems inconceivable that we believed the Japs when they told us the move would be to convalescent and rest homes”. This was indeed a tragic miscalculation, as about one-third of the British contingent of F Force were unfit men, included in the hope that they would recover their health.⁶⁵

The marches began on the evening of 3 May 1943 and continued until arrival at Sonkrai on 21 May. There were 13 night marches, with five rest nights, covering a total distance of 309 Km or 193 miles (see Table 6).⁶⁶ Wild recorded that the march would have been “arduous for fit troops in normal times”, but with the number of sick and the shortage of food “it proved a trial of unparalleled severity”.⁶⁷ The monsoon broke soon after they set off, all men were heavy-laden with their own and other kit, and the paths deteriorated into muddy water channels. In the pitch darkness, several men fell off bridges or into ditches, and a number of sprains and fractures resulted.

Early in March, food supplements could be bought from local Thais, but this rapidly ceased and food deteriorated to “rice and onion stew with hot water to drink, and often rice only”.⁶⁸ The staging camps at which F Force rested during the day were not camps at all; rather they were jungle clearings with no shelter and water supplies often distant. Soon, sick men were being left behind, despite the enormous efforts of the medical officers who were continually tending to the sick both on the march and at halts. Captain Phillips, writing later in Changi, recorded that their work on the march “deserves special credit”. They had little sleep and were frequently rewarded for trying to protect the sick by receiving a slapping.⁶⁹

Table 6. F Force Night Marches. Banpong to Sonkrai, 3 to 21 May 1943

Date	From	To	Km	Miles
3/4 May	Bampong	Tamara	25	15½
4/4 May	Tamara	Kanburi	25	15½
5/6 May	REST	-	-	-
6/7 May	Kanburi	Wompeh	24	15
7/8 May	Wompeh	Tardun	26	16
8/9 May	REST	-	-	-
9/10 May	Tardum	Tarso	24	15
10/11 May	Tarso	Kanyo	23	14½
11/12 May	Kanyo	Kinsayo	18	11½
12/13 May	REST	-	-	-
13/14 May	REST	-	-	-
14/15 May	Kinsayo	Womping	23	14½
15/16 May	Womping	Bronkali	23	14½
16/17 May	REST	-	-	-
17/18 May	Bronkali	Tarkanun	17	10½
18/19 May	Tarkanun	Konkoita	23	14½
19/20 May	Konkoita	Shimo-Nieke	20	12½
20/21 May	Shimo-Nieke	Sonkrai	17	11
Total			309 Km	193 miles

Note: The above is taken from the Coates and Neald Report.⁶⁶ Spellings of individual camps is as recorded in that report.

On 19 May 1943, the penultimate night March began from Konkoita to Shimo-Nieke. Coates and Nield recorded “a terrific downpour of rain just as we were about to leave camp, made us and our belongings soaking wet”.⁷⁰ The march continued wet, muddy and hilly, a hot water stop was missed, and an inept Japanese guard missed the destination, leading to an extra 5 Km march. At Neike, F Force learnt with trepidation that cholera had broken out. The next night they made the final “quite endless” journey to Sonkrai, once more arriving in rain.⁷¹ Here there were huts, but they had no rooves – it took a week before any effective shelter was achieved. Though most of F Force stayed at the Sonkrai group of camps, others went to surrounding camps including those beyond the Three Pagodas Pass on the Burma side of the railway.

Dysentery, tropical ulcers and malaria became highly prevalent, but it was cholera which struck most fear into POWs, the native coolie force, and the Japanese. The disease struck suddenly and spread rapidly, and men frequently died within 24 hours from severe dehydration due to the dramatic liquid diarrhoea. The worst epidemic hit Sonkrai between 21 May and 26 June 1943. During this period there were 315 admissions with cholera to the camp hospital, with 219 deaths (70%).⁷² Cholera victims were separated if possible – often into tented areas outside the main camp. This is shown for Lower Sonkrai (No. 1) camp in Figure 9, where the cholera tents were across a stream to the north of the camp, ironically close to the cemetery.⁷³ In fact it became more common practice to burn the bodies of dead cholera victims on horrific funeral pyres – the cemeteries were usually full anyway, and the burning of the bodies reduced infection risk. As can be imagined, attending these fires was not one of the most popular of jobs. Richard Dix, a dentist at Sonkrai, described how bamboo spars would be stacked criss-cross, bodies then placed on top, and the fire set alight. It would take 8-10 hours for the bodies to burn, apart from “bones and things”.

A particularly bizarre and horrific problem was that after burning for a while, “due to contractions” the bodies could sit up as though alive. After a while, the cremation parties learnt to put more and heavier timbers over the corpses to prevent this “disturbing sight”.⁷⁴ These scenes of writhing corpses on the funeral pyres were to return and haunt the dreams of many F Force survivors in years to come

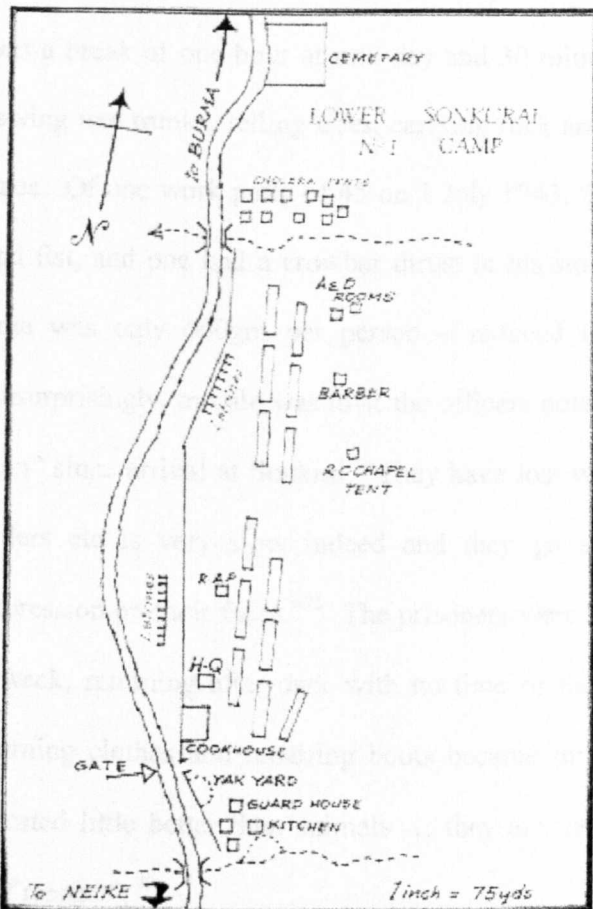


Figure 9.

A plan of No. 2 Camp Sonkrai (Lower Sonkrai), showing the separated cholera tents. Of interest also is the Barber's Tent, demonstrating perhaps an attempt to maintain discipline and appearance in this most difficult of POW camps.⁷⁵

Conditions at Sonkrai during the speedo were a living nightmare. Coates and Neald recorded that there were only 180 men fit for work, but the Japanese were demanding 260. Despite protests, the numbers had to be made up by sick men, including those with fever, diarrhoea and tropical ulcers.⁷⁵ This insistence on sick men working was a recurring theme on the railway. Three levels of fitness were accepted – fit, fit for light duties, and unfit. The Japanese always insisted that men in

the first two categories (and sometimes the third) were used for heavy work.⁷⁶ These levels of fitness were Japanese systems, but the categorisation of men into these levels fell to the POW doctors. This was an unenviable task, as they had to both protect their sick men as much as possible, but also do their best to provide reasonable numbers for the work parties.

Work parties at Sonkrai left camp at 0900 hr and returned at 2150 hr. There was a break of one hour at mid-day and 30 minutes at 1700 hr. The work involved sawing tree trunks, felling trees, carrying rock and timber and laying sleepers and rail lines. Of one work party of 45 on 1 July 1943, “15 were hit over the head with hand and fist, and one had a crowbar thrust in his stomach”. The daily rice ration at this time was only 600gm per person – reduced by 50% to 300 gm for the sick.⁷⁷ Unsurprisingly, morale was low; the officers noted a “slow and gradual change in the men” since arrival at Sonkrai. “They have lost what spirit they had, their reaction to orders etc is very slow indeed and they go about with a vacant look and lost expression on their faces.”⁷⁸ The prisoners were working over 12 hours a day, 7 days a week; returning after dark with no time or facilities for leisure or basic self-care (darning clothes and repairing boots became impossible, for example). They were “treated little better than animals ... they are losing their individuality and ... their self respect”.⁷⁹

This miserable existence, with its associated high death rate, continued until the railway completion in mid-October 1943. Evacuation of the sick from the up-country camps had been proceeding since July, but in late August and September it accelerated. Most were taken down to the base hospitals on the Thailand side, but some unlucky men were taken to Tambaya Camp in Burma (50 Km Camp – see Table 5). By mid-September 1943 there were 1,600 men in this camp – 500 cases of

beriberi, 521 with dysentery, 575 with malaria and 317 with tropical ulcers. There were few doctors, and food and medical equipment was scarce⁸⁰

Conditions in October began to improve as the near-completed railway was able to bring in more food, and work reduced (but did not stop even after railway completion, as roads and road-bridges were being built). The “fit” POWs remaining were evacuated down-country in November 1943, to the Thai base camps and on by rail to Singapore.

Of the 7,000 men of F Force 3,100 died – a mortality rate of 44% and the worst of any group of prisoners on the railway project.⁸¹ Of all the F Force up-country camps, however, it was Sonkrai with the worst statistics. From the 1,602 men who stayed at Sonkrai after the march in, 305 were later evacuated to Burma, and 122 eventually left for Singapore – a total mortality of 73%.⁸² In fact, the mortality was almost certainly higher. Many of the deaths were due to cholera, and it was known that many so-called “cholera recoveries” later died either of late complications or of other causes (presumably weakened by the cholera). Major WJF Phillips, in his F Force report written back in Changi, recorded that in No. 2 Camp Sonkrai there was a 64% immediate mortality, but an ultimate mortality of 100%.⁸³

When the F Force survivors eventually reached Singapore, 95% were infected with malaria, and 50% required prolonged hospitalisation, often because of dysentery and malnutrition. Six weeks after their return, two Japanese medical officers examined 3,000 survivors with a view to selecting men for work on aerodrome construction. They found only 125 men fit – and only for light duties.⁸⁴

The reasons for the disaster of the up-country camps are in many ways obvious, but there were other more complex causative factors. Overall, the problems can be summarised as follows:-

- Because of the IJA promises that their destination would be ideal for recuperation and rehabilitation, F Force began its journey up-country with a large proportion of already sick men.
- The Japanese made the classic military mistake of overstretching its front line. The camps near the Thai/Burma border were too far in front of the railhead, and had no easy road access. This led to serious supply problems with regard to food and equipment.
- The journey up-country unfortunately coincided with the start of the monsoon, and work at the up-country camps was straightaway into the “speedo” phase, with seven day a week work schedules.
- The cholera epidemics had a major mortality impact on both POWs and local labour forces. Cholera was rarer down-country, and was a specific and major problem for F Force.
- A peculiarity of F Force was that it was the only group of POWs in Thailand which remained under the command of Singapore (Major-General Arimura’s Headquarters at Changi). The local Japanese commander was Lt Col Banno who, as Cyril Wild observed, “proved incapable either of administering the Force or of protecting its personnel from the outrageous demands and treatment of the Japanese engineers”.⁸⁵
- Medical Officer numbers in many camps were significantly lower than elsewhere on the line. In Tambaya Camp in Burma, on one occasion there was a single MO in charge of 450 very sick men. Later in 1943 Tambaya had 1,900 hospitalised patients and only 6 MOs.

The Base Camps and Base Hospitals

In his immediate post-war report on *Malay and Thailand Prisoner of War Camps*, Lt Col Phillip Toosey includes a section entitled “Tamarkan as a Base Hospital.”⁸⁶ He records that by May 1943 both bridges at Tamarkan had been built and most fit men were moved to work further up the line. Toosey was kept behind (despite his many requests to be allowed to go with his men) in order to develop and run Tamarkan as a Base Hospital. This suggests that the Japanese had already realised that large numbers of sick POWs would need evacuation from up-country, and also that they required high quality officers to meet the demands of what was likely to be huge numbers of incoming patients. Toosey had certainly proved his leadership skills at Tamarkan in the preceding months during bridge construction.⁸⁷

Toosey was given five doctors and 45 medical orderlies. During mid-1943 up to 100 up-country POWs were arriving, usually each night, and by July there were 3,000 men at Tamarkan, only 400 of whom were able to work. Details of the arrival of sick parties from up the line are worth quoting fully from Toosey's report:-

*'Parties of approx 100 arrived nightly and the Camp reached its maximum strength by July. The sick were in an appalling condition, approx 75% of the parties were stretcher cases and men frequently arrived dead. They were brought in cattle trucks or on the railway, the load being between 30 and 40 per truck. No arrangements had been made for feeding or treatment on the journey by the Japanese. On one occasion a party of 60, mostly stretcher cases, were dumped off a train in a padi field some 2 miles from the camp in the pouring rain at 0300 hrs. They were left without a guard and a search party had to go out from the camp to locate them.'*⁸⁸

Regarding the individual state of the sick men, Toosey continued –

*'It is impossible to describe adequately the condition of these men. As a typical example I can remember one man who was so thin that he could be lifted easily in one arm. His hair was growing down his back and was full of maggots, his clothing consisted of a ragged pair of shorts soaked with dysentery excreta; he was lousy and covered with flies all the time. He was so weak that he was unable to lift his hand to brush away the flies which were clustered on his eyes, and on the sore places of his body. I forced the Japanese Staff to come and look at these parties, which could be smelt for some hundreds of yards, but with the exception of the Camp Commandant they showed no signs of sympathy, and sometimes merely laughed.'*⁸⁹

Toosey described these experiences as “scenes of misery which will live for ever in the memories of all of us”. The incoming sick were always given food and tea on arrival, whatever the time of day or night, and “many men burst into tears at receiving help and food”.⁹⁰ Jack Chalker (the “railway artist”) described similar scenes at Chungkai Base Camp. He helped to unload barges “containing dead, dying and desperately ill survivors ... poled down the river for days without medical attention and scarcely any food ... I cannot remember one conscious occupant who was able to speak”. Chalker also recalled weeping, but on the part of himself and others unloading the barges – “tears of horror and anger against the Japanese as we

lifted the pitiful remains out of those stinking barges and carried them to the huts.”⁹¹

Chalker’s portrayal of such scenes is shown in Figure 10.

With Kanburi (Kanchanaburi) Camp, Chungkai and Tamarkan formed the main base hospital camps. They were closely situated within 7 Km of each other—Kanburi (50 Km), Tamarkan (55 Km) and Chungkai (57 Km). In addition, Nakom Paton Camp was constructed solely as a hospital camp. It was not a pre-existing



Figure 10. Jack Chalker’s drawing of the up-country sick being unloaded from barges at Chungkai Base Camp.⁹¹

railway camp, and was situated south of Nang Pladuk (0 Km Camp) towards Bangkok. There was no similar group on the less populated Burma side of the railway, though Tambaya (50 Km from the Burma 0 Km Camp) acted as the largest hospital camp on this side of the line. The eventual size of these camps were enormous. Tambaya reached over 2,000 and as mentioned, Tamarkan housed about

3,000 POWs Chungkai had between 4,000 and 10,000 patients, Kanburi about 3,000 and Nakom Paton up to 10,000 “heavy sick”.⁹²

It can be seen that by modern standards these were massive camps and massive hospitals. The camps developed well-tuned levels of command, as did the hospitals, which had administrators, record keepers, finance committees and workshops. The initial challenge in 1943 was to house, cope with, and hopefully treat the huge numbers of incoming sick. “Wards” (atap huts) were designated for specific illnesses, with regular MOs and orderlies assigned to each. The amoebic dysentery ward at Chungkai became known as “Amoebic Hall” – many new arrivals came into this ward, and often died within a few days of arrival.⁹³ Stanley Gimson, an Indian Army Officer at Chungkai, on encountering Amoebic Hall for the first time, noted that the “latest arrivals had been too far gone to survive” and “wondered whether euthanasia wouldn’t be a good thing”.⁹⁴

The tropical ulcer ward at Chungkai was little better. The severity of the ulcers in the up-country evacuees was far worse than had been seen before. Gimson talks of cases where “the whole calf of the leg is eaten away”, and “some whose flesh is a writhing mass of maggots”.⁹⁵ The situation at other hospital camps was similar. The ulcer wards at Kanburi were described as a “sight and stink beyond belief ... a lot of rotting legs, flesh, sinews and tendons”.⁹⁶ Despite the terrible state of these legs, and a significant mortality, many lives were saved by amputation.

Kanburi Hospital Camp was the main base camp for F and H Forces, and as such took in probably the worst of the up-country casualties. Rather like Nakom Paton, this camp was slightly off-railway, close to the main camp. Unfortunately, the up-country sick began to arrive in August 1943 before the arrival of L Force (Medical), which was to provide hospital staffing. For a short time the sick had only one MO and three orderlies to care for them.⁹⁷ By October, there were 28 wards full,

and by the time of transfer to Singapore in early December, 406 deaths had occurred. Table 7 shows the causes of death, with malnutrition the main cause followed by dysentery.⁹⁸ Many other evacuated sick stayed in Thailand, some until surrender in 1945, and for them conditions at the base camps improved considerably, though high levels of hospital activity continued well into 1944. Even in late 1943, the base camps were luxurious by up country F Force standards – Captain Harry Silman RAMC at Kanburi was able to eat six eggs a day and read books for the

Table 7. Deaths at Kanburi Camp (H and F Forces), 28 August to 8 December 1943⁹⁸

Cause of Death	Number
Beriberi	181
Dysentery (bacillary and amoebic)	114
Malaria	41
Other malnutrition syndromes	24
Other causes	24
Tropical ulcers	22
TOTAL	406

first time in months. On 22 December 1943, he wrote in his diary that “I was sorry to leave Kanburi, where the conditions were good and the food excellent”.⁹⁹ Stanley Gimson expressed in his own diary feelings of envy which must have been widespread. At Chungkai on Sunday 11 April 1944 he talked of an “aimless and carefree existence” with no work, reading, regular meals and daily river-bathing. “Coming down from the wilds as we do, it is difficult not to be envious of those who have been here all the time, some of whom have all their baggage with them and are surrounded by Changi-esque plenty”.¹⁰⁰ Gimson’s comments are understandable; as

an example Lt JA Richardson, who spent much of his time on the Railway at base camps, recorded in his diary for Sunday 23 July 1944, “John Coast’s birthday. The eight of us had a celebration: steak, eggs, chips and onions; excellent!”¹⁰¹

The Base Hospitals rapidly realised that the incoming sick evacuees needed psychological and social support as well as medical care, since recreation had been non-existent up country. During their brief spell at Kanburi in late 1943, the survivors of H and F Forces had nightly lectures arranged in each ward, though these were later banned by the Japanese. Quizzes and occasional concerts, however, were allowed.¹⁰² One of these concerts was held on 5 October 1943, when a group of patients sang the following composition concerning their chronic dysentery (sung to the tune of “Three Blind Mice”):

*Three times a night, three times a night,
See how we run, see how we run,
We all sit out on the bog in a row,
We'll all be happy when we don't go,
Three times a night!*¹⁰³

Major Arthur Moon of the RAAMC, who worked closely with Phillip Toosey at Tamarkan as Senior MO, very much realised the therapeutic value of such recreation and entertainment. He personally organised concerts, sports events, river bathing sessions, a weekly magazine and even a barber’s shop.¹⁰⁴

Mortality rapidly fell at the Base Hospitals from early 1944. At Chungkai Camp there were 382 deaths (of a patient-base of 2,500) between October and December 1943, falling to 143 from January to March 1944, and only 37 from April to June 1944.¹⁰⁵ The doctors began medical meetings at which they discussed interesting or difficult cases. The lecture programme developed from the Changi model and in Chungkai became so extensive it was widely known as the “University of Chungkai”.

There was also more extensive flourishing of leisure and sport activities, helped by a softened Japanese attitude. At Chungkai on 29 April 1944, the final of the Johnnie Walker Cup (football) was held between “Doc Dunlop and his Quacks” (from the hospital staff) and “Angela Spong and her Boyfriends” (a group of convincing cross-dressing POWs). Also at Chungkai, on 12 May 1944, Eric Cliffe and the Chungkai Theatre Orchestra performed a “Promenade Concert”.¹⁰⁶ Performances and plays flourished to such an extent that Jack Chalker at one time found himself rehearsing four different shows at Nakom Paton at the same time! An array of talent – both on stage and back stage – was suddenly discovered in this conscripted group of imprisoned soldiers (the “Citizens Army”). These skills were also put to use by the medics, and we will later return to these medical innovations and inventions in the treatment of the sick.

Throughout 1944, and into 1945, food supplies continued to improve somewhat, and drugs and medical equipment were in better supply. As the war turned against the Japanese, this also seemed to favour better POW treatment. Mail and some Red Cross supplies were allowed through to the camps. Fears and concerns moved away from food, disease and overwork, to the problem of allied bombing raids on or near their camps. There were also concerns in mid-1945 that if the Japanese capitulated, the IJA guards in the POW camps would respond by massacring their prisoners to literally “bury the evidence” of what had gone on.

The “coolie” workforce and camps

The Japanese always knew that they would need bigger numbers than the available POW workforce to construct the Thai-Burma railway. The shortfall was made up by a huge number of local and imported “coolies”, whose camps and

hospitals were separate from the allied POW's, and who suffered worse treatment and greater mortality than even their "white coolie" fellow-workers.

The recruitment process of these labourers was interesting. For example, in Malaya advertisements were lodged by the IJA in local newspapers in March 1943, offering three-month work contracts in Thailand. Free travel, housing food and medical care was offered, as well as pay of one dollar per day, and a ten dollar advance on signing the contract. Few locals were taken in by this offer, and the Japanese then resorted to "press gang" tactics. Free film shows were organised, and when the theatre was full the doors were locked, and all adult males were seized and put on trains heading north to Thailand. In other areas, armed troops would visit villages and demand at least half of the adult males for railway construction.¹⁰⁷

In the early days, there was virtually no medical provision for this workforce on the railway. One British POW officer reported that "any coolie who fell ill was just left to die wherever he was", and a sick coolie was "considered fit to work if he could walk 20 yards without help or without the use of crutches".¹⁰⁸ In the early speedo period, the coolie mortality rate became a concern even to the Japanese, if only because it was significantly affecting the likelihood of railway completion. Two dedicated base hospitals at Kanburi were set up, at first staffed by the Japanese Medical Services. Later an extensive chain of "coolie hospitals" was established along the railway, and K and L forces were brought up from Changi, with at least part of their remit to support these hospitals.¹⁰⁹

The mortality of this group of workers was staggering. The Australian K Force report estimated total deaths between 150,000 and 200,000 (though this was probably a little exaggerated).¹¹⁰ At Dai Ni Coolie Base Hospital (Kanburi) between August 1943 and March 1945, the total workforce passing through the camp amounted to 15 – 20,000 of whom about 11,000 died (63%). At Takanon Coolie Camp (Numbers 1, 2

and 3) over a 41 day period in mid 1943, there were 356 deaths out of a total of 2,360 (32%). At Ipoh Coolie Camp (made up of imported Chinese civilian labourers) there were 690 men when the camp opened in July 1943, and only 19 were still alive in December 1944 (a mortality of 97%)¹¹¹

The sheer size of the coolie force was one factor involved in these high mortality figures. Supply of food and medical care, particularly up-country was difficult for these large numbers. The lack of military organisation also worked greatly to their disadvantage. They had no structure of command or discipline, and did not have their own doctors and medical orderlies. Apart from giving K and L forces the monumental task of supporting their medical care (too late for the many who had died), the Japanese appeared to have done nothing to provide any organisation or leadership for the coolie force. The spectrum of diseases which affected these men was no different from the allied POWs, though the cholera epidemics hit the coolie camps especially hard.

Japanese attitudes to the local labourers suggested that they operated a racial “pecking order”, with the coolies of even lower status than POWs. Treffrey Thompson recorded episodes of maltreatment which amounted to vivisection and murder. In January 1944, a group of twenty coolies escaped from Banpong. They were recaptured and brought to Kanburi for punishment. Some were severely beaten, but others were injected intravenously by a Japanese doctor with a red fluid. A number of these victims died overnight, and the survivors were taken to the camp hospital. They were desperately ill and the “whole of the inside of their mouths were red, swollen and ulcerated and all were quite unable to swallow even occasional sips of water. Every man died in extreme agony in a day or so.”¹¹² Some weeks later, a Japanese officer ordered a POW doctor to give an injection to a coolie who “had become insane”. The doctor refused, and the officer dissolved a red tablet in water

and injected it into the patient himself. The tablet was mercurous perchloride, and the man died the next day in a similar way to the escapees. There seems little doubt that these episodes represented murder by mercury poisoning.¹¹³

Japanese attitudes and treatment of the coolie force resulted in massive illness and mortality, and represents an especially sorry (and sadly largely unknown or forgotten) episode in the Far East theatre of war. A particular tragedy was that these unfortunate workers were civilians, and neither internees nor prisoners.

Conclusions

An important feature of the experience of Allied prisoners on the Thai-Burma Railway was that there was in fact not one single experience. What happened to individual POWs depended on many factors, but most importantly where they were stationed on the railway. No-one had an easy time, but in general, construction on the Burmese side of the line was easier than in the Thailand sector. When the line was completed, many prisoners from Burma were transported over the Three Pagodas Pass to the Thai Base Camps, and many could not believe that the railway had been built over such difficult country. In Thailand, there were the obvious differences between up-country and base camps – the appalling deprivations of Sonkrai to the “Changi-esque” situation in Chungkai. There were also a number of “in-between” camps which have not been discussed in this chapter – for example Wampo, Tarsoa, Tonchan, Konyu, Hintok, Rintin etc. Here, the mortality may not have been as high as the up-country border camps, but there was plenty of death, disease and suffering.

A peculiar and much-debated aspect of railway construction was the Japanese treatment of POWs. It has been understandably argued that if the Japanese had provided more food, shelter and medicines, and worked the men less arduously, the railway may have been built more quickly. The question goes to the heart of Japanese

attitudes to the captor-captive relationship. Jack Chalker came to know the commander of Chungkai, and once asked him why he and his colleagues held POW life so cheaply. The reply was - "I am a soldier. To be a prisoner of war is unthinkable".¹¹⁴ Ikuhiko Hata, a Japanese professor of modern history, calls this a "shame culture" in a perceptive chapter examining Japanese attitudes to war prisoners in World War II.¹¹⁵ Hata's chapter title begins with the phrase "From Consideration to Contempt ...", which reflects the fact that in previous conflicts Japan had treated its prisoners well. The "culture of shame" would therefore not seem to be one adequate single explanation for an overall mortality of 27% amongst Pacific theatre of war POWs, compared to 4% amongst those in Europe.¹¹⁶

There were also practical difficulties faced by the IJA, when they captured such a huge and unexpected number of Allied soldiers at the end of their "Lightning War". Already at an overstretched distance from Tokyo, providing food, shelter and medicine to these prisoners was a serious logistic issue.¹¹⁷ Japanese command and discipline on the Thai-Burma Railway also played a part. The Japanese engineers (themselves under pressure to complete their project from Tokyo) essentially ran the programme; the Japanese army camp staff simply responding by forcing increasing sick and underfed POWs to work. It is also likely that the Japanese soldiers attached to the POW jungle camps were not the elite of the IJA – many of their actions suggested a lack of military experience and understanding. Their devolution of daily discipline and duties to poorly-trained Korean Guards (who frequently had even less respect for the POWs than did the Japanese) did not help the situation. There was, in addition, a culture of violence inside the Japanese army, where physical chastisement of NCOs by officers, and men by NCOs was deemed perfectly acceptable.¹¹⁸ A final and more general factor may be that once mistreatment of oppressed minorities begins, the situation can rapidly escalate to horrific extents, even amongst previously

unremarkable individuals. Two historical observers of the European Jewish Holocaust talk of the way that “ordinary men”¹¹⁹ and “neighbours”¹²⁰ can be drawn into a culture of inhumanity.

The next two chapters will deal exclusively with doctors and disease management on the Burma Railway. However, the current chapter has identified some of their problems and responses. The up-country march of F Force drew attention to a major difficulty medics were to have throughout imprisonment – as well as having to deal with their own survival under the most extreme of circumstances, they had a duty of care to the sick POWs assigned to them. The number of such patients, and the severity of their illness was also daunting. A culture of compromise arose, making best use of what was available, and using untapped POW skills and surrounding resources to provide what was unavailable. How this was done varied greatly – what was possible in Sonkrai was very different from what could be done in Chungkai. Surviving the “hunger, the blood and cruelty”¹²¹ was a constant and complex challenge to the railway POW doctors.

- 1 The Changi diary of Capt RM Horner is held at the Department of Documents, Imperial War Museum (IWM), but has recently also been published – RM Horner. *Singapore Diary. The hidden journal of Captain R M Horner* (Strand, 2006), p 25
- 2 *Ibid*
- 3 PH Romney (IWM 81/7/1). Diary entry for 1 April 1942
- 4 R Hardie. *The Burma-Siam Railway. The secret diary of Dr Robert Hardie 1942-45.* (London, 1983), p 21
- 5 RPW Havers. *Reassessing the Japanese Prisoner of War Experience. The Changi POW Camp 1942-5.* (London, 2003), pp 28-29
- 6 R Havers. The Changi POW camp and the Burma-Thailand Railway. In: P. Towle, M. Kosuge & Y. Kibata (Eds). *Japanese Prisoners of War.* (London, 2000), p 25
- 7 R Burton. *Railway of Hell* (Barnsley, 2002), p 67
- 8 L Toseland. *River Kwai. Yasumee Nai!!* (Northampton, 1994), p 52
- 9 *Ibid*
- 10 FAE Crewe. *The Army Medical Services Campaigns, Vol II.* (London HMSO, 1957), pp 141-142

- 11 Horner (2006). p 82
- 12 Havers (2000). pp 30-32
- 13 R Hearder. *Careers in Captivity: Australian Prisoners of War Medical Officers in Japanese captivity during World War II* (PhD Thesis, University of Melbourne, 2003), pp 92-95
- 14 Havers (2000), pp 32-33
- 15 Crewe, pp 141-171
- 16 HC Benson. (IWM) 86/87/1
- 17 B MacArthur. *Surviving the Sword. Prisoners of the Japanese 1942-45*. (London, 2005), pp 325-340
- 18 Crewe , p 143
- 19 J. Chalker. *Burma Railway Artist. The war drawings of Jack Chalker*. (Barnsley, 1994), p 35
- 20 Horner. pp 82-83
- 21 Toseland. p 55
- 22 *Ibid*
- 23 J Chalker This story was recounted at a conference on “Medicine War and Captivity – south east Asia. 1941-45”, held at the Royal Society of Medicine in London, 16 January 2006
- 24 R. Burton (Barnsley, 2002). p 85
- 25 E Martin. From : *Medicine, War and Captivity – southeast Asia, 1941-45* (RSM, 2006)
- 26 Toseland. p 55
- 27 From the writings of Major Clifford Kinvig, an authoritative military historian on Far East war and imprisonment in World War 2. See: C Kinvig. *Death Railway*. (London, 1973); C Kinvig. *River Kwai Railway. The Story of the Burma-Siam Railroad*. (London, 1992); and C Kinvig. Allied POWs and the Burma-Thailand Railway. In: *Japanese Prisoners of War*. Eds P Towle, M Kosuge & Y Kibata (London, 2000)
- 28 Kinvig (1992). pp 40-59
- 29 *Ibid*. p 40
- 30 *Ibid*. pp 43-45
- 31 IWM Misc 1305
- 32 CE Escritt. Map of the Thai-Burma Railway. This hand drawn map is dated 1978, and appeared in a privately published pamphlet by GPO Adams. *The Thailand to Burma Railway. An Illustrated History*. (Poole, 1979), p 12
- 33 D Tett. *A Postal History of the Prisoners of War and 'Civilian Internees in East Asia during the 2nd World War. Vol 3: Burma, Thailand and Indonesia 1942-1946*. (Hertfordshire, 2005), pp xv-xvii
- 34 R Dix. Imperial War Museum Sound Archive (IWM – SA) 4991/3, p 12 of transcript
- 35 Tett. p xv

- 36 *Ibid*
- 37 S Saddington. *Escape Impossible*. (Stockport, 1997), p 108
- 38 *Ibid*. pp 122-140
- 39 Kinvig (2000). p 39
- 40 I MacDonald. *Dr Ian MacDonald's prisoner of war recollections*. National Army Museum Archive (NAMA) 9407-204
- 41 Saddington. pp 117-118
- 42 The report by Futamatsu Yoshihiko (*Across the Three Pagoda's Pass*) makes interesting reading. Yoshihiko was Chief Engineer on the Thai-Burma Railway, and the report is part of the archive of Capt CE Escripp (IWM 93/7/2). Escripp's comments on some of Yoshihiko's more trite comments are enlightening.
- 43 See : Chalker. pp 56 & 64; and Kinvig. pp 118 & 129
- 44 Kinvig (1992). p 129
- 45 Capt FS Robinson. IWM 99/31/1
- 46 C Lyons. IWM-SA 10752/3, pp 25-26 of typescript
- 47 Chalker; and Hardie
- 48 Kinvig (1992). pp 128-129; and Kinvig (2000). pp 45-46
- 49 PJD Toosey. Report on Malay and Thailand Prisoner of War Camps. IWM 93/14//7, p 8
- 50 B Roberts. Interview, recorded 1980. IWM-SA 4796/5, p 31 of transcript
- 51 Saddington
- 52 J Bradley. *Towards the Setting Sun*. (Chichester, 1982)
- 53 *Ibid*. p 64
- 54 *Ibid*. p 110
- 55 *Ibid*
- 56 A depiction of this punishment is shown in Chalker. p 46
- 57 R Lamont-Brown. *Kempeitai. Japan's dreaded military police*. (Gloucestershire, 1998)
- 58 Roberts. pp 30-31 of transcript
- 59 PU Coates, RSMP Neild. Chronological diary. Up country with F Force. Liverpool School of Tropical Medicine (LSTM) records
- 60 CHD Wild. Narrative of F Force in Thailand, April-December 1943. LSTM records.
- 61 J Bradley. *Cyril Wild. The tall man who never slept*. (Sussex 1991).
- 62 *Ibid*. p 48

- 63 This and other detail was recorded by Major WJF. Phillips RAMC of F Force on return to Changi in late December 1943. "Report on the medical aspects of conditions prevailing in F Force camps in Thailand and Burma". *Changi Medical Reports 1943-44*. IWM Misc 19 (373), pages unnumbered
- 64 Diary of Capt Harry Silman. IWM 66/226/1. p33
- 65 *Ibid*
- 66 Coates & Neald, p2
- 67 Wild. p1
- 68 *Ibid*
- 69 Phillips (in: *Changi Medical Reports*)
- 70 Coates & Neald. p 6
- 71 *Ibid*. p 71
- 72 *Ibid*. p 10
- 73 D Wall. *Heroes of F Force*. (New South Wales, 1993). p 43
- 74 Interview with Richard Dix. Recorded 1981 IWM – SA
- 75 Coates & Neald. p 13
- 76 Phillips
- 77 Coates & Neald. p 11
- 78 *Ibid*
- 79 *Ibid*
- 80 Phillips
- 81 Silman. p 33
- 82 Coates & Neald. p 17
- 83 Phillips
- 84 Wild. p 4
- 85 Wild. p 2
- 86 PJD Toosey. "Malay and Thailand Prisoner of War Camps". Written in late 1945, Singapore. IWM 93/14/7
- 87 See P Davies. *The Man Behind the Bridge. Colonel Toosey and the River Kwai*. (London, 1991); and J Summers. *The Colonel of Tamarkan. Phillip Toosey and the Bridge on the River Kwai*. (London,2005)
- 88 Toosey. p 8
- 89 *Ibid*
- 90 *Ibid*

- 91 Chalker. p 78
- 92 See Toosey, p 78; and Phillips; for details of the POW strength of Tamarkan and Tambaya Camps. For Chungkai, see H-S Darmastut. *Medicine in POW Camps. A study of Chungkai POW Camps on the Thai-Burma Railway.* 1998 BSc Dissertation, Wellcome History of Medicine (HOM) Library, 39293981 (Shelf Mark 1998/HAR). For Nakom Paton see Chalker. p 102; and for Kanburi, see Summers. p259.
- 93 Stanley Gimson. Interview transcript, recorded 1991. IWM-SA 5196/8
- 94 *Ibid.* p 55
- 95 *Ibid.* p 56
- 96 CR Boyton. Handwritten account, written in the 1950s. IWM 97/6/1
- 97 *H Force in Thailand – Medical Report.* UK National Archives (NA). WO 222/1356. p 5
- 98 *Ibid.* Appendix 1
- 99 Capt Harry Silman. Extracts from Medical Diary. IWM 66/226/1. p 32
- 100 Lt G Stanley Gimson. Contemporary war diary. IWM 66/328/1. p 90
- 101 Lt JA Richardson. War diary. IWM 87/58/1. p 85
- 102 H Force in Thailand, p 6
- 103 SE Wood-Higgs. Contemporary journal typescript. IWM 81/32/1
- 104 Major Arthur Moon. Report on Tamarkan POW Hospital. This useful report is part of the Phillip Toosey archive at the Imperial War Museum, London. IWM 93/14/7
- 105 Darmustat (Wellcome HOM, 1998)
- 106 Capt RBC Welsh. Transcript of diary. IWM 66/225/1, p265
- 107 8th Division in Captivity – K Force. Australian War Memorial (AWM) archive, AWM 54 544/9/1. This immediate post war Australian report concerned the activities of K Force (Medical), which comprised both Australian and British doctors and orderlies. Appendix (B) to the reports contains much useful detail on the coolie workforce.
- 108 Lt Colonel Sir Treffery O Thompson. Post-war report. IWM 97/32/1. This document, written in the immediate post-release period by a POW British Officer, is a draft version of a planned book *Medical Victory*. Chapter 12 contains useful detail on the coolie labour force.
- 109 *Ibid*
- 110 8th Division in Captivity – K Force. Appendix (B). p1
- 111 *Ibid* pp 2-4
- 112 Thompson. Chapter 12
- 113 *Ibid*
- 114 Chalker. p
- 115 I Hata. "From consideration to contempt: the changing nature of Japanese military and popular perceptions of prisoners of war through the ages". In *Prisoners of War and their Captors in World War II*. Eds B Moore and K Fedorowich (Oxford, 1996), pp 253-276

- 116 *Ibid.* p 266
- 117 *Ibid.* p 263
- 118 M Harrison. *Medicine and Victory. British military medicine in the 2nd World War.* (Oxford, 2004). p 80.
- 119 CR Browning. *Ordinary Men. Reserve Police Battalion 101 and the final solution in Poland.* (Middlesex, 2001)
- 120 JT Gross. *Neighbours. The destruction of the Jewish community in Jedwabne, Poland.* (Princeton, 2001)
- 121 S Pavillard. *Bamboo Doctor.* (London, 1960), p 206

CHAPTER 3

DISEASE, DISABILITY AND DEATH

**The spectrum of illness and mortality
on the Thai-Burma Railway**

At the height of “Speedo”, and with the railway behind schedule, conditions at Konyu Camp (149 Km on the Thailand side) were poor. Dr Stanley Pavillard awoke as usual at 4am to the cries of “Tenko, Tenko” from the Japanese (basically a call to get up and parade). “Pav” was a former Straits Volunteer medic before capture, and his experiences in Singapore were recounted in Chapter 1. In the “steamy darkness of a Siamese jungle in the early morning” he described “thin shadows moving about indistinctly, muttering and cursing” with everywhere the “squalid noise of great preoccupation with bowels”.¹

Pavillard was on duty for the ensuing early morning sick parade. He asked the first man what was wrong with him – “a silly question, even in this first light I can see that the poor bastard is shivering in the throes of a malaria attack”. Pav ordered him to rest and prescribed quinine. The next man said, “Sir, I have a swollen foreskin”. Pavillard found that a jungle bug had attached itself to his prepuce; it could not be pulled off or its claws would remain in the skin and cause infection. He anaesthetised the bug with a drop of chloroform, and it duly released its grip. The man was sent to work with reassurance.

Next was an NCO with vomiting and severe diarrhoea. The man was dehydrated and ill – another case of cholera. He was admitted to hospital with three bottles of rapid intravenous saline ordered.² The serious was interspersed with the mythical, for example non-existent sprains or diarrhoea to avoid work. Malingering was a real problem as it reduced the workforce, leading to the IJA forcing the sick (including the genuinely ill) to work. POW doctors often adopted policies of demanding stool samples to be brought to sick parades by those reporting with diarrhoea. This, however, rapidly led to a “black market” in dysenteric stool samples! Pavillard’s own solution was to admit diarrhoea cases to a separate tent where they would stay until they produced a witnessed dysenteric stool sample. On one day at

Konyu there were 90 admitted to the “stool tent”, and only 17 (19%) produced true diarrhoea stools. Forty-six (51%) passed normal stools, and the rest (30%) passed nothing and eventually admitted that actually they were constipated!³

Sick parades occasionally were comical. One of Pavillard’s cases on that morning at Konyu was a man complaining of “wet dreams” which he thought were weakening him. Nocturnal ejaculations were almost unknown amongst POWs, and libido in general was low – probably a response to weight loss and poor nutrition. Pavillard knew that the man worked in the cookhouse. “Good God, look at you man, you’re fatter than most of us ... you are stealing the bloody rations!” He was told to stop taking extra rations, and then his wet dreams would soon stop.⁴

This brief scenario from a Burma Railway morning sick parade serves to introduce this chapter, which deals with the major diseases and illnesses encountered on the railway. How these diseases were coped with, treated and where possible prevented will be dealt with in Chapter 4.

Nutritional deficiency diseases

Malnutrition and its effects were experienced in all camps on the Thai/Burma Railway to a greater or lesser extent. This was in contrast to diseases such as malaria or cholera, which were much more of a problem in the up-country camps. Even for those POW doctors with pre-existing tropical experience (e.g. the Dutch, British Straits Volunteers, Indian Army doctors etc) these were novel clinical experiences, and presented a great clinical and therapeutic challenge. The syndromes encountered were often dramatic. For example, in his diary Lt Col C Wilkinson describes his own wet beriberi at Sonkrai Camp, “my feet and legs, scrotum, small of back, all became swollen up to a huge size ... I have lain in bed for over 2 weeks now ... great difficulty in getting to the lavatory”.⁵ Wilkinson was fortunate in receiving a B

vitamin injection, and he slowly recovered. The appearance of such beriberi patients as Wilkinson is shown in Figure 1, with swollen scrotum and abdomen prominent.⁶



Figure 1. A POW with acute wet beriberi at Chungkai Camp in 1943, showing the marked swelling (oedema) – particularly of the abdomen and scrotum.⁶

The uniqueness of the POW nutritional syndromes to the medical officers led to a degree of intrigue, which in turn resulted in particularly good clinical record keeping. Indeed, though standard nutritional problems such as beriberi were in the theoretical knowledge-base of the medics, they were to encounter other syndromes which were outside even textbook experience. Perhaps because of these factors, two British POW doctors wrote up their experiences after the war for MD theses – Captain RJS Wilson on optic neuropathy,⁷ and Captain AD Leigh on neurological deficiency syndromes.⁸

Dietary content and quality There are various records of diet in the railway camps, though details are understandably not as good as those recorded in Changi (see Chapter 1). There was also marked variation from place to place, and from time to time. The dietary problems were similar to those in Changi, but were exaggerated by a higher need for calories (because of hard physical labour), and a greater difficulty in provision of meat and vegetables. Once more, the diet was heavily rice-based, and on the railway it was usually contaminated by grit and weevils, as well as being mostly polished. At least initially, the cooks tried to wash out the contaminants, resulting in

further B vitamin loss. Later, it was often cooked as it was, on the assumption that a cooked weevil would add something of nutritional value.⁹ A standard daily diet (per man) in late 1942 and early 1943 on the railway was as follows:

• Rice	750 g
• Vegetables	75 g
• Meat	32 g
• Fish	16 g
• Sugar	16 g
• Salt	12 g
• Oil	4 g

The report from which these details originate also noted that “vegetables were about 20% bad, fish was about 95% maggoty, rice was maggoty, polished and broken”.¹⁰ Those who were sick were given less food, and the situation at remote camps was worse, as shown by these figures (grams of food per man) from Sonkrai Camp in August 1943:¹¹

• Rice	610 g
• Beans	90 g
• Dried beef	33 g
• Whitebait	3 g
• Flour	1 g

The rice ration varied in proportion to work – most going to those working on the railway, less to the light sick doing camp duties, and the least to the hospital sick. A more detailed analysis of the F Force diet in general was compiled by Major Dobson in July 1943, and demonstrates the gross deficiencies, particularly of calories and protein. (Table 1).¹² Such a highly active group of young men would usually require 3,350 calories and 84g of protein per day, compared with the average F force intake of 1904 calories and 48g respectively.¹³

When well established, the base camps had much better diets. Thus at Tamuang Camp, February-April 1945, the standard diet was of 2,777 calories, made up by 492g of carbohydrate, 60g protein, 28g fat and reasonable quantities of B vitamins (for example, daily thiamine was 327 IU).¹⁴ The Tamuang Report also

gives details of several other therapeutic diets available, including “Fluid”, “Light”, “Nutritional”, “Nutritional Amoebic”, “Highly Nutritional”, “Highly Nutritional Amoebic”, and “Ordinary Amoebic Residue-Free.”¹⁵ However, in the early

Table 1. Dietary constituents of F Force rations, July 1943 (per man in grams)

Food	Weight	Carbohydrate	Protein	Fat	Calories
Rice	450	361	27	2	1570
Beans	42	21	8	-	116
Onions	112	17	1	-	72
Dried meat	16	-	6	7	87
Whitebait	9	-	6	-	24
Potatoes	10	2	-	-	8
Oil	3	-	-	3	27
Totals	642g	401g	48g	12g	1904 cal

Note: The thiamine content was approximately 115 IU

days of the establishment of the base hospitals, the situation was not so good. H Force parties began arriving at Kanburi from August 1943, and there were soon 3,000 men in the camp, overwhelming the food and equipment resources. Daily food supplies were 30-50% below ideal, and “many lives were lost for want of food”.¹⁶

Before leaving diet, food and its preparation, the role of the camp kitchen staff should be mentioned. They worked under very difficult circumstances; firewood was often in as short supply as rations, and open-air cooking was difficult in the extreme when the monsoon rains came. Occasionally, however, there was a humorous side. At Linson Camp (203 Km) the Japanese brought in elephants to help with the jungle clearing, and it was recorded in the camp diary on Friday 27 October 1944, “Elephant

trouble overnight. Jumbo, with forefeet shackled, visited the kitchen and consumed a skip of pumpkins, a few onions, some salt and 36 gallons of water. Jimmy McWilliam can now give a derisive answer to his wife when she complains of mice in his larder!"¹⁷

Spectrum and extent of nutritional disorders The range of syndromes seen on the railway was broadly similar to those encountered in Changi, and have been briefly described in Chapter 1 (Table 5). These were:-

- Cardiac or wet beriberi
- Neuropathic or dry beriberi
- Retrobulbar neuritis
- Spastic diplegia
- Wernicke's encephalopathy
- Pellagra
- Scrotal dermatitis
- Stomatitis/glossitis/cheilitis
- Night blindness

The difference on the railway was that these conditions were more common and more severe, and also that unusual variants occurred. The association with jungle camp life became so obvious that the prefix "camp" was used for some conditions. Thus, retrobulbar neuritis (nutritional amblyopia) became known as "camp eyes". As well as the diffuse nerve damage of dry beriberi or painful neuropathy ("happy feet"), some individual nerves were occasionally affected. Palsy of the peroneal nerve caused foot drop. Involvement of the VIII cranial nerve (vestibulo-auditory) caused deafness ("camp deafness") or vertigo ("camp dizziness"). Facial palsy sometimes occurred, and occasionally the autonomic nervous system was involved, leading for example to disturbances of bladder function and micturition.

Numerically, nutritional disorders were probably the commonest illnesses on the Thai/Burma Railway. Table 2 shows admissions to Tamarkan Camp Hospital, and deaths with causes, in July 1943. At the time the camp strength was just over

3,000.¹⁸ Malnutrition can be seen as easily the commonest cause of hospital admission (36% of all cases), but well behind dysentery as a cause of death (only 13% of all fatalities). These figures from Tamarkan are probably reasonably representative, but as with other aspects of the railway experience, there were exceptions and variations. In September 1943, survivors of F and H Forces reached Kanburi Camp. The hospital figures and diagnoses are shown in Table 3; ¹⁹ here beriberi was not the commonest diagnosis, and dysentery was only the fourth commonest. The explanation probably lies in the extreme conditions experienced by these forces up-

Table 2. Admissions and deaths (by cause) at Tamarkan Hospital Camp, 1943 ¹⁸

Admissions		Deaths	
Malnutrition	930 (36%)	Dysentery	58 (67%)
Tropical ulcers	650 (25%)	Malaria	11 (13%)
Dysentery	545 (21%)	Malnutrition	11 (13%)
Malaria	450 (18%)	Others	7 (7%)
Total	2575	Total	87

Table 3. Diseases and numbers in Kanburi Camp Hospital, September 1943 (H and F Forces)¹⁹

Malaria	503
Beriberi	459
Tropical ulcers	448
Dysentery	211
Septic scabies	108

country. The men at Kanburi were the minority survivors – dysentery had already taken a fatal toll on many men. Beriberi and the benign forms of malaria, as diseases

less likely to kill, became the commonest afflictions in this selected group of survivors.

Major nutritional syndromes This section began with a personal description of the bizarre lower body swelling of wet beriberi, which represented a form of severe heart failure, caused by cardiac muscle weakness due to thiamine deficiency. As with many nutritional diseases, its onset was often preceded (and presumably precipitated) by an attack of malaria or dysentery. The typical swelling would then begin, sometimes rapidly and sometimes more insidiously. It could then run a fulminating course, or become more chronic and less severe. In the acute cases swelling was often massive (“resembling the familiar rubber man in the Michelin Tyre advertisement”²⁰), and sometimes collapse and sudden death (presumably due to cardiac arrhythmia) occurred. Stanley Saddington described two such deaths, noting that they occurred by no means in the more severe cases of beriberi. One case was of Able Seaman Wignall (or “Wiggy”). Saddington recalled that “Wiggy... had a chess set, and one particular afternoon I played two or three games with him. He was suffering from beriberi, but I had seen far worse cases. He was cheerful, played sensibly and betrayed no sign of impending death. The following afternoon there was a burial, and when I asked who had died, I was told it was Wignall”.²¹

In some camps, swelling in the absence of other signs of avitaminosis was ascribed to “famine oedema”. This is a condition caused by severe malnutrition when protein levels in the blood fall, leading to reduced osmotic pressures favouring leakage of fluid from inside cells into the tissues. The “dry” form of beriberi led to peripheral nerve damage (neuropathy), leading often to tingling and sensory loss in the legs. Captain MH Churchill RAMC collected records of 500 cases of malnutrition on the railway, 80 of whom had dry beriberi. He found, on detailed examination,

sensory loss in 72%, muscle weakness in 72% and absent tendon reflexes in 37%.²² In modern terms this would be called a “mixed sensori-motor neuropathy”, meaning that both sensation and muscle strength was involved. Churchill also noted that many affected POWs had obvious or mild signs of cardiac beriberi.

The “Burning Feet” syndrome (“Happy Feet”, “Electric Feet”, “Camp Feet”) appeared to be distinct from dry beriberi, though there was some possible overlap. It was very common, especially up-country, and could be highly debilitating. Reports of two large series of cases were written up in medical journals after the war from Changi²³ as well as Hong Kong and Java,²⁴ though it was also well recorded on the railway.²⁵ The symptoms were of a dull background ache in the feet and lower legs, with super-imposed unpleasant tingling and shooting pains (hence “Electric Feet”). Pain was notably worse at night and was relieved by moving the feet or putting them in cold water. The touch of blankets on the feet worsened the pain, making sleep difficult (a symptom now known as “allodynia”). In many up-country camps, affected men would spend much of the night walking and stamping around their huts trying to relieve the irritation, consequently losing sleep and making work the next day even more difficult. The syndrome was generally regarded as being due to nicotinic acid (vitamin B₆) deficiency, but response to treatment with this, and indeed other vitamins, was variable; and something of a mystery still surrounds the exact causation of the syndrome.

Nutritional amblyopia (Camp Eyes) was described by Churchill as “a common condition” affecting 81 out of 1,200 (7%) men in one Thai Camp (though this was in mid-1945, and Churchill comments that many sufferers died of other conditions).²⁶ It was often accompanied by other nutritional diseases, and was characterised by photophobia (eye pain in bright sunlight) and progressive blurring of vision. Reading was initially impaired, and later even recognition of people or objects became

difficult. Fundoscopy (examination of the back of the eye with an ophthalmoscope) showed the retina to be congested and inflamed, and the optic disc (where the optic nerve enters the eye from the brain) was usually swollen. The Australian POW doctor Major AR Hazelton described the condition as “starvation amblyopia”. He ran the Eye Clinic at Nakom Paton Camp and recorded his experiences there in December 1944 (published after the war).²⁷ Of 409 men he saw complaining of “poor vision”, 277 (68%) were nutritional in origin. In Leigh’s MD thesis, he records that later in the course of the condition, the retina and optic discs became pale (a finding later substantiated post-war).²⁸ He considered the basic lesion to be an optic neuritis – a nutritionally induced inflammation of the optic nerves. The condition was generally thought to be related to riboflavin (vitamin B₂) deficiency, though as with “Painful Feet”, response to treatment was variable. Hazelton thought that thiamine was the most useful treatment, but noted that “10 eggs a day for 30 days” produced particular objective improvement.²⁹ Most MOs gave generalised nutritional support such as this to their patients with this particularly distressing and debilitating condition.

No mention in camp medical records was made of vitamin B₁₂ deficiency. This can lead to “pernicious anaemia”, and in severe cases to neuropathy and spinal cord syndromes. If B₁₂ deficiency did occur on the railway, it could certainly have contributed to a number of neuropathic syndromes seen and attributed to other vitamin deficiencies. It is likely that the medical officers considered B₁₂ deficiency unlikely – the small amounts of meat and fish in the diet, with frequent duck egg supplements, probably allowed sufficient intake to avoid deficiency symptoms.

Less common or problematic nutritional syndromes Inflammation of the tongue (glossitis), angles of the lips (cheilitis) and mouth (stomatitis) remained common but not serious problems, related to riboflavin deficiency. Scrotal dermatitis (“Changi

Balls”) was common, again riboflavin-related. In advanced and severe cases, the scrotum could be as “big as a football” making “walking ... impossible”.³⁰ Though POW doctors rarely had available tablets or injections of riboflavin, “marmite” was more commonly available, and worked very well. Pellagra was a well known vitamin deficiency disorder due to shortage of nicotinamide (nicotinic acid, vitamin B₃). It caused a dermatitis in light-sensitive areas of the body (e.g. the hands, arms, neck etc). Another well-known condition, “night blindness” (due to vitamin A deficiency) was rare, as the diet usually contained sufficient amounts of this vitamin. Churchill found the condition in only 3 of 1,200 POWs he examined on the railway.³¹ He attributed this to the common presence of pumpkin (a rich source of carotene) in the camp diet.

The rarer nutritional neurological syndromes included isolated cranial nerve lesions, peripheral nerve palsies (e.g. foot drop), spinal cord syndromes (e.g. spastic diplegia) and autonomic neuropathy. Affection of most of the cranial nerves was described, though the optic nerves (nutritional ambyopia) and the vestibulo-auditory (“Camp Deafness”, “Camp Dizziness”) were the commonest. The olfactory (I), trigeminal (V) and vagus (X) could also be affected. An unusual peripheral nerve syndrome was of the recurrent laryngeal nerve, leading to vocal cord paralysis and hoarseness of the voice.³² Wernicke’s Encephalopathy was recorded by de Wardener and Lennox, and their findings were published post-war.³³ This is a complex syndrome of brainstem dysfunction, due to pure thiamine deficiency, characterised by diplopia (double vision) due to weakness and inco-ordination of the extrinsic eye muscles. De Wardener and Lennox coined the term “cerebral beriberi” for the syndrome. Their description of 52 cases of this rare condition remains a classic of descriptive and observational medicine. Interestingly, de Wardener later became a celebrated Professor of Medicine in London.

Lessons from the past? At least some of these POW nutritional syndromes had been described before – albeit in the far past and in obscure situations. Thus, Strachan in 1897 reported “on a form of multiple neuritis prevalent in the West Indies”.³⁴ The patients were poorly nourished and complained of peripheral numbness and cramps, poor vision, reduced hearing, and “burning on the soles of the feet ... very often present at night .. preventing resting”. In 1911, Stannus reported on inmates of Zomba Jail in Nyasaland (now Malawi). The men were vitamin deficient in their diet, and had “burning pains” in the soles of their feet.³⁵ He attributed this to pellagra, though this would not accord with modern descriptions of the condition. Further cases of “footburning” were recorded in 1929 by Sharples amongst sugar plantation labourers in British Guiana.³⁶

During the 2nd World War itself, Pallister (in 1940) described a neurological syndrome in Chinese immigrants to Malaya comprising some or all of ataxia (balance disorder), reduced sensation and weakness of the legs, and “burning feet”. He attributed it to their practice of eating polished rice, though he noted a disappointing response to vitamin therapy.³⁷ Finally, Spillane and Scott in 1945 reported an “obscure neuropathy” amongst German POWs in the Middle East. This consisted of varying combinations of optic atrophy (amblyopia), tinnitus, nerve deafness, ataxia, paraesthesia and paraplegia.³⁸ It was noted that the syndromes occurred when nutrition was poor and dysentery common. Like Pallister, they found vitamin treatment unhelpful.

It can be concluded that the neurological syndromes encountered by Far East POWs had mostly occurred sporadically in specific malnourished groups on vitamin poor diets. Nothing had happened before, however, on the same scale as the Far East POW experience in general, and the Thai/Burma Railway project in particular. The variable response to vitamins, both in Far East POWs, and in some of the other

reports discussed in this section, is interesting but difficult to evaluate. On the railway, for example, often only “home made” vitamins of doubtful strength could be used. Even with proper preparations, it may be that the wrong type of B vitamin was given, or the dose was too low. The often-close relationship of these neuropathies with dysentery led some to wonder whether “toxic” or “infective” factors may play a part – perhaps on a background of nutritional deficiency. More likely, however, is that the stress of a dysenteric attack put an added strain on already depleted vitamin reserves, leading to the appearance of an overt nutritional syndrome.

It will be seen in the final chapter that many of these neurological problems were to persist long-term into post-POW life, presumably indicating that the nutritional nerve damage was, at least in some cases severe enough to be irreversible.

Dysentery

The term “dysentery” in Far East imprisonment encompassed both bacillary and amoebic forms. In Changi, the bacillary form was more common – an acute and short-lived infection due to bacteria of the *Shigellae* species. On the railway, amoebic dysentery was as much or more of a problem; this is the more chronic and indolent form caused by infection with the protozoan organism *Entamoeba histolytica*. Both types are characterised by profuse bloody diarrhoea, abdominal cramps and fever, and a particularly unpleasant symptom “tenesmus” – a feeling between bowel evacuations of wanting to defecate when the rectum is empty.

The constant misery caused by dysentery is illustrated by the following extract from the memoirs of S Dawson, a journalist who served in the ranks of the 18th Division, and was at various camps on the Thailand side of the railway:-

It was common enough for a man to have to pay 20 visits a day to the latrines – whilst working this meant a journey of a few yards into the jungle, for there were no latrines there – and the Japanese took it

*upon themselves to limit these visits as much as possible... To dash into the jungle and be caught coming back without having asked permission was to qualify for a slapping. And if one did ask permission it very often pleased the Nip to keep one standing at attention until it was too late*³⁹

The story illustrates both the misery of dysentery and the callousness of Japanese attitudes. It is noteworthy that Dawson's memory is of presumably acute bacillary dysentery cases in men working on the railway. Unless very severe, suffering this type of dysentery at most qualified a POW as "light sick" (camp duties), and often even "fit" (railway work). Amoebic dysentery was usually more severe and frequently resulted in hospitalisation (where much better disease records were kept, compared with non-hospitalised POWs). Hospital statistics thus exaggerated the proportions in favour of the amoebic type. An example is the disease returns compiled by Colonel Edward "Weary" Dunlop for 24 January 1944 at Chungkai. Dysentery cases totalled 716 out of 2616 in the hospital (27%), but nearly all (714) were amoebic, with only 2 bacillary.⁴⁰ It is thus very difficult to enumerate the exact extent of bacillary dysentery on the Thai/Burma railway. However, most POWs who survived the experience remember many personal attacks – often too many to enumerate. Certainly, what "out-patient" records exist show that dysentery (mostly bacillary, but some chronic amoebic cases) was a common problem on the morning sick parade, with most men returned to work.⁴¹

Though treatment will be discussed in detail in Chapter 4, the railway medics were faced with particular problems in respect to dysentery. The Changi experience had taught many doctors that sulphapyridine ("M&B") could be highly effective for bacillary dysentery, but supplies on the railway were restricted and variable. Indeed, the Japanese sometimes confiscated supplies to treat gonorrhoea in their own ranks, caught by encounters between the Japanese guards and local "comfort women" (an entirely acceptable IJA policy).⁴² Dysentery also required as efficient removal of

diarrhoea stools as possible. Hospital cases were separated into Dysentery Wards with makeshift bedpans, and latrine siting and design became a major challenge and preoccupation for camp medics and commanding officers (Figure 2).⁴³



Figure 2. A POW with dysentery, only able to reach the latrines with help. Note that behind the two main figures there is another sufferer squatting over a latrine pit.⁴³

Bacillary dysentery was both endemic and epidemic. Mild attacks could involve 3-6 loose or watery stools per day, with mucus but no blood. More fulminating and potentially fatal cases could be associated with 80-120 stools per day, containing both mucus and blood.⁴⁴ The dysentery wards were often huge – at one time Captain Harry Silman RAMC was looking after 200 cases at Kanburi, of whom 50 also had beriberi.⁴⁵ The misery and squalor of these was recorded by the railway artists – see Figure 3.⁴⁶ Doctors were of course not immune to dysentery, and an attack suffered by Captain P MacArthur RAMC at Takanum in June 1943 gives a useful insight into the disease.⁴⁷

- 11 June 1943. *Extremely acute dysentery. Am very weary and ill.*
 14 June 1943 *Four fearful days and nights of dysentery even soiling my clothes very badly as I ran for the benjo*
 16 June 1943 *I am very much better; stools loose now. Having 4 or 5 raw eggs a day. Too weak to walk yet.*

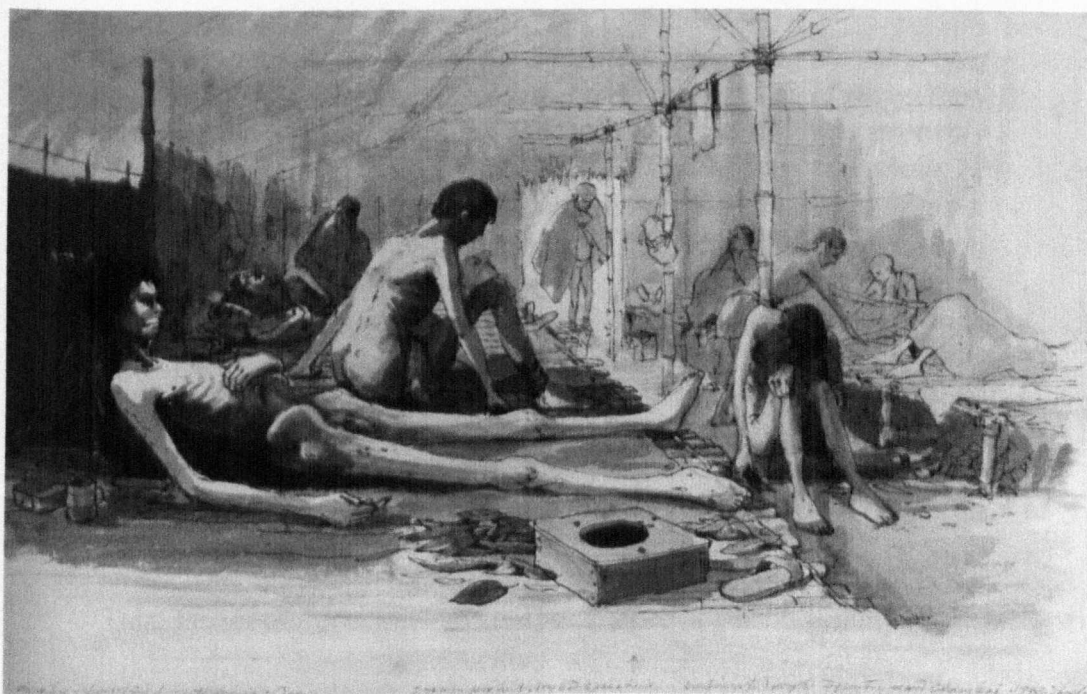


Figure 3. A Dysentery Ward at Chungkai, 1943. A makeshift bedpan is shown in the centre, as well as a pile of leaves to act as “toilet paper”⁴⁶

In fact, MacArthur’s dysentery relapsed five days later, though he returned to work. On 7 July he recorded “my dysentery continues unchanged.”⁴⁸ The implication was that the original attack may have been amoebic rather than bacillary, and that it had evolved into the chronic amoebic form of the disease.

A bizarre but widespread response of the Japanese to dysentery was the practice of “glass rodding” or “bum-sticking”. This was a form of screening for the disease involving lining up large groups of POWs, who would then have to bend down whilst the Japanese inserted glass rods into their rectums, and took the rods away “for examination”. The practice had no scientific validity then or now, and it was doubtful whether anything was actually done with these specimens. Sometimes, however, a glass-rodding parade did result in action; Harry Silman’s diary records that after a “bumsticking” parade at Kanburi, 174 POWs with “possible” results were

sent into isolation on the far side of the camp.⁴⁹ The choice of this isolation group may, however, have been entirely arbitrary, and an enlightening account by Private Harry Howarth doubted the value of the exercise.⁵⁰

We were called out on parade for a medical inspection. We were even more astonished when we discovered the type of medical inspection. Eyebrows were raised when the Jap "medical orderly" who probably swept the floor in a Tokyo abattoir, produced a glass rod about 12 inches long from a cardboard box and with a flourish began to jab it in the direction of the man at the head of the column. As it dawned on this individual that he was about to be deflowered with a blunt instrument, he attempted to sneak away, but too late, he was seized, told to bend over, and the bloody great glass rod was inserted into his lower rectum. As the Japanese used the glass rods, there was no attempt at tabulation of any kind and all the glass rods were thrown together in the same box. It was obviously just a propaganda exercise so that they could say they had tested POWs for dysentery infection.

This Japanese "concern" over dysentery – a phenomenon not shared with other POW diseases, probably reflects the high prevalence of the condition. The bacillary form affected almost everyone, and was certainly universally present up-country. The contemporary record *H Force in Thailand – Medical Reports* comments, "the curse of dysentery upset the force from the beginning, and at sometime or another all ranks were affected."⁵¹ Amoebic dysentery was less common, but still hugely prevalent – in his report, Major Courtney-Lendon comments, "this infection was rife and it would be a conservative estimate to say that 50% of all ranks were infected at some period."⁵² The mortality, as with other disease, varied with the situation of the camp, but even at Chungkai Hospital in 1943 the mortality of bacillary dysentery was 17.6%, and for amoebic dysentery 20.3%. Of the 2,027 total dysentery patients admitted, the overall death rate was 19.3%.⁵³

In the preceding section on nutritional disorders, it was mentioned that two British RAMC doctors on the railway recorded their experiences immediately post-war and successfully submitted MD theses to their graduating universities. Major

Courtney-Lendon's general report on POW disease has been quoted in this section, and later qualified him for a Cambridge MD. In addition, Lt Col LRS MacFarlane RAMC submitted his MD in December 1946 entitled *Unusual Aspects and Therapy in Amoebic Dysentery*.⁵⁴ Known in Kanburi as "Uncle Mac", MacFarlane was a pathologist and clinician. His report predominantly concerns treatment of amoebic dysentery, and will be referred to in detail in the next chapter. This amazing total of four MD degrees from medical POW experiences reflects the remarkable observation and recording by the RAMC doctors, as well as their ability to make a positive contribution to medical knowledge from such a desperate experience.

Cholera

Though dysentery was a constant companion to life on the Thai/Burma Railway, and probably overall caused the greatest morbidity and mortality, the most feared and devastating diarrhoeal disease was cholera. It was very much an epidemic (rather than endemic) disease, and was relatively uncommon in other areas of allied imprisonment in the Far East and south-east Asia. Cholera is caused by a bacterium, *Vibrio cholerae*, and is characterised by sudden onset of abdominal cramps, vomiting and very severe diarrhoea. The stool is so loose that it has the appearance of pale-yellow water (so-called "rice-water" stool). Profuse amounts are passed, leading to rapid dehydration, collapse and often death. The disease course from the onset of symptoms to death could often be remarkably short, and many instances occurred in the railway camps where POWs developed symptoms in the evening, and were dead by the next day. Though antibiotics of certain types can help (they were yet to be discovered during the early 1940s), the main treatment is simple rehydration – either orally in the earlier stages or in milder cases, or by intravenous infusion. Mortality on the railway during epidemics was 60-70% or more, but with modern fluid treatment

systems, mortality from the disease is now usually below 1%.⁵⁵

A few POWs survived cholera to recount their tales – one drank 15 litres of salty water overnight, starting as soon as symptoms began. By the morning he was out of danger.⁵⁶ Some survived by being lucky enough to have intravenous saline.⁵⁷ As well as oral fluids, Thomas Woodhouse was treated with crystals of potassium permanganate every quarter of an hour (though there is no modern evidence that this could have helped).⁵⁸ Woodhouse also recorded that survival from cholera had some disadvantages, as he was assumed to be immune from further attacks, and was assigned to medical orderly duties in the cholera tents.

In the more remote up-country camps, little in the way of treatment was possible, and most victims “swiftly shrank to nothing and died within 24 hours”⁵⁹ – see Figure 4. In the early days of cholera, the dead were buried in mass pits. A

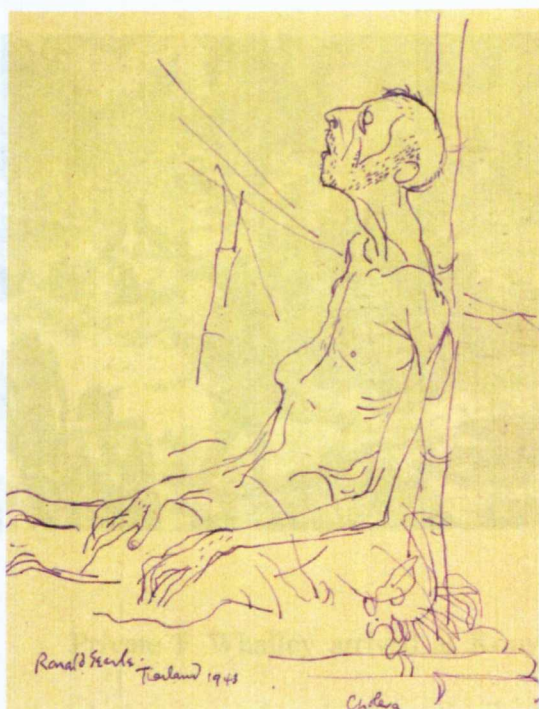


Figure 4. Drawing of a POW dying of cholera up-country in 1943 (Ronald Searle sketch⁵⁹)

description by Private ES Benford of being part of such a burial party illustrates the horrific nature of the task –

It was the most horrible, nauseating task I had encountered. We had no masks and we knew that we must not on any account put our hands to our faces. I stood rooted to the spot, trying hard not to breathe, for the stench was sickening. The ghastly stench from hundreds of dead bodies, black wasted bodies, with their skeleton-like limbs spread grotesquely at every angle Each body was lying in a pool of grey liquid vomit and excreta. Flies swarmed over the bodies in their millions and set up a continuous humming. I vomited over the first one that we tried to lift.⁶⁰

When the bodies were finally in the pits “like surplus black dolls dumped by some toy manufacturer”,⁶¹ they were covered in lime and then soil. Such burials did not continue for long, however, and because of infection concerns were replaced by equally harrowing funeral pyres, described in the preceding chapter. JS Cosford, at Tamarkan Camp, recalled (as did many others) that “the occasional body would move and attain a sitting position, as the heat of the funeral pyre contracted the dead man’s muscles .. sights that remain in one’s memory for ever”⁶² (Figure 5).

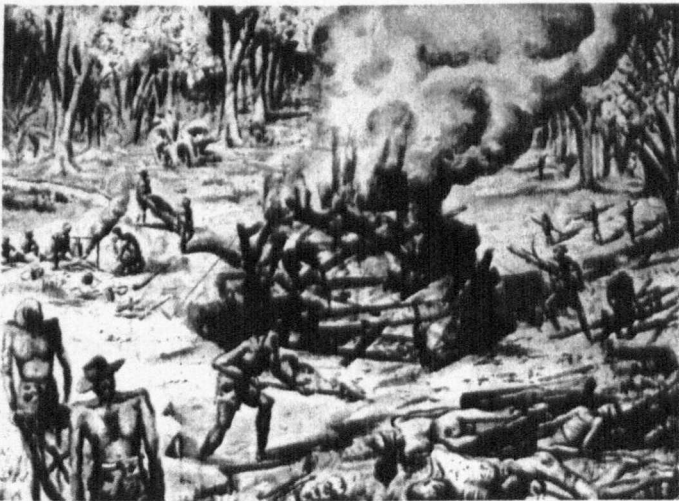


Figure 5. A cholera funeral pyre at Tamarkan Camp (drawing by Charles Thrale⁶²)

Private F Whalley arrived at Konyu II Camp towards the end of the cholera outbreak there, and found it “practically deserted – almost all the original inhabitants were dead”. Of the cholera cremation pyres at Konyu, he wrote:

There were only a few skeleton-like travesties of humanity left, and the signs of a big fire where they burnt their dead. These fires flared at every camp where cholera struck. They lighted the way out to work

*in the dark before dawn, they guided the men back through the dark wetness of the jungle long after dusk. And always, lying around them in stick-like bundles were the bodies that awaited cremation – bodies at which the returning men peered closely as they came in, to see if any of their mates lay among them.*⁶³

Where exactly cholera first broke out on the line is uncertain. It was probably at Konkoita Camp in early May 1943, during the later stages of the F Force march up-country.⁶⁴ Cyril Wild of F Force resolutely blamed the “criminal negligence of the Japanese”, as “every one of the 15 marching parties was forced to camp for one or more days within a few yards of huts filled with hundreds of cholera-stricken coolies, on ground covered with infected faeces, where the air was black with flies”.⁶⁵ The British officers asked for spades to remove the faeces, but were told to “use your hands”. The F Force senior officer, Lt Col Harris protested to the Japanese CO, Lt Col Banno, demanding that forward movement should stop immediately to prevent the spread of cholera. Banno refused, the march continued, and as Harris predicted cholera spread up the line.

Though the F Force march certainly aided the spread of cholera throughout the up-country camps, it probably also arose spontaneously in other sites. The upper Kwae-Noi river area was an ideal environment for cholera outbreaks, which had occurred for many years before the 2nd World War amongst the local population. The climate was hot and moist, ideal for the growth and spread of *Vibrio cholerae*. With no piped water or sewers, the rivers were both sources of drinking water and receivers of faecal effluent. The large numbers of flies helped spread the bacteria from infected faeces to food, and the POW camps also added overcrowded and unsanitary settlements, filled with poorly nourished and weakened potential human hosts for the cholera bacillus. It was the perfect environment in place and time for disastrous cholera outbreaks.⁶⁶

Four railway doctors wrote of their experiences of cholera in post-war medical journals, two as part of general medical reviews (EE “Weary” Dunlop and Stanley Pavillard), and two in papers devoted to cholera only (Hugh de Wardener and “Marko” Markowitz). Pavillard encountered cholera at Tonchan, and immediately began a series of lectures to the men, explaining the nature of cholera and preventive hygiene methods. He felt that this significantly reduced later mortality. Conversely, Pavillard noted “the coolies were dying like flies, and many fled, only to die in the jungle”.⁶⁷ This experience of very high infection and death rates amongst the local labour force was a common one. In Dunlop’s paper (published as was Pavillard’s in the *British Medical Journal* in 1946), he firmly attributed the cholera outbreaks to the “Asiatic coolies, who contaminated water supplies and camp areas”.⁶⁸ He experienced an outbreak at Hintok where 150 of the workforce of 1,000 were affected, with 63 deaths (a commendable mortality below 50%). Dunlop recalled the great Japanese fear of the disease; often they “compelled the patients to be attended in appalling unsuitable jungle sites with little shelter”.⁶⁹ Figure 6 shows a secretly taken photograph of what was known as “Cholera Hill” at Sonkrai Camp.⁷⁰

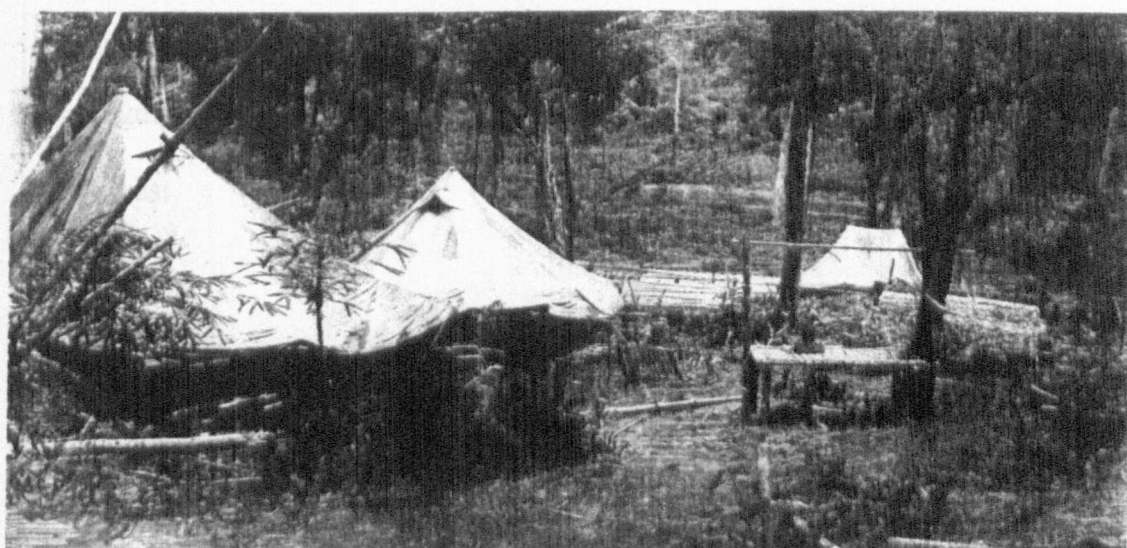


Figure 6. “Cholera Hill” at Sonkrai No 1 Camp – a makeshift tented area to the north of the main camp. The photograph was secretly taken by George Aspinall, an Australian POW, using X-ray film brought up from Singapore.⁷⁰

Captain J Markowitz RAMC described the cholera outbreak at Chungkai from June to September 1943. As with most base-camp cholera, it was brought in from up-country and rapidly spread, including to the local labour camps and villages (where again, mortality was high).⁷¹ Unlike up-country camps, Marko and his colleagues had the luxury of laboratory support, and limited supplies of intravenous fluids. The numbers admitted to the camp hospital, with mortality, is shown in Table 4, which

Table 4. The cholera outbreak at Chungkai, June-September 1943. Hospital admissions and deaths.⁷¹

Week commencing	Cases admitted	Deaths
14 June	73	13
21 June	49	16
28 June	2	7
4 July	1	1
11 July	1	0
18 July	0	0
25 July	2	0
1 August	19	3
8 August	24	5
15 August	7	5
22 August	10	3
29 August	2	0
5 September	3	0
12 September	1	0
Total	194*	53 (27%)

* This was the total of suspected cholera admissions. Of these, only 134 were considered definite or "true" cases, giving a case fatality rate of 40%.

demonstrates two distinct “waves” of the outbreak, with a dramatic start in mid-June declining markedly into early July, but then a further smaller outbreak peaking in early August and finally declining in early September.⁷² Though Markowitz gives no definite reasons for this, there was certainly a new influx of up-country sick in early August, including some “cholera convalescents”, and it seems likely that these men may have initiated the second wave. The main hospital records counted all cases admitted (194) and of these, 134 were regarded as true cases in that the stool samples were microscopically positive. By modern standards, this is probably an over-strict criteria, and the true mortality of the outbreak probably lies between the two figures in Table 4 i.e. 40% of laboratory-confirmed cases, and 27% of clinically suspected cases.⁷³ The distinction is an important one, since it affects comparison with up-country statistics (where the remote camps had no laboratory support). It was Hugh de Wardener who recorded such an up-country epidemic in the *Lancet* in 1946. The outbreak was at Linson Camp (205 Km in his report, but probably actually 203 Km), and occurred between May and September 1943 (the majority of cases were in May and early June).⁷⁴ At the time there were 1,600 British and 250 Dutch in this very primitive camp. The camp hospital, de Wardener commented, “is not to be misunderstood... it was a name given to that part of the camp in which the most serious sick were placed”. There was no microscope or laboratory facilities of any kind, and in mid-1943 the hospital accommodation was simply four tents – one each for dysentery, malaria, diphtheria, and general medical and surgical cases.⁷⁵

Despite these difficult conditions, careful records of clinically diagnosed cholera admissions were kept, and de Wardener charted the course of the epidemic graphically (see Figure 7).⁷⁶ The exact date of onset of the epidemic was uncertain “owing to the inexperience of the medical officers in the diagnosis of cholera” - an inexperience which of course rapidly altered as the epidemic proceeded. It can be

seen from the graph that there were again two waves of cases, remarkably similar to Chungkai. The major outbreak was in May and early June 1943, but a second smaller peak occurred in July. Clearly the same reasons for as those at Chungkai could not be operative (further intake of cholera cases from up-country). However, the second

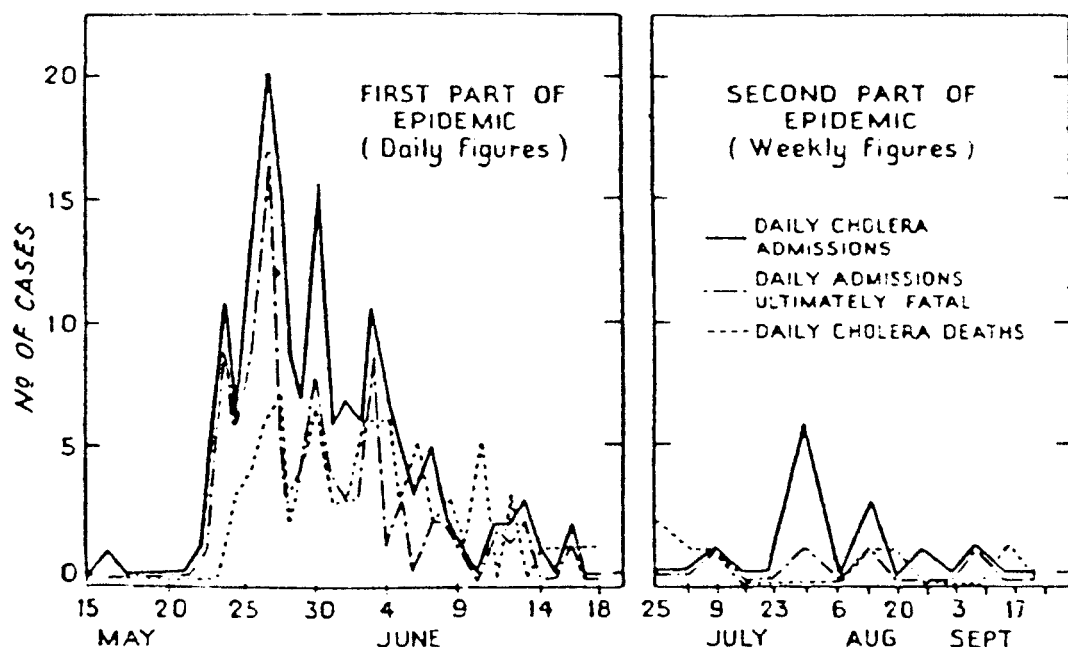


Figure 7. The cholera epidemic at Linson Camp (205 Km), May to September 1943. Chart prepared by Capt Hugh de Wardener RAMC at Linson, reproduced in an article in the *Lancet* in 1946.⁷⁶

Linson wave occurred entirely in a small, slightly-separate sub-camp, known as the “Fit Camp”. It seems likely that this was therefore a true separate outbreak, possibly brought in from the main camp.

Of the total camp strength of 1,850 there were 174 cases of cholera during the outbreak, of whom 100 died (a mortality rate of 58%). The overall attack rate of 9% was remarkably low, and was probably related to fortuitous cholera vaccination. All but one of the cholera cases occurred in British POWs – there was only a single non-fatal cholera case in the Dutch. The issue of the frequently observed Dutch immunity to cholera will be discussed further in the next chapter, but de Wardener attributed it

(at least at Linson Camp) to their receiving cholera vaccination just before the epidemic struck.⁷⁷

Like his report on Wernicke's Encephalopathy referred to earlier in this chapter, de Wardener's account of the cholera outbreak at Linson is a valuable work of meticulous and succinct clinical observation, recorded under most difficult circumstances. His detailed description of the symptoms and signs of cholera go far beyond the classical features of profuse diarrhoea, dehydration and collapse. The diarrhoea he described as "watery, colourless and copious". Effortless vomiting could occur ("pints of fluid gushed out from the patient's mouth"). He also described more subtle symptoms such as reduced hearing, visual blurring, voice hoarseness and apathy. Physical signs included "a soft compressible pulse, sunken darkly-ringed eyes, and the washerwoman appearance of the fingers". Pre-terminally, sufferers would enter an "algid phase" typified by restlessness and cyanosis (blueness of the extremities).⁷⁸

In conclusion, cholera gave the railway doctors one of their greatest challenges. Its sudden and dramatic epidemic emergence, rapid clinical time course, and often high mortality made it a very different threat to railway POWs than beriberi, malaria and dysentery. Cholera also typified the vast differences between the up-country and base camps; in terms of both frequency of occurrence, mortality and treatment opportunities. But whatever else came out of these fearful outbreaks, they formed the basis of a unique clinically descriptive medical literature in the immediate post-war years.

Tropical ulcer

As with cholera, tropical ulcer was not seen at Changi, and was a new experience and challenge for the railway doctors. This curious condition begins with

minor trauma to the ankle or lower leg (which was of course very common working on the railway in jungle conditions and with inadequate footwear). Infection can then take hold, followed by chronic destructive ulceration, often involving deep tissues below including bone. There is no doubt that the weakened and poorly nourished condition of the POWs greatly predisposed them to tropical ulcer. The condition is not commonly seen in modern tropical medical practice, and has been described as a problem of the “poor and hungry” – a strikingly apt description of POWs on the Thai/Burma Railway.⁷⁹

Tropical ulcers on the railway were common at all times and in all places, but as with many other conditions, they were more common and florid up-country during the speedo period. Their appearance and extent was often dramatic – Phillip Meninsky recalled that his own was “bigger than a saucer”, and Constantine Petrovsky (a doctor with the British Army Field Ambulance) recollected that if “the ulcers were full of maggots with pus pouring out – then you might be let off work.”⁸⁰ The medical orderly EA Dixon worked on the ulcer ward at Tonchan Camp, and described this as “quite an experience ... the smell was never absent and it was the smell of rotting flesh”.⁸¹ Writing immediately post-war, E Holden recalled his own tropical ulcers at 211 Km Camp (Thailand), “I was thoroughly run down, and had some bad ulcers on my right shin which refused to heal.”⁸² Shortly afterwards he was evacuated down to Chungkai and the ulcers soon cleared up. This experience was very common, and fits in with the “poor and hungry” analogy mentioned above. Dr LH Turner RAMC, a medical officer in F Force referring to medical equipment and supplies, commented “we had nothing till we got back to Kanburi, then the diet improved and everything began to heal – especially tropical ulcers.”⁸³

The severity of the tropical ulcers which came down the line to the base hospitals after speedo was remarkable. These were far from the usual superficial

ulcers seen in modern European practice in patients with diabetes or circulatory disorders. Dunlop described frequent “gross involvement of bone, joints, muscle, tendon, vessels and nerves”.⁸⁴ The base hospitals were overwhelmed by these patients, and dozens of ulcer wards had to be set up (Figure 8).⁸⁵

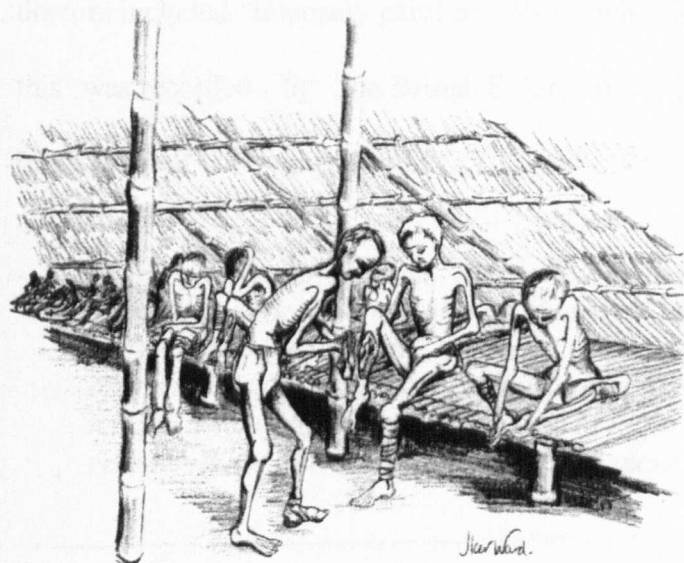


Figure 8. An Ulcer Ward at Tamarkan Camp (drawing by Charles Thrale)⁸⁵

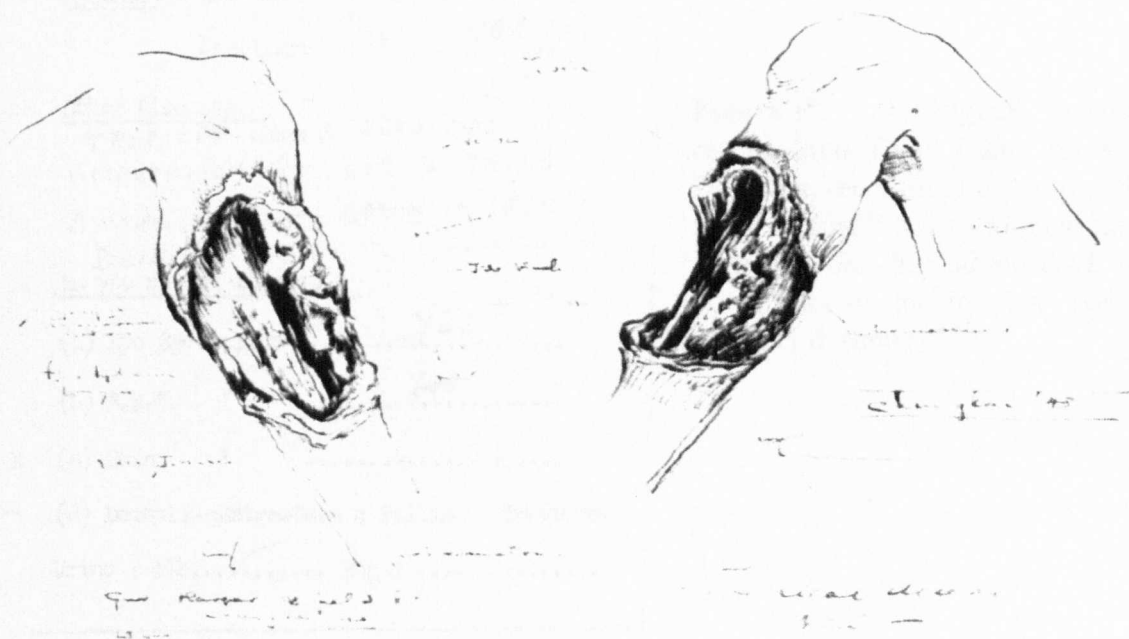


Figure 9. Anatomical sketches of deep tibial tropical ulcers, drawn by Jack Chalker at Chungkai in late 1943 (print donated to the Liverpool School of Tropical Medicine, and later published).⁸⁶

A semi-anatomical sketch of extensive tibial tropical ulcers is shown in Figure 9;⁸⁶ not surprisingly many ulcers such as these resulted in high lower-limb amputations (Figure 10).⁸⁷ Surprisingly, few POWs objected to this drastic treatment, as tropical ulcers were extremely painful – descriptions from POW doctors included “intensely painful”, and “dying in agony”.⁸⁸ A vivid example of this was recorded by the British F Force doctor, Captain Harry Silman who wrote in his diary of 22 September 1943.⁸⁹

I saw my former batman, Windmill RE, today. He is in the ulcer ward, and looks a wreck of his former self. He pleaded with me with tears in his eyes for his leg to be taken off, but he is such a bad operative risk, I understand it will not be done. He says the pain is terrific, twenty-four hours a day, and at night he is afraid of losing his reason. What a terrible thing a tropical ulcer is.

<u>Summary of Medical History.</u>	
<u>Malaria</u> :	No. of Attacks..... 30 +
<u>Dysentery</u> :	Amoebic " NO
	Bacillary " YES (2)
<u>Other Diseases.</u>	
TROPICAL ULCER RESULTING IN AMPUTATION RT LEG AT THIGH/ AVITAMINOSIS - OPTIC + SKIN DENGU FEVER (CELLULITIS)	
<u>Do you require to see: ?</u>	
(a) Eye Specialist	YES
(b) E.N.T. "	YES
(c) Skin "	
(d) Dental: - Extraction & Filling : Defures.	
Urine : Alb..... Sugar	

Figure 10. Original medical record from Tarso Camp on Sgt J Donovan, recording his “amputation rt leg at thigh” due to tropical ulcer. Note also that he had suffered over 30 attacks of malaria and two of bacillary dysentery⁸⁷

Silman was referring to the therapeutic dilemma faced by many railway doctors, “amputation is the only treatment and relief” but “the post-operative mortality is very high, owing to the general poor condition of the patients”.⁹⁰ Captain Markowitz,

who at Chungkai developed the greatest experience and expertise in amputation for tropical ulcer, had a very simple rule for deciding to operate – “Indications for amputation. In brief the indication was to save life”.⁹¹ Markowitz’s paper, like de Wardener’s reports on cholera and on Wernicke’s encephalopathy, was a classic of observational research. It was written at Chungkai Camp and published just after the war. The first 100 cases of severe tropical ulcer treated by mid-thigh amputation are described; all were extremely ill, and often debilitated by other conditions (indeed nearly three-quarters were suffering from malaria, dysentery or beriberi). Considering this, the mortality of 32 men (32%) was commendable. In fact, Markowitz attributed only one of these deaths to the surgery itself, the rest were related to poor nutrition and infections. Comorbid conditions also appeared to exacerbate ulcers, and interfere with healing. Markowitz commented:

*Often the downward course of an ulcer dated from an attack of malaria. The next commonest cause for a relapse of an ulcer was nutritional deficiencies, either beriberi or pellagra, or a combination of both. Next in importance was amoebic dysentery.*⁹²

Markowitz noted that relapses were also related to movement between camps, a phenomenon which he ascribed to interruption of treatment (fresh dressings etc), excess walking, and poor food and shelter.⁹³ Available statistics on tropical ulcer in the railway camps reveal interesting patterns. The frequency of the condition is emphasised by figures from Tarso Camp in late 1943, where of a total camp population of 2,500 there were 700 (28%) in the ulcer wards.⁹⁴ At Chungkai during 1943 there were 1,352 men admitted with tropical ulcers of a total of 11,347 admissions (12%).⁹⁵ The in-patient mortality here was only 2.7%,⁹⁶ emphasising that Markowitz’s series (discussed previously) very much represented the most severe cases. With its generally good medical facilities, it is likely that many ulcer patients at Chungkai were treated out of hospital. The proportion of tropical ulcer patients in

the hospital at Tarso demonstrated an interesting differential between POW nationalities. In-patient prevalence figures for Dutch, Australian and British prisoners were 3.8%, 13.5% and 16.0% respectively.⁹⁷ These low rates amongst Dutch POWs (which also occurred with cholera) will be discussed in more detail in the next chapter.

The last word in this section refers to the unfortunate coolie labour force who (as discussed in the last chapter) suffered particularly poor conditions and treatment. The doctors and medical orderlies of K and L Forces contributed greatly to the care of these marginalised railway workers. Captain WB Young of No 2 Coolie Camp at Kanburi wrote of the tropical ulcer situation there-

*There were ulcer cases in every ward, and the stench from them had to be experienced to be believed. Treatment was practically non-existent. A pit about 4 foot long, a foot wide and 3 foot deep had been dug between each hut. A bamboo pole was laid across the pit lengthways. The patients would crawl out to the pit and put their feet on the bamboo pole. The soiled foul-smelling rag, which served as a dressing would be pulled off, and the surface of the ulcer washed with a cup full of solution from a bucket in which some lime or potassium permanganate had been dissolved. While the solution was being poured over the ulcer it would be scrubbed with a small piece of cotton wool held in a pair of home made bamboo forceps. The ulcer was then smeared with zinc oxide paste and a dirty rag applied as a dressing being held in place by a piece of string. The whole proceedings took place in a swarm of flies and the stench was revolting.*⁹⁸

Malaria

In the jungle areas of Thailand and Burma through which the railway was constructed, anopheline mosquitoes (the type which transmits malaria to man) were very common, and hence malarial transmission was intense. The protozoan parasite which causes malaria in man exists in four main species – *Plasmodium falciparum*, *Plasmodium vivax*, *Plasmodium ovale* and *Plasmodium malariae*. The commonest type in the railway area was vivax, causing what was then known as “benign tertian

malaria” (BTM) – a debilitating febrile illness, though fortunately which rarely resulted in death. Falciparum malaria, then known as “malignant tertian malaria” (MTM), occurred less frequently on the railway, but was far more serious. It carried a significant mortality risk due to life-threatening complications such as cerebral malaria (an encephalitic syndrome), algid malaria (severe shock), and blackwater fever (a form of kidney failure).⁹⁹

In terms of frequency, malaria was without doubt the commonest medical problem on the Thai/Burma railway. Figure 10 refers specifically to Sgt Donovan’s leg amputation, but his medical record also notes over 30 attacks of malaria. Private S Dawson described malaria as “the disease which caused the greatest inconvenience ... it was not really painful or dangerous except when it led to blackwater fever ... or cerebral malaria, often resulting fatally and often leaving the victim partially paralysed”.¹⁰⁰ The problem of malaria was accentuated by drug shortages, lack of control strategies (to prevent mosquito breeding), and the vulnerability of POWs to infection. This was related to both their weakened state due to undernutrition and other diseases, and also a lack of natural immunity because of their lack of previous exposure to malaria.

In a report on malaria amongst POWs on the railway, Dr Robert (“Bob”) Hardie mentioned the frequency of anopheline mosquitoes in the camps, and also their particular activity at dawn and dusk. This was when roll calls were held, and many men were bitten at this time.¹⁰¹ By early 1943, 800-900 cases of malaria per month were being seen at Chungkai. Hardie blamed these numbers mainly on the Japanese failure to instigate or support preventative measures; “our efforts have been constantly thwarted”, he wrote.¹⁰²

One of the most useful and remarkable sources on railway malaria was a report by T Wilson and JA Reid entitled *Malaria among prisoners of war in Siam*

(“*F* Force) published in 1949.¹⁰³ Prior to the fall of Singapore, Wilson was a Health Officer with the Malayan Medical Service, and Reid an entomologist with the Institute for Medical Research in Malaya. They had the misfortune to be co-opted by the Japanese to F Force as advisors on malaria and nutrition, and left Changi with the Force in April 1943. They had the only microscope in the group, with a small stock of stains and slides. Though frequently moved between camps, and enduring many of the hardships common to F Force in general, they collected incredibly detailed entomological and parasitological information. The report resonates with objectivity and colonial reserve, with little hint of the disaster of disease and death occurring around them. They describe transport of their equipment “carried from camp to camp in the microscope box, slung between the two of us on a bamboo pole”. Of the march up country with F Force, they mention “one slept in the open by the wayside for a few hours in the middle of each night”; and concerning their valuable and quite unique observations, “we have thought it worthwhile to record them, in spite of their limited scope”.¹⁰⁴

The main survey was of five of the most remote camps close to Three Pagodas Pass. Their paper does not use the commonest names for the camps – referring to them as Shimo Nieke (Niki Niki, 277 Km), Nieke (Niki, 281 Km), Shimo Sonkurai (Lower Sonkrai, 288 Km), Sonkurai (Sonkrai, 290 Km), and Kami Sonkurai (Upper Sonkrai, 293 Km). The summarised results in Table 5 use the more common names in parenthesis above. Niki Niki and Niki camps were surveyed between May and June 1943; and between July and August 1943 a survey was carried out at Niki, Lower Sonkrai, Sonkrai and Upper Sonkrai. Useful comparative surveys were carried out following evacuation to the base camp at Kanburi (50 Km) from October to December 1943, and again back at Changi between January and February 1944. The methodology was meticulous, using thick blood films stained with Field’s rapid stain

(a dye which showed up malarial parasites under the microscope). A film was only considered negative if no parasites were found in 100 microscope fields (a highly rigorous methodology)¹⁰⁵

The numbers of cases for the 4 separate surveys in Table 5 include both total cases, and those due to *P.vivax* and *P.falciparum*.¹⁰⁶ Combining all surveys, *P.vivax* malaria made up 476 of 680 cases (70%), and *P.falciparum* 142 of 688 (21%). The remaining 9% were due to the rarer *P.ovale* or *P.malariae* species, or could not be firmly diagnosed. Because the numbers of POWs surveyed in the various camps differed, as did the camp populations, Wilson and Reid calculated rates per thousand men per day, so that true comparisons could be made between the surveys. These showed infection rates of 17.1 at Niki Niki and Niki (Survey 1), 2.5 at Niki and the Sonkrai Camps (Survey 2), 1.4 at Kanburi (Survey 3), and 0.2 at Changi (Survey 4).

Table 5. The Wilson & Reid Survey of new malarial attacks and types, comparing up-country camps with Kanburi and Changi¹⁰⁶

	Camps	Km	Survey Period	Vivax cases	Falciparum cases	Total	Rate/1000 men/day
1	Niki Niki Niki	277 281	May-June 1943	267	107	421	17.1
2	Niki Lower Sonkrai Sonkrai Upper Sonkrai	281 288 290 293	July-August 1943	92	27	131	2.5
3	Kanburi	50	October- December 1943	82	8	93	1.4
4	Changi	-	January- February 1944	35	0	35	0.2
TOTALS				476 (70%)	142 (21%)	680	

Note: The total cases exceeds those due to *P. vivax* and *P.falciparum*, because of small numbers of malaria due to rarer species, and some which could not be firmly categorised.

There was thus a “league table” of infection risk descending southwards from the Burma border. The particularly high rates in the first survey (May-June 1943, at Niki Niki and Niki) was related to “men going down with fever a few days after arrival, obviously a result of infection acquired during the march”. The journey up-country certainly gave every opportunity for malarial infection, since anopheline mosquitoes are active in the evening and night, and with men sleeping in the open and/or marching at night, high infection rates were inescapable. Malarial fevers start about two weeks after the infecting bite, explaining the high rate of malaria seen after arriving at the first up-country camps.¹⁰⁷

The infection rates referred to above were all new malarial infections, i.e. occurring in men who had not had a previous clinical malarial attack in the last 12 months. Secondary or recurrent attacks of malaria occur because without specific eradicated therapy, malarial parasites can lie dormant in the liver after an infection has subsided, and re-emerge later without further new infection. Not surprisingly, reinfections occurred later in the Wilson/Reid surveys, and showed a reverse pattern of frequency to primary attacks. Thus, the secondary attack rates (per 1,000 men per day) were 6.7 in Survey 1 (compared to a primary attack rate of 17.1), for Survey 2 the figures were 8.5 and 2.5 respectively, for survey 3 (Kanburi) they were 9.5 and 1.4, and for Survey 4 (Changi) 18.6 and 0.2. These are shown fully in Table 6.¹⁰⁸

Some explanation of these figures (in Table 5 and especially Table 6) is worthwhile. Firstly, there were epidemiological differences in vivax and falciparum malaria occurrence in the sites surveyed - falciparum was much more common in the up-country, compared with base camps (and in particular Changi). Secondly, malaria control systems (spraying of breeding sites etc) also varied; they were essentially non-existent up-country, occurred to some extent in the base camps, and were quite

Table 6. Comparison of primary and secondary malarial attack rates in the Wilson/Reid surveys 1943-1944 ¹⁰⁸

	Primary malaria attacks		Secondary malaria attacks	
	Number	Rate/1000/day	Number	Rate/1000/day
1. Niki Niki Niki	421	17.1	164	6.7
2. Niki Lower Sonkrai Sonkrai Upper Sonkrai	131	2.5	448	8.5
3. Kanburi	93	1.4	632	9.5
4. Changi	35	0.2	2,907	18.6

sophisticated at Changi. These factors largely explain the declining occurrence of new attacks of both *P. vivax* and *P. falciparum* infections from Survey 1 (up-country) to Survey 4 (Changi) – see Table 5. The rise in secondary (relapsed) malaria rates from up-country down to Changi (Table 6) is particularly explained by time factors, in that relapses usually occur several weeks or months after the primary attack, and would therefore be more likely after evacuation from up-country to the base camps or Changi. The effect was likely to be exaggerated by the high vivax attack rate up-country, since vivax malaria is more likely to relapse than is malaria due to *P. falciparum*.

Over the 12 month period from leaving Changi, the overall death rate due to malaria alone amongst F Force was 4%, but malaria was recorded as a contributory factor in a further 7%.¹⁰⁹ The overall rate of 11% is certainly significant, though by no means as great as dysentery or beriberi mortality, for example. Most F Force deaths were predominantly up-country and malaria death rates were significantly

lower down the line. In Chungkai, the malaria death rate for 1943 was only 2% - probably because of better facilities, and also the fact that most malarial cases were relapses (as discussed previously) which tended to be less severe than primary infections.¹¹⁰ The 11% malarial mortality of F Force, however, underestimates the importance of the disease. Wilson and Reid pointed out that attacks caused loss of appetite and weight loss, often leading to recurrences of dysentery, worsening of beriberi or deterioration of tropical ulcers – all with their own potentially increased mortality.¹¹¹ With typical modesty, Wilson and Reid conclude their report by saying that “there is little new in this somewhat hazy and incomplete picture of the malarial history of a large group of British and Australian prisoners of war during their short stay in Siam”.¹¹² Under the circumstances, their report is anything but “hazy and incomplete” and provides a fascinating quantitative insight into the problem of malaria on the Thai/Burma railway, which they finally describe as “the fate awaiting any non-immune population which is exposed, without protection of any sort, to highly malarious conditions.”¹¹³

To conclude, malaria was a constant threat to the health and vitality of the railway workforce. Very much an endemic problem, as a disease it was not as dramatic in nature as cholera or tropical ulcer, and killed far less men than dysentery or beriberi. However, by its frequency and seriously debilitating nature, malaria caused greater morbidity than any other disease and indirectly contributed to much mortality assigned to other conditions.

Other diseases

Though malnutrition, malaria, dysentery, cholera and tropical ulcer were undoubtedly the “big five” diseases facing the men and medics on the Thai/Burma railway, there were many other problems – both exotic and mundane. With such a

large workforce present in the camps for prolonged periods of times, the army doctors had a significant “general practitioner” role dealing with common ailments and illnesses. The Chungkai medical records, for example, include data on bronchitis, pneumonia, simple gastroenteritis and skin conditions. Surgical operations included sebaceous cyst excision, wart removal, tonsillectomy and stripping of varicose veins.¹¹⁴ Dyspepsia was common enough to be called “rice tummy” by the men, reflecting their own beliefs as to its origin. In between diarrhoeal attacks, constipation (probably due to the low fibre diet) was common, often associated with troublesome haemorrhoids. Dr Stanley Pavillard’s railway notebook details lists of cases, which as well as the “big five” referred to previously, includes rheumatic fever, renal colic, duodenal ulcer, scabies, dermatitis, conjunctivitis, abscesses, jaundice and piles.¹¹⁵ Even the common cold was recorded on some sickness lists.¹¹⁶ Fractures, sprains and soft-tissue injuries were common everywhere, related both to the railway work (e.g. blast injuries, falls from bridges etc), and to beatings and punishments by the Japanese and Korean guards. Surgery and anaesthesia under these difficult circumstances provided particular difficulties and challenges, as did dentistry.¹¹⁷ Some surgical experiences bordered on the bizarre – Private Walter Hunter recalled that his friend “Sgt Ginger Leach of Ordnance Corps had his appendix removed without anaesthetic by a Japanese veterinary surgeon ... the operation took two hours”¹¹⁸ The topics of surgery, anaesthesia and dentistry will be discussed in more detail in the next chapter.

A variety of more tropically-based diseases also occurred. Dengue, a severe influenza-like illness caused by a mosquito-borne virus, was common and troublesome. Private JR Houghton described his own attack, “one morning I awoke with an awful headache and pain at the back of the eyes ... every bone ached ... twice I lapsed into delirium ... I really thought I was going to die, and particularly didn’t

care”.¹¹⁹ Houghton took two weeks to recover, and during that time ate almost nothing. As an acute feverish illness, dengue could be mistaken for malaria. Characteristically, it is associated with particularly severe muscle pains (myalgia), and this was used to make the diagnosis clinically in camps with no laboratory support. A negative malarial slide made the diagnosis much more secure, and at Tamuang Camp (where there were laboratory facilities) between February and April 1945, malarial cases made up 57% of hospital admissions, and dengue 10%.¹²⁰

Typhus existed as a low-grade endemic problem with occasional sudden outbreaks. Caused by rickettsial organisms often transmitted by the bites of rat fleas, a particularly severe epidemic occurred in Tarso Camp in 1944, with several deaths. It led to a major rat-hunting operation – “by the end of the day there was a pile of rat corpses which ran into hundreds”.¹²¹ Jaundice was not uncommonly seen – at the time its detailed viral aetiology was not known, and on the railway it was sometimes thought exacerbated by undernutrition or toxins.¹²² At least two of the several viruses which cause hepatitis (hepatitis A and B) are common in south-east Asia, and they were probably the cause of most episodes of jaundice. Snakes, some poisonous, were common in the Thai and Burma jungles, but serious snakebite amongst POWs was rare – more frequently they were caught to eat (Private C Lyons described it as “like the breast of white meat of chicken”).¹²³

A disease which was well-known in Changi, and which reappeared on the railway was diphtheria. It occurred sporadically on the railway, but at certain times in some base camps there were sufficient cases to warrant the setting up of “Diphtheria Wards”. The classical severe sore throat (faucal diphtheria) as a sole manifestation was not frequently seen. Cutaneous lesions – often on the limbs or scrotum – were common, and more serious manifestations included involvement of the heart (myocarditis) and toxin-mediated neurological damage. These latter problems often

occurred after a cutaneous attack, and the manifestations were heart failure or sudden death, and various forms and degrees of paralysis (neuritis).¹²⁴ Cardiac death in diphtheria could be very sudden. During an “alarming epidemic” on the railway in 1942, Capt KW Todd RAMC described one of the early cases as having “died of heart failure from merely turning over in bed”.¹²⁵ Once established neurological complications occurred, recovery was slow and prolonged nursing and rehabilitation were required.¹²⁶

Anaemia must have been a common disorder, but it was only rarely recorded as a specific disease. There are two reasons for this. Firstly, though the diagnosis can be clinically suspected, the definitive diagnostic test (haemoglobin estimation) was almost never available, even at the base hospitals. Secondly, anaemia was always due to specific primary causes (for example malnutrition, malaria or hookworm infection) and these conditions would be recorded, but not usually any associated anaemia. Other causes of anaemia included chronic infections such as amoebic dysentery or severe tropical ulcers (nowadays known as “anaemia of chronic disease”). This type of anaemia, as well as the anaemia of acute malaria (due to haemolysis, or destruction of red blood cells) were probably the major causes of anaemia on the railway; but definitive data does not exist. Anaemia will be discussed further in the next chapter, when blood transfusion treatment is discussed.

Finally, some discussion on mental illness is of interest, not because it was common, but rather because it was apparently uncommon. In his post-war MD thesis on POW disease on the Thai/Burma Railway, Dr N Courtney-Lendon comments on the generally good morale, and that “homosexuality was almost unknown and hysteria and mental diseases were rare”.¹²⁷ Though perhaps something of a simplification, Courtney-Lendon’s main contention was borne out by others. In a thoughtful post-war interview, Stanley Gimson “noted also that insanity and suicide were remarkably

rare". His information was that there were only three cases of authenticated suicide on the railway project.¹²⁸ One of these was probably recorded by Weary Dunlop in a post-war report on Tarso Camp Hospital written in late 1945. In a list of 344 deaths, there was one "found dead on railway line (suicide)".¹²⁹ Finally, in an immediate post-war paper, Captain Todd remarked that "psychoses were rare ... psychoneuroses and even psychosomatic diseases seemed to have been rarer than in civilian life".¹³⁰ Todd related this phenomenon to detachment from normal life and relationships, leading to "simplicity" and a "lack of inner conflict".¹³¹ Gimson's theory was that the pressure of work and survival meant that men had "no capacity left to brood on their circumstances".¹³² Neither of these views would hold up to current concepts of the psychological response to traumatic experiences, and the rarity of mental health problems is in stark contrast to the high rates of post-traumatic stress disorder and other psychiatric syndromes which occurred in the post-war years (affecting at least one-third of surviving Far East POWs).¹³³

It may be that the answer is a cultural one. In these mid-twentieth century days, a psychiatric diagnosis carried a considerable stigma, particularly in the armed forces. Suicide was also held legally and morally unacceptable. Men would therefore be unlikely to present with mental health problems, and doctors would probably be reluctant to diagnose them. In this context, it is of interest that at Nakom Paton at least there was a somewhat covert "Mental Ward" of at one time 34 patients, set up by Colonel Coates and staffed by 18 orderlies led by Warrant Officer Jack McLaren. Details of the conditions of these patients are shown in Table 7 – most had significant psychiatric diagnoses, eg schizophrenia, anxiety neurosis, and depression (melancholia). Interestingly, their average age of 32 years (with a range of 22-45 years) was somewhat older than most of the railway POWs, and none of these patients

Table 7. Diagnoses of 34 patients in the Mental Ward at Nakom Paton

Schizophrenia	11
Anxiety neurosis	9
Melancholia	6
Neuraesthesia	3
Manic-depressive psychosis	1
Amnesia	1
Kleptomania	1
Confusional psychosis	1
Head injury	1
Total	34

Note: The above information is from unpublished data recorded by Warrant Officer Jack McLaren medical orderly in charge of the ward, which was part of the camp hospital at Nakom Paton¹³⁴.

were officers.¹³⁴ In an Australian report of POW medicine at Chungkai, a brief comment was made that “Col Barrett as a psychiatrist had splendid results in the treatment of nervous complaints”.¹³⁵ Overall, the evidence supports a general rarity of mental problems on the railway, but that at least part of this was related to potential stigmatisation and cultural unacceptability (the “stiff upper lip”). Those cases presenting with obvious psychiatric illnesses appear to have been segregated quietly, perhaps because of fears of the effect their presence may have had on the general morale of the men.

Conclusions

A major feature of Burma Railway medicine was that it presented the POW

doctors with a spectrum of disease in most cases unseen before. The Indian Army and Volunteer Forces medics may have been acquainted with malaria and dysentery; but not beriberi, tropical ulcers and cholera. For the British RAMC doctors recently arrived in Singapore, all this was new. Some may have benefited from the brief tropical training in Liverpool or Edinburgh, and all were helped by their experience of managing beriberi and dysentery at Changi. The medical problems of the railway were still, however, enormous both in scale and diversity. The story of railway medicine demonstrates that the way diseases emerged and were managed depended very much on location and time. The early speedo days in the up-country camps were far worse than the base hospitals. Above all, the enforced local labour force suffered most of all in terms of disease prevalence and mortality. As discussed previously, there was no one railway experience; and no one medical experience – either for doctor or patient.

In effect, the army doctors were engulfed in a bizarre and serendipitous clinical experiment into the effects of the human body on severe malnutrition, overwork, and tropical disease exposure. Colonel Marsden, the RAMC pathologist referred to earlier, regarded himself as having “had the opportunity of taking part in a large scale human experiment on the effects of prolonged malnutrition ... and in addition we were able to observe ... the effect of other factors such as fatigue and intercurrent disease”.¹³⁶ Marsden’s comments accurately encapsulated the three major issues of nutrition, fatigue and disease – a complementary and all too often fatal triad of circumstances.

What emerged was an innovative therapeutic response which will be discussed in the next chapter; but also a meticulous recording of disease and death. The primary source medical observational material is remarkable in its breadth and detail, particularly for those doctors in the up-country camps, where simply obtaining paper

and writing materials was a major problem. The discipline of record-keeping probably emerged from both the rigors of undergraduate medical education in the 1930s, and also the inherent discipline and bureaucracy of the British Army.

Whatever the background, the results were remarkable – in particular four post-war MD theses based on railway medical experience, and a collection of post-war clinical papers describing larger numbers of tropical ulcer, cerebral beriberi and amoebic dysentery cases than existed elsewhere in the medical literature. Tribute should be paid here in particular to the publications (often written in the railway camps themselves) of de Wardener and Markowitz; and especially to the Wilson/Reid team and their incredible malarial surveys with F Force. The primary source material that these doctors and scientists provided remain a continuing testimony to their positive response to adversity.

- 1 S Pavillard. *Bamboo Doctor* (London, 1960), p 149
- 2 *Ibid.* p 151
- 3 *Ibid.* p 152
- 4 *Ibid.* p 150
- 5 Lt Col C Wilkinson. Diary. Imperial War Museum (IWM) Department of Documents. IWM 81/7/1
- 6 J Chalker. *Burma Railway Artist.* (London, 1994), p 97
- 7 RJS Wilson. *Deficiency Optic Neuropathy.* MD thesis, Trinity College Dublin, 1947
- 8 AD Leigh. *Neurological Disorders Resulting from Malnutrition During Japanese Captivity 1942 -1945.* MD thesis, University of London, 1947
- 9 See : AD Leigh (1947) pp 2-5; and Churchill CMH. Dietary deficiency diseases among prisoners of war. *Journal of the Royal Army Medical Corps (J R Army Med Corps)* 1945; 85: 294-298
- 10 GNQ Forward Report (immediate post-war report on Thailand and Indo-China released POWs). UK National Archives (NA). WO 222/1358
- 11 JA Reid & T Wilson. Report on nutrition and discussion of the main causes of death, "F" Force, Thailand. *J Roy Army Med Corps* 1947; 89: 149-165
- 12 This data is from an addendum (p 17) to Reid & Wilson
- 13 RS Gibson. *Principles of Nutritional Assessment.* (Oxford,1990), Appendix A, pp604-605

- 14 Quarterly Report Feb-April 1945, Tamuang Camp. Wellcome History of Medicine (HOM) Library, RAMC 496
- 15 *Ibid*
- 16 H Force in Thailand – Medical Report. NA. WO 222/1356, pp 5-6. This report was compiled at Kanburi Camp in 1944
- 17 Major FJH Nelson. *Linson POW Camp. Report and Diary*. Liverpool School of Tropical Medicine (LSTM) records, p 49
- 18 This data is from the report of Major Arthur Moon, an Australian neurosurgeon who was Senior Medical Officer under Colonel Philip Toosey at Tamarkan Camp. The report is part of the Toosey Archive at the Imperial War Museum (IWM 93/14/7).
- 19 H Force in Thailand (NA WO 222/1356), p 5
- 20 Reid & Wilson. p 11
- 21 S Saddington. *Escape Impossible*. (Stockport, 1997), p 137
- 22 MH Churchill. Dietary deficiency diseases among prisoners of war. *J Roy Army Med Corps* 1945; 85: 294-298
- 23 EK Cruickshank. Painful feet in prisoners-of-war camps in the Far East. Review of 500 cases. *Lancet* 1946; 2: 369-372. Interestingly, after the war Cruickshank became a recognised expert in nutritional disease.
- 24 JA Page. Painful feet syndrome among prisoners of war in the Far East. *British Medical Journal* 1946; 2: 260-262; and J Simpson. Burning Feet in British prisoners of war in the Far East. *Lancet* 1946; 2: 959 -961
- 25 Churchill, p 295
- 26 *Ibid*
- 28 Leigh. p 107
- 27 AR Hazleton. The nature of starvation amblyopia. *J Roy Army Med Corps* 1946: 86: 171-178
- 29 Hazelton. p 178
- 30 AW Frankland. Deficiency scrotal dermatitis in POWs in the Far East. *British Medical Journal* 1948; 1: 1023-1026
- 31 Churchill. p 295
- 32 Leigh. pp 29-30
- 33 HE de Wardener & B Lennox. Cerebral beriberi (Wernicke's Encephalopathy). *Lancet* 1947; 1: 11-17
- 34 H Strachan. On a form of multiple neuritis prevalent in the West Indies. *Practitioner* 1897; 59: 477-484
- 35 HS Stannus. Pellagra in Nyasaland. *Transactions of the Royal Society of Tropical Medicine and Hygiene (Trans Roy Soc Trop Med & Hyg)* 1911; 5: 112-119
- 36 L Sharples. The condition of "burning feet" or "foot burning" in labourers on sugar plantations in the Corentyne District of British Guiana. *Journal of Tropical Medicine and Hygiene (J Trop Med & Hyg)* 1929; 32: 258-260

- 37 RA Pallister. Ataxic paraplegia occurring amongst Chinese in Malaya. *Trans Roy Soc Trop Med & Hyg* 1940; 34: 203-211
- 38 JD Spillane & GI Scott. Obscure neuropathy in the Middle East. *Lancet* 1945; 2: 261-264
- 39 S Dawson. Memoirs of experiences on the Thai/Burma Railway. Written in 1946. IWM 95/9/1, p 161
- 40 EE Dunlop. *The War Diaries of Weary Dunlop*. (Hertfordshire, 1987), p 386. Appendix II. Sir Edward "Weary" Dunlop was Senior MO at Chungkai and other camps. An Australian surgeon, he was a man of great physical and mental stature, who commanded enormous respect.
- 41 See for example, the meticulous records of Captain Harold Lord. IWM 367
- 42 Amongst others, this practice is recounted by the Dutch medical officer Captain FVB Dumoulin. IWM 97/6/01, p 28
- 43 See: Lt Col HS Flower. Railway diary. IWM 86/87/1, p31; and Chalker, p 54
- 44 Dr N Courtney-London. *Disease among Prisoners of War*. Wellcome HOM Library, RAMC 1042, p 32. This post-war retrospective report ("written post 1951") was presented as an MD thesis to the University of Cambridge.
- 45 Captain Harry Silman. Diary. IWM 66/226/1, p 25
- 46 Chalker. p 89
- 47 Capt P MacArthur. Diary. IWM 66/218/1, p 160
- 48 *Ibid*. p 161
- 49 Silman. p 15
- 50 The incident took place at Nong Pladuk. See: H Howard. *Where Fate Leads*. (Bolton, 1983), pp190-191
- 51 H Force in Thailand – Medical Report, p 4
- 52 Courtney-London. p 31
- 53 Capt RBC Welsh. Diary. IWM 66/225/1. Welsh was an RAMC doctor at Chungkai, Takanun and Linson; he kept an informative diary with meticulous medical records. See also: DCL Lewis. IWM 95/9/1 for mortality lists which further demonstrate the extent of dysentery deaths
- 54 Lt Col LRS MacFarlane. *Unusual Aspects and Therapy in Amoebic Dysentery*. MD thesis dated 19/12/46; part of a larger archive – IWM P152. The thesis was also published in the *J Roy Army Med Corps* 1947; 89: 233-254 (Part 1), and 255-273 (Part 2).
- 55 See: R Beattie. *The Death Railway. A brief history*. (Bangkok, 2005), p 32; and F Kakar, AH Ahmadzai, N Habib, A Taqdeer & AF Hartmann. A successful response to an outbreak of cholera in Afghanistan. *Tropical Doctor* 2008; 38: 17-20. This latter report describes a cholera outbreak in Kabul, Afghanistan in 2005 where simple public health and rehydration methods achieved a mortality of only 0.1%.
- 56 This story is recounted by EA Dixon in a retrospective memoir written between 1988 and 1991 (IWM 91/35/1, p 21)
- 57 Francis Maguire. Interview recorded 1 November 1982. Imperial War Museum Sound Archive (IWM-SA) 6374 (Reel 2)

- 58 Thomas Woodhouse. Interview transcript. IWM – SA 184/5, p 41
- 59 R Searle. *To the Kwai and Back. War drawings 1939-1945*. (London, 1986), pp 126-127. See also: Brigadier CH Kappe. Australia War Memorial (AWM) archive AWM 3DRL/2695. This record includes a harrowing list of English cholera deaths at Sonkrai
- 60 ES Benford. IWM 86/35/1. A retrospective account by a gunner who served as a medical orderly at many camps on the Thai/Burma Railway.
- 61 *Ibid.*
- 62 JS Cosford. *Line of Lost Lives* (Northampton, 1988), p 96
- 63 F Whalley. IWM 98/79/1. This retrospective but vivid account was written in the 1990s.
- 64 See: C Kinvig. *River Kwai Railway. The story of the Burma-Siam Railroad*. (London, 1992). pp 131-132; and Capt Cyril Wild. Narrative of "F" Force in Thailand, April-December 1943. LSTM records, p 2
- 65 C Wild, p 2
- 66 C Kinvig, p 131
- 67 SS Pavillard. Medical experiences in Siam. *British Medical Journal* 1946; 1: 135-137
- 68 EE Dunlop. Medical experiences in Japanese captivity. *British Medical Journal* 1946; 2: 474-484
- 69 *Ibid.* p 484
- 70 T Bowden. *Changi Photographer. George Aspinall's record of captivity*. (Sydney, 1984). p 121
- 71 J Markowitz. Experiences with cholera in a jungle camp in Thailand. *J Roy Army Med Corps* 1946; 86: 150-158
- 72 *Ibid.* pp 157-158
- 73 *Ibid*
- 74 HE de Wardener. Cholera epidemic among prisoners of war in Siam. *Lancet* 1946; 1: 637-640
- 75 *Ibid.* p 637
- 76 *Ibid.* p 638
- 77 *Ibid.* p 640
- 78 *Ibid.* p 639
- 79 E Parry. Tropical ulcer and the rural health team. *Africa Health* 1996; 18: 20-21
- 80 P Meninsky. IWM-SA 12049 (Reel 4), interview recorded 29 May 1991; and C Petrovsky. IWM-SA 16423 (Reel 1), interview recorded 25 October 1982
- 81 EA Dixon. p 26
- 82 E Holden. IWM 94/4/1. Retrospective account written in 1945-46, p 11
- 83 LH Turner. Telephone interview with GV Gill, 2 March 1998

- 84 EE Dunlop (1946). p 484
- 85 JS Cosford, p 99 (drawing by Charles Thrale)
- 86 J Chalker. *Burma Railway. Images of War. The original war drawings of Japanese POW Jack Chalker.* (London, 2007), p 85
- 87 JWR Donovan. IWM 90/15/1. This archive includes basic camp medical records of this sergeant in the 18th Field Regiment who had an amputation of his leg at Tarso Hospital because of tropical ulcer.
- 88 EE Dunlop (1946), p 484; and EA Coates. Clinical lessons from prisoners of war hospitals in the Far East (Burma and Siam). *Medical Journal of Australia* 1946 (1 June), pp 752-759
- 89 H Silman. p 27
- 90 *Ibid*
- 91 J Markowitz. A series of over 100 amputations of the thigh for tropical ulcer. *J Roy Army Med Corps* 1946; 86: 159-170. This succinct and astute comment is a sub-heading on p 164
- 92 *Ibid.* p 163
- 93 *Ibid*
- 94 EE Dunlop (1946). p 764
- 95 *Ibid*; and RBC Welsh. IWM 66/225/1; under “Chungkai Hospital Statistics” (pages not numbered)
- 96 Welsh
- 97 Dunlop (1946). p 764
- 98 WB Young. Report to Colonial Office, p 9. Held in the archive of Col HC Benson. IWM 86/67/1.
- 99 K Marsh & J Makani. Malaria. In: *Principles of Medicine in Africa* (3rd Edition). Editors: EPO Parry, R Godfrey, D Mabey, GV Gill. (Cambridge, 2004), pp 284-304
- 100 S Dawson. p 92
- 101 R Hardie. Note on the history of malaria among British POWs in Thailand. Handwritten contemporary report held in the archive of Major TM Pemberton, IWM P437
- 102 *Ibid.* p 4
- 103 T Wilson & JA Reid. Malaria amongst prisoners of war in Siam (“F” Force). *Trans Roy Soc Trop Med & Hyg* 1949; 43: 257-272
- 104 *Ibid.* pp 257-259
- 105 *Ibid.* p 261
- 106 *Ibid.* p 268
- 107 *Ibid.* p 261
- 108 *Ibid.* p 268
- 109 *Ibid.* p 266

- 110 Welsh. Chungkai Hospital Statistics
- 111 Wilson & Reid, p 266
- 112 *Ibid.* p 271
- 113 *Ibid*
- 114 Welsh. Chungkai Hospital Statistics
- 115 S Pavillard. Contemporary hand-written notebooks. IWM 67/202/1
- 116 MacArthur. p167
- 117 LJ Godden. *History of the Royal Army Dental Corps.* (Aldershot, 1971). A general review of the RADC, including “makeshift dentistry” in Far East imprisonment (pp 144-147). This book is held at the Museum of the Royal Army Dental Corps, Aldershot, UK.
- 118 W Hunter. Retrospective account. Liddle Collection (University of Leeds), POW 5
- 119 JR Houghton. Diary. IWM 93/8/1, p 101
- 120 Quarterly Report (Tamuang Camp)
- 121 EW Markham. IWM 86/53/1, p 99. A retrospective account written in 1950
- 122 ATH Marsden. Observations by a pathologist during three and a half years as a prisoner of war in Malaya and Thailand. *Medical Journal of Australia* 1946 (1 June), pp 766-769. Marsden was an RAMC major and pathologist; he discusses hepatitis on p 768 of this paper.
- 123 C Lyons. Oral history interview transcript. IWM-SA 10752/3, p 25
- 124 GS Riddell. Cutaneous diphtheria. Epidemiological and dermatological aspects of 365 cases amongst British prisoners of war in the Far East. *J Roy Army Med Corps* 1950; 95: 64-87
- 125 KW Todd. European into coolie. *J Roy Army Med Corps* 1946; 86: 179-185
- 126 Courtney-Lendon, p 33
- 127 *Ibid.* p 39
- 128 S Gimson. IWM-SA 5195/8. Oral history interview transcript (recorded 1991), pp 60-61
- 129 EE Dunlop. 8th Division in Captivity – D Force. Australian War Memorial (AWM) 54 554/5/1, p 7
- 130 KW Todd. p 185
- 131 *Ibid*
- 132 S Gimson. p 61
- 133 K Khan. *Psychiatric morbidity amongst ex-Far East prisoners of war more than thirty years after repatriation.* PhD thesis, University of Liverpool (Cohen Library), 8751/KHA, 1987.
- 134 This information is from a telephone interview by GV Gill with ex-Warrant Officer Jack McLaren (who was in charge of the Mental Ward at Nakom Paton) on 10 February 1998. McLaren, then a retired professor of mechanical engineering in Glasgow, also donated an original typed list of patients and diagnoses (held at LSTM) from which the information in Table 7 originates. McLaren recalled being asked not to spread word of the existence of this ward.

- 135 8th Division in Captivity – other Thailand Forces. AWM 54 554/17/2
- 136 Marsden. p 766

CHAPTER 4

MAKESHIFT MEDICINE

**Invention, innovation and ingenuity
in treating POW disease**

During his time at various camps on the Thai/Burma Railway, the British army medical officer Major TM Pemberton, kept detailed written records,¹ and from his writings the extreme difficulties in disease treatment presented to the POW doctors can be appreciated and summarised as follows:

- Though some equipment and drugs were brought up from Singapore, they were rapidly disseminated or lost, so that when smaller groups of doctors and orderlies were sent to individual camps, “no equipment or drugs of any sort were sent with these parties”. Pemberton described in one large camp, only a single bedpan being supplied by the IJA; “all other equipment was improvised.”²
- Even after the camps were established, the amount of drugs supplied by the Japanese was “tragically small”. Medicines often had to be bought and smuggled into the POW camps, and the IJA would sometimes confiscate these for their own use.
- The POW workforce was highly mobile, frequently moving between camps regardless of their fitness. Seriously ill men were also often forced to work on the line. All this made continuity of medical care (a well-respected principle of good medical practice) difficult or impossible.
- The MOs and medical orderlies were exposed to considerable personal risk. This was both from direct exposure to patients with highly infectious diseases (e.g. cholera, dysentery and diphtheria), but also from life-threatening violence by the IJA and Korean guards at every morning roll-call when they would try to protect the sick from being forced to work.

This chapter will examine the way in which the POW medical officers responded to the huge therapeutic challenge presented to them. Management systems

will be first described for each of the major five diseases recounted in detail in Chapter 3 (malaria, beriberi, dysentery, cholera and tropical ulcer). General issues including surgery, dentistry, physiotherapy and blood transfusion will next be discussed, followed by mortality patterns and the factors affecting them. Finally, the importance of command, discipline, organisation and morale will be examined, including the development of secret smuggling routes for drugs and equipment from non-POW agencies.

Tropical ulcer

Though tropical ulcers were initially outside the clinical experience of most doctors on the railway, lower leg ulcers due to other causes were not (for example, those due to diabetes, venous insufficiency, or peripheral vascular disease). Some of the simpler treatments used were probably transferred from their experience with these less exotic ulcers. The forms of therapy used for tropical ulcer, in roughly ascending order, were as follows:

- dressings
- curettage (“gouging”)
- maggot therapy
- fish treatment
- skin grafting
- amputation

The simplest therapy – dressings and bandages – was in some ways the most difficult due to availability and sterility issues. If it could be obtained, the iodine-based application iodoform was most commonly used, and if combined with rest and nutritional support, could be effective.³ Other dressings included zinc paste, potassium permanganate (“Condy’s Crystals”), hypochlorite solutions (usually “Eusol” or “Edinburgh University Solution of Lime”), and even sometimes poultices of hot rice. Bandages were often cut-up clothes (always washed and reused), or even

leaves (usually from banana plants). Some doctors developed a “permanent ulcer dressing” system, where the ulcer was encased in dressings and bandages and left to “stew in its own pus” for several weeks.⁴ Stanley Pavillard used this method extensively, and anecdotally described it as developing from compound fracture treatment during the Spanish Civil War. He “applied a little idoform or M&B 693, and then slapped on elastoplast, covering this with bandages made from old sheets or banana tree bark”. After three weeks, most ulcers had vanished.⁵ In modified forms, the same system was used by others,⁶ and interestingly is the basis for modern “compression bandaging” of chronic venous leg ulcers today.

However, in more advanced tropical ulcer cases, such as those which filled the ulcer wards of the base hospitals, dressings alone were not enough. Here, in “huts of rotting legs” when “flesh, sinews and tendons rotted away within a few days” more aggressive treatment was needed.⁷ This was the exquisitely painful procedure of curettage, often more widely known as “gouging”, which involved physical scraping away of slough and pus from the ulcer base to hopefully reveal clean tissue which could then heal more easily. The instrument used was often simply a sharpened spoon, and was usually carried out daily. Rohan Rivett, an Australian POW who endured this treatment himself recalled:

The worst moments of our day came when the MOs started gouging the ulcer cases. Having the raw flesh and exposed nerve scraped with a curetting spoon is about the most acute torture I have ever experienced. It was no wonder that sometimes the air was rent with awful screams and groans which escaped, despite the efforts at control from the patient's lips.⁸

Sometimes men had to be held down by their comrades for this repetitive torture.⁹ Interestingly, curettage of infected ulcers remains a valid technique today – though now with adequate analgesia or anaesthesia. Scraping of ulcers (Figure 1)¹⁰ was sometimes combined with saline irrigation (Figure 2). This latter technique

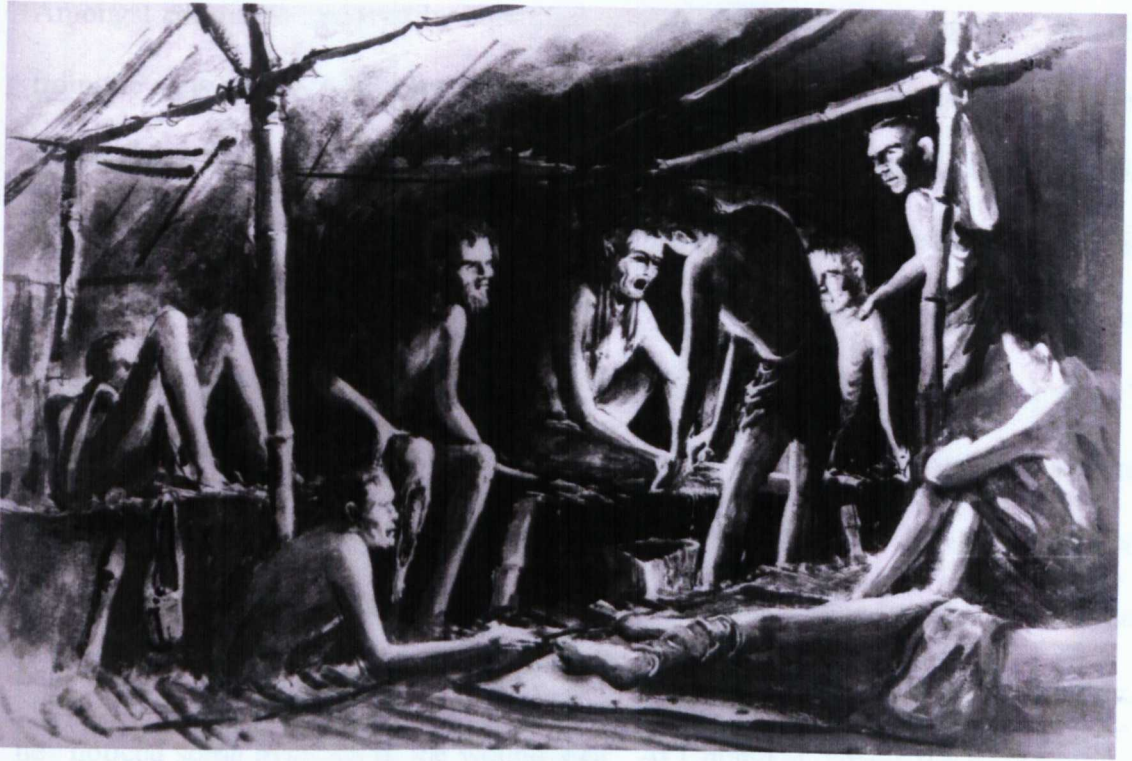


Figure 1. A night round at the ulcer ward of Chungkai Camp. The orderly is scraping a clearly distressed POW's tropical ulcer with a sharpened spoon to remove slough and pus.¹⁰



Figure 2. Saline irrigation of a Tropical ulcer at Chungkai (1943). The apparatus has been constructed from bamboo spars lashed together, and the tripod supports a tin with a soldered exit leading to stethoscope tubing, delivering a slow "drip" of sterile saline to the ulcer site.¹¹

involved the ingenious use of bamboo, tins and tubing (often from redundant stethoscopes), to deliver continuous lavage of ulcers with sterile saline solutions.¹¹

Amongst the debris removed by curettage or irrigation were often maggots – hatched from the eggs of flies which swarmed around the ulcer wards. Many doctors began to realise that maggots may in fact be beneficial, and could be deliberately bandaged into the ulcer to clean it – the rationale being that maggots eat dead flesh, but not living tissue.¹² The practice was taken up by POW doctors, though some rejected it on aesthetic grounds.¹³ Its use dates back centuries, and indeed “maggot therapy” remains a valid technique for cleaning ulcers today. There were certainly several stories of tropical ulcers being dramatically improved by maggots. Private EFV Love was sent down to Chungkai from up-country because of a large tropical ulcer. The bandage remained in place for about two weeks during the journey, during which time he “noticed some irritation in the wound area”. At Chungkai, “when the bandage was removed, to my horror the wound was full of maggots”. The MO was delighted, and after the orderly had removed them all, the wound which had been full of pus originally, was now clean flesh”.¹⁴ The ulcer subsequently slowly healed.

One of the more bizarre methods of cleaning tropical ulcers was “fish treatment” or “river treatment”. Here the sufferer would sit on the side of the river with their leg (ulcer exposed) in the water. Shortly, small fish would arrive and begin nibbling at the infected flesh (Figure 3).¹⁵ Personal accounts of this treatment included, “it worked, but it hurt – they tugged at the flesh”¹⁶ and “they were quite gentle really.”¹⁷ Fascinatingly, the treatment was resurrected post-war as an unorthodox treatment for psoriasis. “Doctor Fish” are used and the patient immerses the affected body part into a spa with the fish inside, which then nibble at the thickened dead skin of the psoriatic plaques. The fish are found in Turkey, where the treatment remains popular, and attracts patients from elsewhere in Europe¹⁸

Surgical treatment of non-healing tropical ulcers was initially by simple

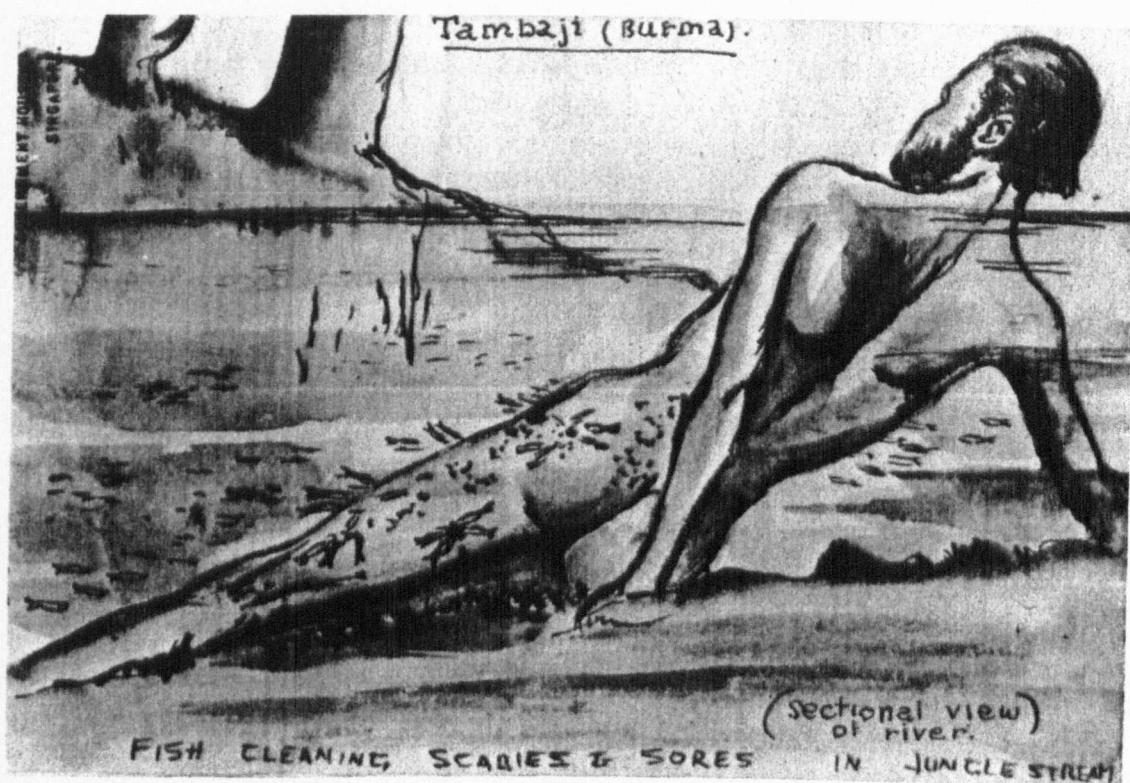


Figure 3. The bizarre “river treatment” or “fish treatment” used for desloughing of tropical ulcers. This drawing by Leo Rawlings¹⁵ shows the system in use for “scabies and sores”, but it was most widely used for tropical ulcers.

excision. Captain RBC Welsh RAMC at Takanum in 1943 described the operation in his diary, “the ulcers are totally excised in one piece, and the resulting saucer-shaped wound dressed”. Welsh described good results, and in particular marked relief from pain.¹⁹ The resulting clean open wound could be left to heal by slow natural granulation, or the process could be speeded by skin grafting.²⁰ “Pinch grafts” were used by applying multiple small pieces of skin from a healthy donor site (see Figure 4)²¹ with often extremely good results.²²

Larger and deeper ulcers required more radical surgery, involving extensive debridement and curettage under anaesthesia. Tendons sometimes had to be removed, as well as portions of infected bone (a term known as “sequestrectomy”). Such radical surgery was not always successful but did occasionally avoid amputation.

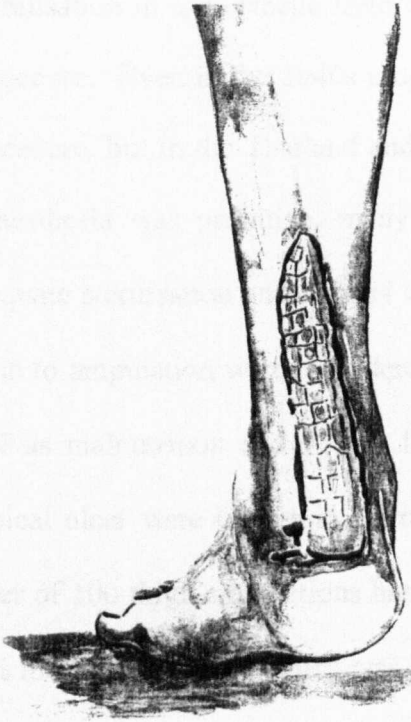


Figure 4. Drawing of a tropical ulcer at the back of a prisoner's ankle, treated by excision and pinch grafting (sketch by Jack Chalker at Nakom Paton Camp, 1944).²¹

Sometimes, infected bone (or “sequestrae”) would be naturally extruded from the ulcer, following which healing would then take place. Gordon Smith (a medical student prior to the war, and medical orderly/laboratory scientist on the railway) recorded a dramatic example of this phenomenon. It concerned a man with a shin tropical ulcer so deep that the tibia was exposed and amputation seemed inevitable. One morning, on removing the dressing, a five-inch complete portion of blackened tibia came away; “I could see a hollow sheath where the bone should have been. After a few more weeks, new bone appeared in this sheath, and in due course, the skin healed”. The “hollow sheath” which he described was the periosteum – the growing outer membrane of the bone, and having been left behind, it could regrow the missing tibia.²³

The ultimate treatment was of course lower limb amputation – if possible below the knee, but not infrequently with severely infected ulcers, an above-knee amputation was needed. This was a considerably more debilitating operation, as

mobilisation in a prosthetic limb was much more difficult than with the below-knee procedure. Even in the 1940s amputation of the leg was a relatively straightforward procedure, but in the Thailand and Burma camps the operation was far from simple. Anaesthesia was primitive, many surgical instruments had to be hand-made, and adequate sterilisation and asepsis were difficult. Additionally, most of the men who came to amputation were considerably weakened by prolonged pain and infection, as well as malnutrition and weight loss. The major pioneers of safe amputation for tropical ulcer were Coates in Burma and Markowitz in Thailand. Marko's seminal paper of 100 thigh amputations has been referred to in the preceding chapter, and the 32% mortality (little of which was surgically-related) was remarkable considering the poor health of the men.²⁴

Almost more important than the surgery itself was the ability to rehabilitate the amputees in prosthetic limbs. Here the base camp workshops showed their expertise and ingenuity. The construction of ulcer irrigation apparatus (Figure 2) by ironsmiths and metal workers, and artificial limbs by carpenters and leather workers introduces a theme that will be returned to several times in this chapter.²⁵ The conscripted British army of the 2nd World War contained relatively few professional soldiers, rather it was a "Citizen's Army" bringing together a multitude of skills. This expertise was of little or no use on the battlefield, but in the POW camps of south-east Asia it became invaluable. The artificial limbs were constructed from salvaged wood, forest bamboo, and leather and straps from redundant rucksacks. Several models were produced, often to an individual specification but always dependent upon the patient's height and level of amputation. Various basic designs included the "Chungkai 1", "Burma 3" and "Tarso 2" models. Figure 5 shows one of the more sophisticated models for thigh amputation (Model 7), including articulations at the

knee and ankle, and a carved false shin and foot.²⁶ Many of these prosthetic limbs

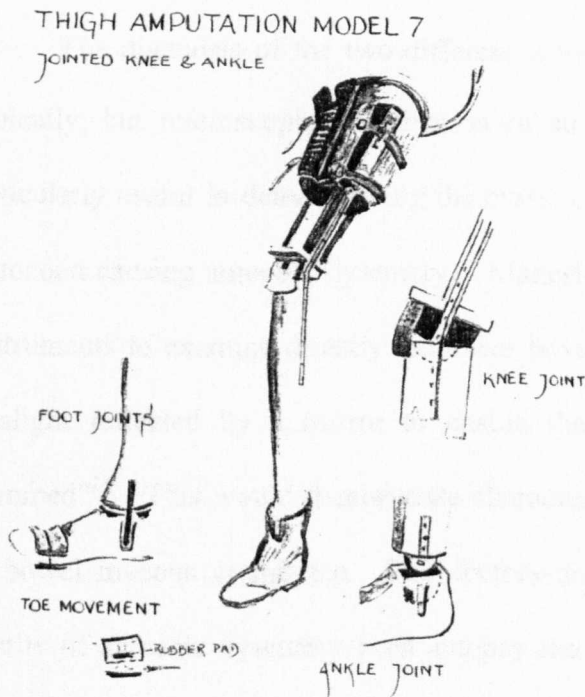


Figure 5.

An advanced type of artificial lower limb (Thigh Amputation Model 7) produced at Nakom Paton Camp in 1944, including articulations at both the knee and ankle joints.²⁶

were so successful that when POW amputees eventually returned home after release, and were offered standard British models, many found their camp prostheses far superior and continued to use them for several years!

Dysentery

Dysentery, in both its bacillary and amoebic forms, was quantitatively the commonest of the major tropical conditions amongst POWs on the Thai/Burma Railway. Mortality patterns of individual diseases will be discussed later in this chapter, but there is evidence that dysentery contributed to mortality more than all other diseases. Dysentery thus presented a major quantitative problem to the railway medical officers. Ironically, treatments for both forms of the disease were available at the time – sulphonamides (“M&B”) for bacillary dysentery and emetine for the amoebic form. M&B worked very well in bacillary types, emetine was less dramatically helpful, but was nevertheless undoubtedly beneficial. Both drugs were,

however, either unavailable or in very restricted supply at most camps, a situation of extreme frustration to the medical staff.²⁷

The diagnosis of the two different types of dysentery could usually be made clinically, but microscopic examination of stools was available in many camps – particularly useful in demonstrating the cysts or adults of *Entamoeba histolytica* (the protozoan causing amoebic dysentery). Makeshift proctoscopes and sigmoidoscopes (instruments to examine directly the lower bowel) were constructed of tin, and used “sunlight reflected by a mirror to enable the rectum in its entire length to be examined”²⁸. This would demonstrate characteristic inflammation and ulceration of the bowel mucous membrane. The doctors also learnt more of the character and severity of amoebic dysentery from autopsy studies of those who had died from the condition.²⁹ Individual cases could also be instructive - Gordon Smith at Tamarkan recorded being handed a “piece of flesh about four inches square” by one of the doctors. It was pink with visible ulcers on the surface and had just been passed rectally by an amoebic dysentery sufferer. The specimen was an intact piece of colonic mucosa, presumably detached by the severe inflammatory process. Smith described this as “the only example I know of internal surgery performed by the patient without anyone cutting open the body!”³⁰

Amoebic dysentery presented the major therapeutic problem. Many cases of bacillary dysentery recovered without specific treatment, and even small amounts of M&B often gave “splendid results”.³¹ Emetine was, however, according to Dunlop, “not supplied by the Japanese, and was obtained only in small quantities by clandestine activities”.³² At Khonkan Camp (55 Km on the Burma side), an interesting alternative source of emetine emerged. Working in the hospital there with Colonel Arthur Coates, was a Dutch medical orderly called Christoffel van Boxtel – a

member of the volunteer forces who coincidentally held a science PhD degree. From a bottle of extract of ipecacuanha (normally used as an expectorant or an emetic), van Boxtel was able to produce and distil 150 doses of emetine. Coates used courses of five injections of the extract, the results of which were dramatic. He later recorded that many POWs eventually returned home “as a result of the timely injection” of van Boxtel’s extract.³³ There will be more of this remarkable Dutchman’s activities later, but this story alone again demonstrates the value of the hugely varied civilian skill-mix available in the POW camps.

Without emetine, however, medical treatment was essentially supportive only. Copper sulphate enemas, and oral Kurchi bark or caraway seed extracts were sometimes used.³⁴ At the base camps later, when food supplies had improved, a “highly nutritional amoebic diet of 4052 calories per day” was also given.³⁵

In unresponsive severely life-threatening cases of amoebic dysentery, surgical operations began to be increasingly used. The procedure was an ileostomy, involving opening the terminal ileum (small bowel) just before it entered the colon (large bowel) and stitching it to the skin surface as a stoma. On the Thai/Burma Railway, the procedure was first tried by Coates in Burma. He had used the procedure before the war for ulcerative colitis, but had no knowledge “of anyone doing it for amoebic dysentery before.”³⁶

The rationale for the procedure was that amoebic dysentery almost exclusively affected the colon, and even in severe cases the ileum was healthy. Diverting intestinal contents out of the ileum to the skin surface effectively “rested” the diseased colon, and also allowed more effective lavage of the colon with amoebicidal enemas (usually potassium permanganate). Coate’s first case was a Dutch POW with a six month history of severe amoebic dysentery which had recently worsened, and it was

considered likely that colonic perforation and death was likely. The procedure was dramatically successful, and the patient recovered and returned to his work as a carpenter. The ileostomy was later closed, and the POW survived to be released to civilian life.³⁷ Instead of an ileostomy bag, a Dutch water bottle was adapted to receive the diverted bowel contents, and worked extremely well (Figure 6).³⁸

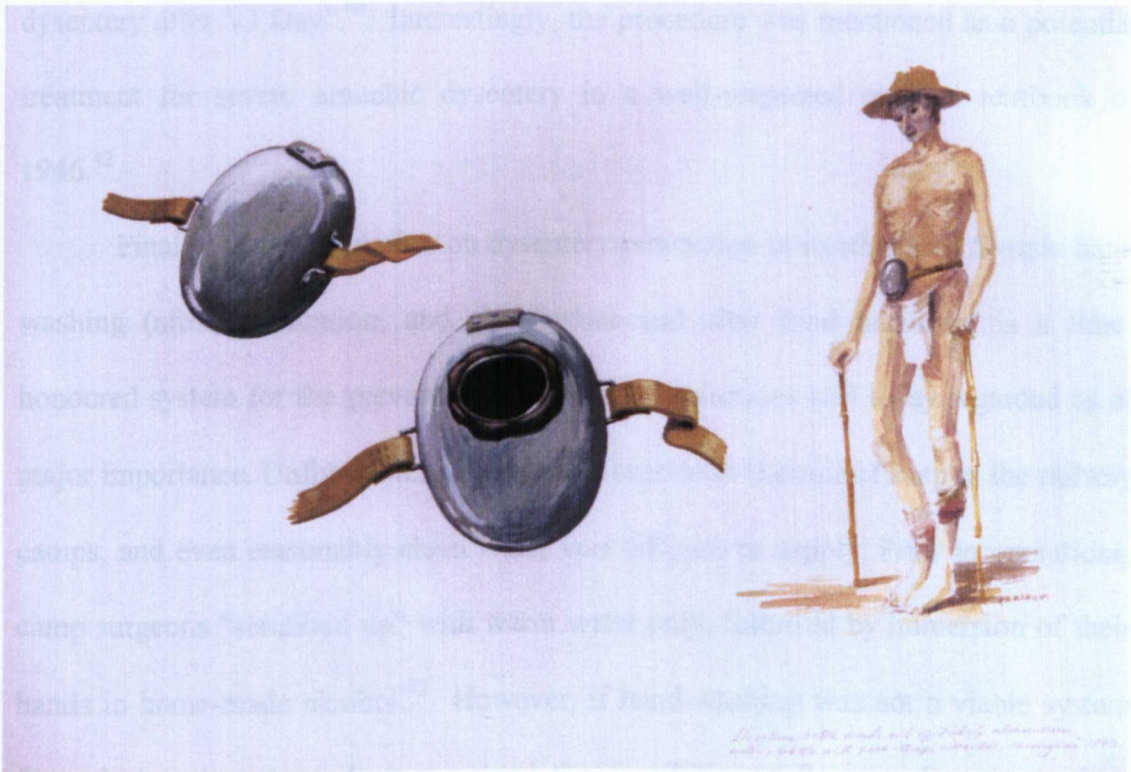


Figure 6. An ileostomy drainage device, fashioned from a Dutch Army water bottle. A hole was made in the side and the drinking stopper closed. The aperture was faced with rubber (from old tyres) to allow a tight seal with the skin. The bottle was held in place by army webbing around the waist.³⁸

The procedure was taken up by surgeons at other camps. The technique varied – for example the caecum (caecostomy) or appendix (appendicostomy) was sometimes opened onto the skin, and occasionally a tube was led from the caecum, via the appendix, onto the skin surface. Regardless of individual technique, the results were good. Of 14 cases operated upon at Nakom Paton, 11 (79%) survived

and recovered,³⁹ and at Kanburi 9 out of 11 (82%) were similarly cured.⁴⁰ Most of the patients who died were moribund, with surgery being performed very much as a last resort. All the doctors involved with patients treated by ileostomy or similar procedures were universally impressed by the dramatic and rapid improvement which followed. In his MD thesis, MacFarlane recorded that “the results were sensational enough to cause South East Asia Command to call for a report on surgery in amoebic dysentery after VJ Day”.⁴¹ Interestingly, the procedure was mentioned as a potential treatment for severe amoebic dysentery in a well-respected medical textbook of 1946.⁴²

Finally, some discussion on dysentery prevention is worthwhile. Simple hand washing (after defaecation, and also before and after food handling) is a time-honoured system for the prevention of diarrhoeal infections still today regarded as of major importance. Unfortunately, there was a near-total absence of soap in the railway camps, and even reasonably clean water was difficult to supply. Prior to operations, camp surgeons “scrubbed up” with warm water only, followed by immersion of their hands in home-made alcohol.⁴³ However, if hand-washing was not a viable system for reducing dysentery, there remained the possibility of fly-control at the latrines (invariably containing fresh dysenteric stools) - clearly a major source of dysenteric cross-infection. Initially, latrines were simple open trenches, with the only attempt at fly control being to sprinkle soil over the stool. This was not terribly effective, and later most camps designed more sophisticated trenches with hinged fly-proof lids; usually used for a week at a time and then completely filled in and moved to another site.⁴⁴ Despite these efforts, flies remained a major problem in the camps, and Brigadier Philip Toosey at Tamarkan is generally credited with introducing one of the more inventive attempts at dysentery control – organised mass fly killing!⁴⁵ Toosey’s

leadership methods and skills will be discussed later in this chapter, but he regarded health control issues as very much part of his remit. He surmised that if every member of the camp killed several flies each day, it may reduce the population sufficiently to prevent or greatly reduce food contamination. He organised the camp carpenters to make baited fly-traps, but also gave a prize each day for the largest number of flies caught – brought to him personally each evening in a tin. He also commented “there even became a black market in dead flies”!⁴⁶ Harry Howarth, one of the POWs in Tamarkan at the time, recalled that every man apart from the very sick was expected to kill and produce 50 flies per day.⁴⁷ The system seemed to be successful, and dysentery cases reduced. Soon fly catching programmes were being widely practiced elsewhere, including at Takanum (where 100 flies per day were expected),⁴⁸ Nong Pladuk,⁴⁹ and Hintok.⁵⁰ The blackmarkets Toosey described also unfortunately flourished, and flies were sometimes attracted with rotten fruit, and sold to other POWs who then did not need to catch their quota. The British POW Len Toseland at Takanum recalled at one time catching his own 100 flies daily, with up to a further 300 for sale on the “fly blackmarket”!⁵¹ Despite these abuses, when properly organised (as at Tamarkan), and combined with other measures such as latrine restructuring and sewage disposal, dysentery rates were greatly reduced, at least in the short term.⁵² The system was even instigated at some camps by the Japanese.⁵³ Similar methods of rat-control were introduced in some camps. Nong Pladuk, for example, had an official POW “rat-catcher” with an average catch per month of 150-200.⁵⁴ At Tarso a whole day was set aside without work to hold a “camp rat-hunt”!⁵⁵ These exercises were not unreasonable as the fleas of rats could transmit plague, and also the more commonly encountered typhus.

Interestingly, such strategies were not unknown before and after the 2nd World

War. For example, the last epidemic of bubonic plague in England occurred in 1910 in Suffolk,⁵⁶ and during the outbreak local authorities encouraged the public to collect dead rats, for which they were paid 2 pence per rat.⁵⁷ With regard to fly control, in 1999 the *Lancet* recorded a study in which efforts to reduce fly populations in rural Pakistan (with insecticides and fly traps) significantly reduced the incidence of acute diarrhoeal disease.⁵⁸ These techniques of “vector control” (the phrase was not in use in the 1940s) used by the railway POWs were echoes of distant past control strategies, and were to be used again in more modern medical practice several decades later.

Cholera

The therapeutic problem of cholera was essentially the provision of fluid rehydration. Cholera vaccines were helpful in prevention, but their availability was entirely in the hands of the Japanese. Even the supply of clean drinking water for victims was often a problem, particularly in the Coolie Camps and up-country. Lt Col Wilkinson was at Sonkrai during the cholera outbreak, when 160 men died of the disease in 3 weeks. He described it as a “perfectly bloody hellish phase.”⁵⁹ Lt Col TH Newey, Senior British Officer of H Force, attributed their high cholera mortality “not so much to what the IJA did as to what the IJA did not do”. He pointed out that the base hospitals “came too late” and that similar hospital camps should have been provided up-country.⁶⁰ It was cholera in these remote camps which led to the only recorded case of euthanasia on the Thai/Burma Railway. This concerned a POW dying of cholera, and a Japanese officer who wanted to shoot him to speed the process. A nearby British Officer concerned that the guard may “make a hash of it” took the revolver and shot the man in the head. He was subsequently arrested by the Kempeitai, taken to Bangkok and tried by a Japanese judge. Surprisingly, the judge

dismissed the case, complimented the British Officer for his action, and reprimanded the Japanese guard. The officer was even allowed out for the day in Bangkok, where he met a Swedish diplomat who gave him up to date news of the war!⁶¹

Water for cholera patients was obtained from rain collectors, or if necessary drawn from the river. It was boiled, and sometimes filtered through cleaned sand. Salt was added if possible. Little more than this could be done in the more basic camps. Elsewhere, water distillation apparatus began to emerge, using makeshift materials (cans, bottles, stethoscope tubing etc). – an example from Chungkai Hospital is shown in Figure 7.⁶² Other “stills” were described in detail from Tarsoa

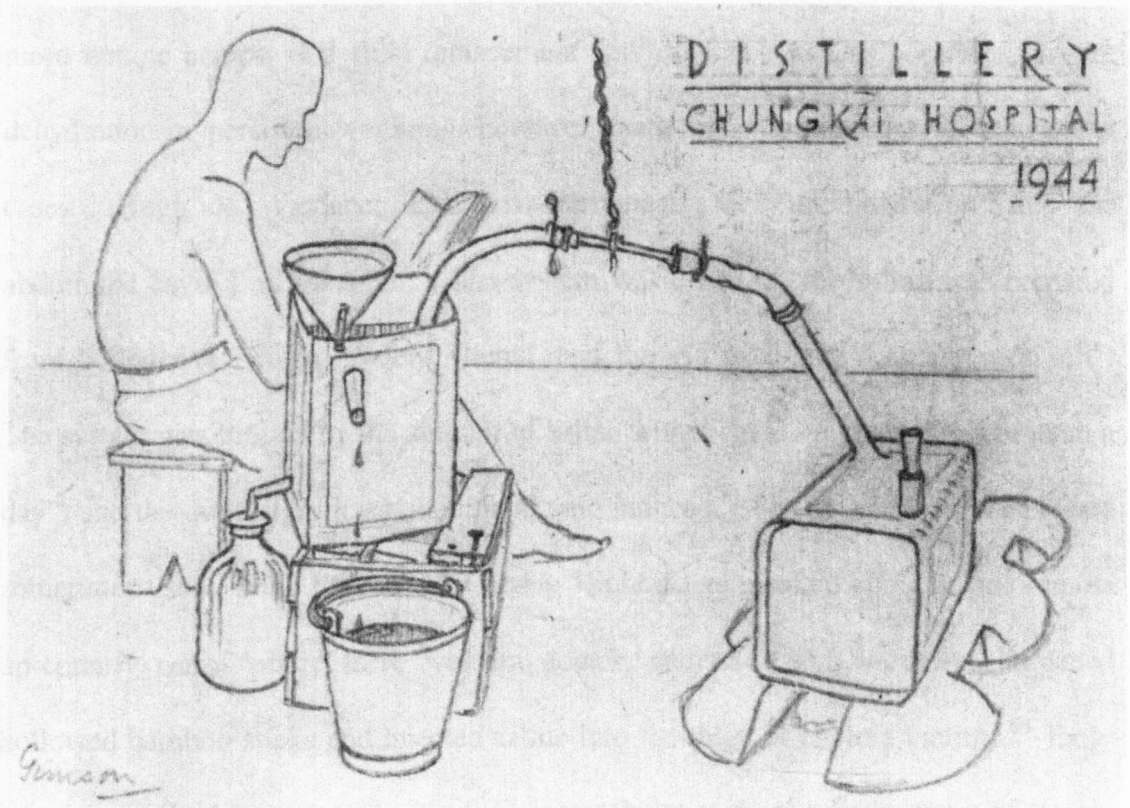


Figure 7. A water distillation system at Chungkai Hospital (1944), used to produce intravenous fluids. The drawing is by Stanley Gimson⁶² Gimson was self-critical of his sketches, calling them “too clean”, but their simplicity provides a powerful reflection of the railway experience.

by Stanley Pavillard,⁶³ and from Tamarkan by Gordon Smith.⁶⁴ Smith recorded how the apparatus at Tamarkan had been made with considerable skill and ingenuity:

*The machine was constructed with material found in the camp. The copper pipe was from the petrol pipe from a Morris 10 that had been cannibalised to allow the engine to operate a water pump for the camp. Two tin cans which had been brought in with foodstuffs; and one of the POWs, who was a good tinsmith, did most of the work. The rubber connection was a small piece cut from one of the doctor's stethoscopes. The charcoal came from the sides of the wood fires in the cookhouse.*⁶⁵

At Chungkai, three stills worked continuously (day and night) during the cholera outbreaks, producing 120 pints of distilled water daily, converted to saline by the addition of crystallised table salt.⁶⁶ Because of the potential difficulties of intravenous fluid administration without specific equipment, and especially at the more remote camps, oral fluid replacement was used as much as possible. Severe dehydration or persistent vomiting, however, made other routes imperative in many cases. Hugh de Wardener used intra-peritoneal saline administration (into the abdominal cavity) at Takanum. The system was crude ... "the saline was prepared from boiled river water, crudely filtered, and the salt used was ordinary rock salt". The system was limited by the amount of saline which could be given ("4-5 pints in a day") and the often significant abdominal pain induced.⁶⁷ Even cruder methods were sometimes used; John Stitt of the Gordon Highlanders recalled being at one remote up-country camp where there was no doctor, and an RAMC orderly sharpened hollowed bamboo sticks and injected saline into the thigh of cholera victims.⁶⁸ Early intravenous fluid treatment, before infusion techniques were refined, were of simple injections of as large amounts of saline as possible.⁶⁹

The technique of intravenous infusion varied a little from camp to camp, and from time to time, largely dependent on available materials. An example is the following entry from the railway diary of Captain P MacArthur RAMC, at Takanum Camp:⁷⁰

17 July 1943. I am finally busy all day and many a night as cholera is getting decidedly worse. Am pouring in 1% saline made by two RAF officers at the cholera laboratory with much success. Give 6 or 7 pints in the first 24 hours with a marked reduction in mortality; given by an infinitely Heath-Robinson apparatus. Use:

Scalpel

Strand horse hair

Bottle with the bottom knocked out

Small piece of glass tubing

"Vick" nasal dropper

Skin needle

Pair dissecting forceps

Rubber tubing

Rubber cork

Morphine tube

Cannula – an ink dropper

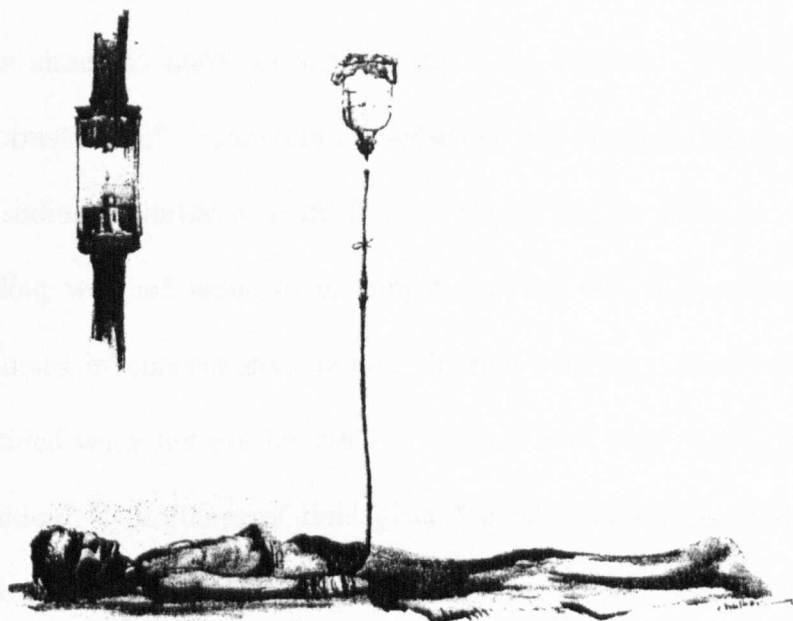


Figure 8. Intravenous saline apparatus for a cholera patient, as used at Hintok Camp. The drawing was by Jack Chalker, and published in Colonel EE Dunlop's war diaries (but not in Chalker's own book).⁷¹

How this equipment was put together is shown in Figure 8.⁷¹ The scalpel, forceps, horse hair (suture) and needle were probably to "cut down" on the collapsed vein of the dehydrated patient, a procedure sometimes but not always necessary. The morphine tube (vial) will have been fashioned into a drip counting device. Some of the variations were interesting – Dr Ian MacDonald used a dried milk tin to hold the saline, and also a split razor blade around the tubing to control the flow.⁷² Dunlop

records the use of discarded saki (Japanese wine) bottles, with the base carefully removed, as an effective drip bottle.⁷³ Stanley Pavillard used jam jars or discarded Japanese beer bottles for the same purpose.⁷⁴ The Dutch POW, Dr Gerrit Bras employed stethoscope tubing (as did others) to connect the saline bottle and the needle, but on occasions he would use coconut shells to hold the infusion fluid – a clever idea as these were naturally sterile on the inside. Bras became known to the Dutch POWs and some IJA soldiers as “Dr Cholera”, and after the war became a celebrated Professor of Pathology.⁷⁵ The amount of salt added to the distilled water was aimed to make an approximate 0.9% solution. Medically, this is known as “normal saline” – normal in the sense that it is of approximately similar concentration to sodium chloride in body fluids. Depending on facilities, this was achieved by adding weighed amounts of simple cooking salt, recrystallised salt, or calculated volumes of concentrated sodium chloride solution. Markowitz used “one litre of distilled water hot off the still” ... “treated with 50cc of 25% sodium chloride stock solution”.⁷⁶ Volumes of fluid given varied – Markowitz would give 1.5 litres and repeat as necessary.⁷⁷ Dunlop records giving 20 pints (about 10 litres) to one patient in the first 24 hours.⁷⁸ The infusions were always given according to the clinical status of the patient, and there seems no doubt that these remarkable “Heath Robinson” infusion devices, backed up by the production apparatus for distilled water, saved hundreds (if not thousands) of lives.

Beriberi

The management of beriberi and other nutritional syndromes consisted of vitamin tablets or injections, as well as general attempts to improve the diet. Both were problematic. As an example, the following is a list of drugs and equipment

provided by the Japanese for the medical staff at Konyu Camp in February 1943 (the camp at the time had 4,000 men).⁷⁹

• Quinine tablets (boxes of 300)	35
• Bandages	10
• Vitamin B ₁ tablets	50
• Aspirin tablets	300
• Morphine ampoules	8
• Plasmogone tablets	1250
• Sulphonamide tablets (M&B)	30

The 50 tablets of thiamine (vitamin B₁) were clearly grossly inadequate, and Dunlop commented that “medical supplies are a cause of grave concern.”⁸⁰ In addition to proprietary vitamin supplements, home-made supplies were produced. These were usually from local plants, and included grass extracts and “jungle spinach”.⁸¹ Yeast cultures were also made; indeed yeast was the basis of “marmite” which was a highly effective source of thiamine when available.⁸²

Supplements to the meagre diet were understandably regarded as highly important. The IJA (perhaps rather strangely) gave all POWs a very small amount of pay. This was usually “top-sliced” to pay for extra food (particularly for the sick). Buying food from local Thai traders was generally allowed by the Japanese, and even in remote camps could be a sophisticated system. At Nikki Camp, Thomas Wilson recorded a “buying trip” to Nikki Village (5 Km from the camp) on Saturday 17 July 1943. So much food was bought that he “hired an elephant to carry the weighty stuff back to the camp ... highlight of the day was to see it and driver swim the river, elephant completely submerged, driver on its neck with only shoulders, arms and head showing”!⁸³ One of the most frequently bought items from the Thais were duck eggs. They were given to the sick and sold at camp canteens along the railway. Many believed that they saved countless lives.⁸⁴ Harold Payne (who later became President of the National Far East POW Federation of the UK) observed retrospectively, “my

goodness there ought to be a memorial to the duck for the number of eggs it laid, and the number of lives it saved".⁸⁵ Less orthodox dietary supplements included monkeys, iguanas, and the occasional snake.⁸⁶

A simple, but crucial message the doctors often gave to the POWs was to simply eat everything and anything they could. It was not unknown for men to trade food for tobacco. John Marsh, an officer with the RASC, recalled "I have known a man die because he chose to buy tobacco rather than duck eggs".⁸⁷ Those who worked with Albert Coates remember his celebrated quotation, delivered to countless men in his camps, "you eat all that rice my lad, your ticket home is at the bottom of your mess tin".⁸⁸

Malaria

As with beriberi, the problem with malaria treatment (and prevention) was one of availability and supply. Quinine was highly effective, but it often had to be rationed. Less commonly available antimalarial drugs were quinacrine ("Atebrin") and primaquine ("Plasmaquine"). Most quinine available on the railway came as sugar-coated tablets (manufactured in Java). Occasionally only quinine powder was available, which was very nauseating and men often tried to avoid taking it. Some doctors wrapped it in paper and got patients to swallow it with food.⁸⁹

Quinine generally worked well in all types of malarial infection. It was also an effective prophylactic, but there were rarely sufficient supplies to use it widely for this purpose. If supplies allowed prophylactic use, it was reserved only for "key" personnel – doctors, interpreters and senior administrative officers.⁹⁰ The preventive dose used was 200 mg twice weekly, a regimen developed from experience in Malaya pre-war.⁹¹

The more severe forms of falciparum malaria (e.g. cerebral malaria or blackwater fever) required intravenous quinine, and if supplies of this had run out, doctors had to be inventive. At Kanburi, one RAMC doctor recalled treating some cases of cerebral malaria in a makeshift way – “when my intravenous quinine had run out, I squashed up an Atebrin tablet in boiled water in a syringe, shook it, and injected that. They all came round.”⁹²

Prevention of malarial transmission was rarely seriously attempted. At the time this would normally consist of spraying mosquito breeding sites (usually stagnant pools of water) with insecticide or oil, as well as bednets to prevent mosquito bites at night. Despite appeals to the Japanese, measures such as these were rarely adopted. The F Force malariologists Wilson and Reid recorded only one breeding site being “oiled with 2 gallons of waste sump oil from the motor transport.”⁹³ Additionally “a few large Japanese army mosquito nets were issued, under which about six men could sleep”. However, the usual frequent nocturnal trips to the latrines “made the proper use of even these few nets extremely difficult”.⁹⁴

A more bizarre approach to malarial management was a Japanese initiative rather similar to “glass rodding” for dysentery. This was the occasional appearance of “Anti-Malarial Parties”. Captain MacPherson RAMC, at Kinsayok Camp on 22 April 1943, recorded that “a Nipponese Anti-Malarial Party has arrived, and announce that blood examinations will be made of all personnel in camp. Today they did the hospital patients – a thick film from each man. Asepsis very sketchy”.⁹⁵ There was no record of subsequent results or treatment, and MacPherson also noted that at the time quinine was plentiful and all men were receiving preventive doses. The whole operation was presumably a somewhat pointless propaganda exercise.

Mortality patterns

Having described and explored the ways in which the major diseases were treated and managed, this section will look at mortality patterns on the railway. This will include total mortality, the factors which affected mortality risk, and an analysis of death rates by disease and nationality.

Mortality data on the Thai/Burma Railway have been collected from camp records, lists of men returning to Changi or alive at the end of the war, and burial records of the Commonwealth War Graves Commission. Unsurprisingly, the records are not complete, but the figures shown in Tables 1 and 2 are as accurate as possible, and owe much to the exhaustive work of the Australian researcher Rod Beattie and the British ex-railway POW Peter Dunston.⁹⁶ High though these figures are, it is

Table 1. Mortality on the Thai-Burma Railway by nationality⁹⁶

Nationality	Total	Deaths	Percentage
British	30,131	6,904	22.9%
Australian	13,004	2,802	21.5%
Dutch	17,990	2,782	15.5%
American	686	132	19.2%
Total	61,811	12,620	20.4%

worth noting that of the approximate 75,000 Malay coolie labourers employed on the line, about 42,000 (56%) died.⁹⁷ Some previously quoted mortality figures have suggested an excess mortality of the British over the Australians,⁹⁸ but the more recent and accurate data in Table 1 shows no significant difference (22.9% versus 21.5%).

The Dutch mortality at 15.5% was however significantly lower than both the other main groups, and this phenomenon will be returned to later. Figure 9 shows POW mortality by month, and vividly demonstrates the marked peak during the speedo phase of railway construction.⁹⁹

Many factors affected mortality risk. The location and remoteness of the camp was an obvious issue. The up-country camps had poorer hygiene, more difficult food supply and often a higher level of physical work. The POWs in these camps were also often weakened by the march in (notably F Force), and cholera epidemics were more frequent in these locations. Officers generally had a lower mortality risk. The reasons for this are not entirely certain. In general they did less physical work than the ranks, but this varied between camps, and was by no means always the case. They received higher rates of pay from the IJA, which sometimes allowed them to buy extra supplies of food.¹⁰⁰ However, in a number of camps, pay was pooled to provide a general camp messing fund, particularly to support the sick.

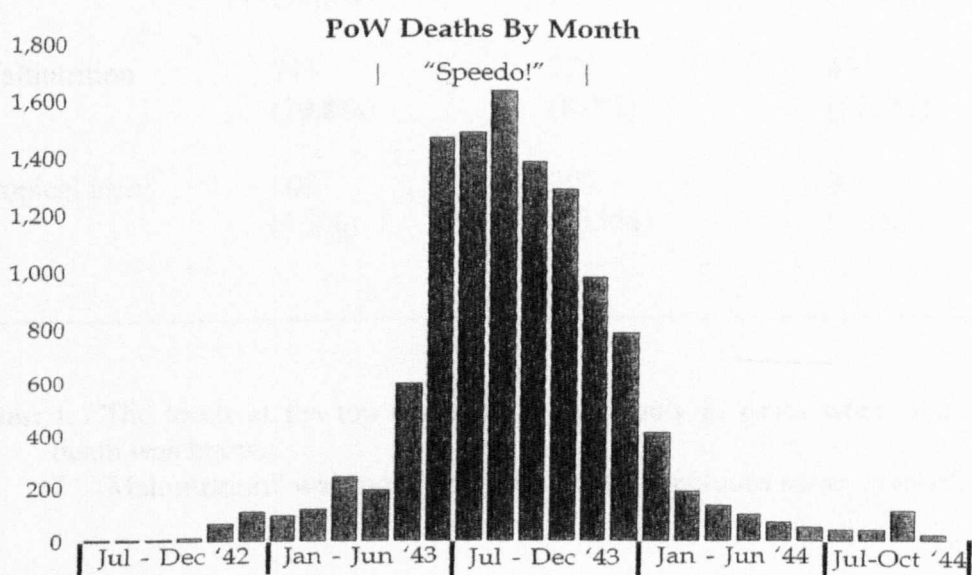


Figure 9. Graph of POW deaths on the Thai/Burma Railway by month, showing the sharp peak during the speedo phase of construction.⁹⁹

Table 2 gives mortality figures for the five major diseases (cholera, dysentery, malaria, tropical ulcer and malnutrition), divided by the three main nationalities (British, Dutch and Australian).¹⁰¹ The Dutch MOs tended to record a single cause of death only, whereas the British and Australian medics would often include other contributory conditions. The figures in Table 2 therefore include cases where a

Table 2. Mortality figures by nationality for the five major diseases on the Thai-Burma Railway¹⁰¹

	British	Australian	Dutch
Total deaths	6,888	2,802	2,791
Cholera	982 (14.2%)	359 (12.8%)	16 (0.6%)
Dysentery	2,313 (33.6%)	1,090 (39.1%)	1,078 (38.6%)
Malaria	752 (10.9%)	614 (21.9%)	400 (14.3%)
Malnutrition	743 (10.8%)	224 (8.0%)	494 (17.7%)
Tropical ulcer	408 (5.9%)	306 (10.9%)	33 (1.2%)

Notes: 1. The totals at the top of the table refer only to cases where the cause of death was known.

2. "Malnutrition" was mostly beriberi but also includes some cases of pellagra

particular disease was either the sole or a contributory cause. The major points of interest from these fascinating data are as follows:

- Dysentery was easily the major cause of mortality (approaching 40%), and this was similar for all nationalities.
- The Dutch had a remarkably low cholera mortality (0.6%).
- Deaths due to tropical ulcer were higher in the Australians.
- Malaria mortality was highest in the Australians.
- Malnutrition deaths were highest in the Dutch.

The lower mortality in general, (and particularly low cholera death rate), amongst the Dutch has been an area of debate for some time. A traditional view is that they fared better because most had lived in south-east Asia (in the Dutch colonies) for many years before the war. A number had married local women and could speak Tamil. The British officer John Stitt recalled that “the Dutch would eat rats ... and plants from the jungle ... they were clever, they’d lived out there most of their lives.”¹⁰² However, there were some simpler factors which determined their better outcome. Firstly, less Dutch were sent up-country than British and Australians; for example, the 7,000 men of F Force had no Dutch at all, and there were only a handful amongst the 3,000 of H Force. Secondly, and of particular relevance to cholera mortality, the Dutch troops prior to captivity had received annual cholera vaccinations. The Dutch contingent at Linson Camp had also serendipitously received booster vaccinations a month before the major cholera outbreak there.¹⁰³

The relatively high tropical ulcer mortality amongst the Australians may be due to post-operative deaths. Amputations tended to be carried out more frequently by the Australian surgeons and it may be that the more conservative approach by the British and Dutch doctors (reserving amputations for life-threatening situations only) was in the long run safer. Some of the other mortality variations are difficult to explain, but the high proportionate mortality of dysentery regardless of nationality, shows just how devastating this disease was on the railway.

Surgery, dentistry and supportive services

This section will deal with how systems of surgery and anaesthesia evolved in the camps; as well as dentistry, laboratory support, and blood transfusion. All required considerable ingenuity, as almost no dedicated equipment existed beforehand.

Surgery During the speedo period, and outside the base camps, surgery could be very challenging. At Wampo Camp, Stanley Pavillard performed an appendicectomy (watched by a Japanese doctor who refused to help) using chloroform anaesthesia, and instruments comprising “artery forceps, one rusty pair of scissors and some equally rusty surgical needles”. There was no knife or scalpel, so a colleague’s cut-throat razor was used. The operation was surprisingly successful, and the patient made an excellent recovery.¹⁰⁴ Post-speedo, and especially in the base hospitals, surgical procedures became somewhat more sophisticated (Figure 10)¹⁰⁵ but inventive approaches were still needed.

The range of instruments was limited, and was extended by the artisans in the camp workshops. Bent forks became especially popular as wound retractors. The Japanese supplied some equipment at the larger camps, but often the least useful – for example surgical gowns and masks. Sterilisation (usually by prolonged boiling) was as meticulous as possible. Suture material was especially problematic until “catgut” began to be successfully produced from the intestines and peritoneal cavity of animals (usually slaughtered oxen). The peritoneal membrane was peeled away, dried, boiled in saline and cut into strips which were then dried and stored in alcohol (distilled from rice). The suture material was highly successful.¹⁰⁶ Rice alcohol was also widely produced as a skin disinfectant prior to surgery.



Figure 10. The operating theatre at Chungkai Camp, 1943-44. A mid-thigh amputation is in progress. The painting is by Jack Chalker, and a print was donated by the artist to the Liverpool School of Tropical Medicine. A similar but not identical version was later published.¹⁰⁵

Table 3. Operations performed at Tamuang Camp February-April 1945¹⁰⁷

Incision of abscesses	51
Excision of cysts/warts	26
Circumcision	16
Suture of lacerations	14
Excision/grafting of ulcers	9
Reduction of fractures	7
Appendicectomy	5
Hernia repair	3
Miscellaneous	8
Total	139

The range of operations performed is interesting, as shown by two examples, the first from a three month period in early 1945 at Tamuang Camp (Table 3),¹⁰⁷ and the second from Nakom Paton Camp in 1944 (Table 4).¹⁰⁸ Tamuang and Nakom Paton were relatively close to each other (39 Km and 23 Km on the Thailand side respectively). Nakom Paton was a dedicated hospital camp not quite on the railway. The range of surgery performed at these camps therefore represent the modern equivalent of a district general hospital (Tamuang), and a central referral teaching hospital (Nakom Paton). Table 4 thus shows the range of more complex and specialist surgery at the base hospital camp – including extensive tropical ulcer

Table 4. Operations performed at Nakom Paton Camp Hospital, 1944¹⁰⁸

Tropical ulcers (excision, grafting, bone removal etc)	200
Appendicectomy	140
Hernia repair	114
Amputation	45
Haemorrhoidectomy	38
Varicose vein excision	30
Laparotomy	14
Cholecystectomy	10
Craniotomy	5
Fractures	3
Total	591

Note: There were 235 other various operations performed in the year (total (826), with an overall mortality of only 18 (2.2%))

surgery, laparotomies and even occasional craniotomies (surgical opening of the skull, usually because of suspected brain tumours (or haemorrhage). For these operations a pedal-operated circular saw was constructed by mechanics at the hospital workshop. At both camps, the frequency of relatively mundane surgery is of interest – abscesses, cysts, herniae, circumcisions and appendicectomies. This reflects the background general problems of a large cohort of young men together over a long period of time. It also shows the confidence developed by the surgeons, particularly at the base hospital camps. The 2% surgical mortality (Table 4) at Nakom Paton is remarkably low, and encouraged the surgeons to take on “elective” non-urgent cases (hernia, varicose veins etc), and also to attempt more risky surgery in urgent situations (eg craniotomy).

Surgical anaesthesia was either by inhalational or spinal techniques. Captain G Holland RAMC, of 196 Field Ambulance, kept detailed records of anaesthetics he delivered at Chungkai, Takanun and Tamuan from December 1942 to August 1945 (the total extent of his time on the railway).¹⁰⁹ Out of a total of 1,087 anaesthetics, 620 (57%) were spinal, 405 (37%) inhalational, and 62 (6%) intravenous. The latter small number used sodium pentothal (a barbiturate) and were used for brief procedures such as fracture reduction, when the drug was available – which was relatively rarely. Inhalation anaesthetics included chloroform, ether and ethyl chloride, or varying combinations of these drugs. Spinal anaesthesia involved the injection of local anaesthetic agents into the cerebrospinal fluid surrounding the lumbar spinal cord, thus anaesthetising the body below the waist, but keeping the patient awake. A variety of agent were used, depending on availability, including dental novocaine if necessary. Arthur Goodman, a chemistry graduate, constructed a home-made anaesthetic machine at Kanburi, and even delivered several anaesthetics with it

himself.¹¹⁰ Lack of anaesthetics was often a serious problem, and at one particular time of shortage van Boxtel, the Dutch scientist, dissolved and distilled cocaine tablets to produce a workable spinal anaesthetic.¹¹¹

The advantage of spinal anaesthesia was that it could be used reasonably safely in sick and poorly nourished patients, where inhalational anaesthesia may be dangerous. It was thus particularly useful for tropical ulcer surgery, and POW doctors became highly skilled in the technique. Markowitz performed 600 such anaesthetics in one three month period, and identified a problem of occasional blood pressure falls (“circulatory collapse”) – now a well recognised side-effect of the procedure.¹¹²

Dentistry Qualified army dentists belonged to the Royal Army Dental Corps (RADDC), and dental clinics and surgeries became established at Roberts Hospital, Changi, soon after capitulation. When they were moved to Thailand, the army dentists did their best to gather as much equipment as possible for the move. Some were able to take reasonably complete “field dental kits”, but many had to take whatever they could scavenge. As with other aspects of medical care on the railway, shortage of drugs and equipment was a constant problem.¹¹³ Once again, the ubiquitous bamboo came into its own, at least for the construction of remarkably workable dental chairs (Figure 11).¹¹⁴

In the base hospitals, extensive and relatively complex dental work became possible. At Tamarkan Camp Hospital, between May and December 1943, a total of 5,461 treatments (in 3,700 patients) were given by Captain R Diggle RADDC – including 216 visits (6%) by Japanese guards and officers!¹¹⁵ Details of these treatments are shown in Table 5. The volume of work is astonishing, and some procedures (for example root fillings) were highly complex. The report of this dental

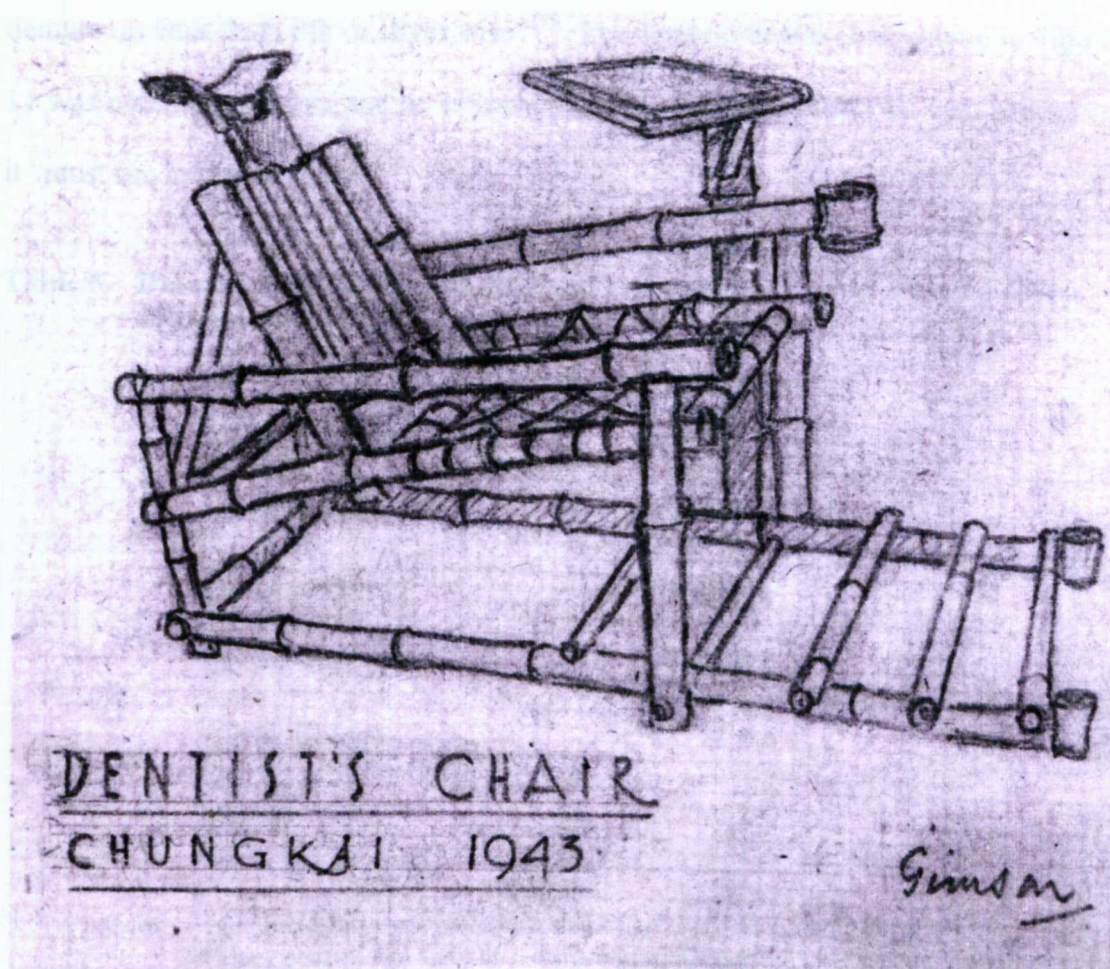


Figure 11. A bamboo-constructed dental chair used at Chungkai Camp, 1943. The drawing is by Stanley Gimson.¹¹⁴

clinic's activities again confirms the difficulties of drug supply – “the only dental drugs supplied by the IJA was a quantity of 0.5% Novocaine (which was quite useless for the purposes). Oil of Cloves and four ounces of mercury were purchased locally and a 20 oz bottle of Sovatex was obtained from the Base Hospital at Kanchanaburi”.¹¹⁶

At Chungkai, Captain David Arkush RADC had similar problems of supply. He restricted local anaesthetic use to 1 ml of 1% Novocaine to “spread it out over a fair period until other sources of supply appeared”.¹¹⁷ Arkush carried out a similar range of treatments to Diggle in Tamarkan, and also devised a method of repairing broken false teeth “by drilling holes on either side of the fracture ... and lacing the

denture up with floss silk or silver wire"¹¹⁸. The bamboo dental chair shown in Figure 11 was made for Arkush, and he estimated that the numbers of POWs who had sat in it "must run into thousands".¹¹⁹

Table 5. Details of dental treatments given at Tamarkan Camp Hospital, May to December 1943¹¹⁵

Cavity fillings	1488 (39%)
Extractions	1036 (27%)
Zinc dressings	1784 (47%)
Gum treatments	1149 (30%)
Root fillings	4
Total	5461

- Note:**
1. All treatments were given by a single dental officer (Capt R Diggle)
 2. Many patients had more than one treatment (hence the total is more than 100%)
 3. The 5,461 treatments were given to 3,770 attending patients
 4. The cavity fillings (1,488) were mostly cement (1,226), but 262 were amalgam.

Dental treatment and drug shortages had their lighter side. A POW at Konchan Camp recalled being in the dental queue when a Japanese guard with toothache came and pushed to the front demanding immediate treatment. The dental officer had no choice but to examine him, give an anaesthetic injection and extract the offending tooth. The guard left the surgery sweating and grunting, looking very unwell. The dentist then told the men waiting to see him that he had injected water rather than local anaesthetic, both to teach him a lesson and to conserve anaesthetic supplies!¹²⁰

Laboratory services Laboratory support for the railway doctors usually consisted of microscopical examination of blood slides to diagnose malaria, or stool samples

from patients with diarrhoea (in particular to diagnose amoebic dysentery). At base hospitals, haemoglobin levels and simple biochemical tests were occasionally available. Facilities in the up-country camps were universally rudimentary. The malarial survey of Wilson and Reid (referred to in Chapter 3) is an exception,¹²¹ but this was a specific survey ordered by the IJA and not part of routine medical services.

Laboratory work was carried out by medical scientists of the RAMC, or partially trained volunteers. One of the latter group was John Gordon Smith, an Edinburgh medical student who interrupted his studies to volunteer for the army in 1939. He was captured at the fall of Kuala Lumpur, interned in Pudu Gaol, and made friends with Dr Dudley Gotla of the RAMC. When it became apparent that Smith was to be moved to Thailand, Gotla gave him his microscope, his copy of *Manson's Tropical Diseases*, and gave him a short course in microscope slide staining. Later, at Tamarkan, "Nipper" Smith became the hospital microbiologist and was greatly appreciated by the medical staff. He developed an innovative oil-immersion microscopic technique using locally produced coconut oil, and examined over 20,000 malarial blood slides.¹²²

The range of intestinal parasites seen in stools from patients with diarrhoea is shown in Table 6, which records over 7,000 microscopical tests at Tarsoa and Tamuang Camps from November 1943 to April 1945.¹²³ The parasites detailed in Table 6 include protozoa (*Entamoeba coli*, *Entamoeba histolytica* and *Giardia lamblia*) and helminths or worms (*Strongyloides stercoralis*, *Ankylostoma duodenale* and *Trichuris trichiuria*). Of the protozoa, *E. histolytica* was the cause of amoebic dysentery, though its close relative *E. coli* was harmless. *G. lamblia* could cause an unpleasant protracted diarrhoeal illness known now as giardiasis, but more commonly in the 1940s as lambliaosis. These protozoa were diagnosed by finding characteristic

Table 6. Intestinal parasites found on stool examination by the laboratories at Tarsoa and Tamuang Camps, November 1943-April 1945¹²³

<i>Entamoeba coli</i>	1944	(27%)
<i>Trichuris trichiura</i>	1849	(25%)
<i>Entamoeba histolytica</i>	1156	(16%)
<i>Giardia lamblia</i>	1075	(15%)
<i>Strongyloides stercoralis</i>	745	(10%)
<i>Ankylostoma duodenale</i>	487	(7%)
Others	19	(<1%)
Total	7275	

cysts, or occasionally trophozoites (adults) in the stool on microscopical examination. The worms included *A. duodenale*, one of the human hookworms, which could lead to severe anaemia. *T. trichiuria* could be asymptomatic, but a heavy infection could be associated with diarrhoea or even rectal prolapse. *S. stercoralis* was at the time thought to be asymptomatic, but is now recognised to sometimes cause diarrhoea or rashes. The worm infestations were diagnosed by the findings of typical ova (eggs) or larvae in the stool. The rates of infection in Table 6, even considering that the samples were taken from a selected group of POWs with diarrhoea, are extremely high by modern tropical standards. This presumably reflects the prevalence of these parasites in the area, and the high susceptibility of the POW hosts due to weakness and malnutrition.

Blood transfusion One of the major achievements of medical care on the Burma Railway was the provision of services for the transfusion of blood to anaemic and/or

severely ill and malnourished men. Surprisingly sophisticated systems developed in the base hospital camps, but even up-country limited but useful transfusion facilities existed. In the latter situation direct person to person transfusion was often practised, as no anticoagulant (usually citrate) was available to stop the donated blood clotting prior to later delivery to the patient. Pavillard described a terminally ill POW, “Snuffy” Craig, at Kinsayok for whom he had no more medically to offer. He found a volunteer donor who knew he was Group O (the “universal donor”) and fixed needles in arm veins of both patient and donor. With a syringe he simply drew blood in aliquots from the donor and injected it into the patient. The procedure was repeated with different donors over the next three days, and Snuffy improved and slowly returned to full health.¹²⁴ Pav and others used this technique extensively from then on, particularly in cases of severe malaria with haemolysis (destruction of red blood cells by the malarial parasite).

The lack of anticoagulant was common even at the base camps, but was ingeniously solved by the “defibrination” technique. Even in the 1940s this was a highly dated system and involved immediately stirring or “whisking” the freshly donated blood. The fibrinogen in the blood (responsible for formation of clot) would then “seed out” on the stirrer and form a clot around it, which could later be removed leaving anticoagulated blood. The idea of using this system probably arose quite separately at different camps, and there were slight differences in technique. Thus at Chungkai and Nakom Paton a home-made wooden spatula was used,¹²⁵ whereas at Tamarkan an “egg whisk” was used made from a bamboo stick cut into fine fibres at the end.¹²⁶ Whatever the stirring implement used, it was vigorously boiled beforehand to maximise sterility. Typing of donor versus recipient blood was usually done crudely by watching for agglutination of the mixed bloods under the microscope.

Despite the crudeness of this technique, reactions to transfusions were rare and indeed it was often noticed that transfusion reactions were more common when citrate was available as an anticoagulant rather than when simple defibrinated blood transfusion was used. At Chungkai and Nakom Paton hospitals 1,452 transfusions were given, and specific transfusion units were set up led by a “Transfusion Officer”. A semi-quantitative estimate of the results is shown in Table 7 which summarises the outcome of 250 transfusions at Chungkai Hospital.¹²⁷ The high mortality figures show that transfusion was reserved for serious cases, but that when used there was almost always improvement. The results, as Gordon Smith later recorded, “exceeded our expectations”, and in many cases those “close to death started to improve, and eventually made a good recovery”.¹²⁸

Table 7. Outcome of 250 transfusions of defibrinated blood at Chungkai Hospital¹²⁷

Disease	Number	Much improved	Improved	No change	Died
Tropical ulcer	110	9%	30%	31%	30%
Amoebic dysentery	77	27%	37%	1%	35%
Malnutrition	32	13%	53%	3%	31%
Malaria	17	30%	41%	0%	29%
Miscellaneous	14	0%	64%	0%	36%

Command and camaraderie

Medical skill and ingenuity were undoubtedly crucially important in survival on the Thai/Burma Railway, but organisation and discipline also had their part to play. The best results occurred when non-medical Commanding Officers used their

leadership and respect to support the medics. Philip Toosey of Tamarkan is a good example of this – his “fly-swatting” initiatives have already been referred to. He also welcomed parties of up-country sick personally. Len Baynes recalled that when he and his fellow POWs arrived from Tarsoa, Toosey asked them to sit on their kit bags and then said, “This is Tamarkan Camp, and it’s about the cleanest in Thailand. I’m going to rely on you to help me keep it this way.”¹²⁹ Many testified to Toosey’s charisma and leadership skills.¹³⁰ He insisted on smartness and discipline in the camp, but also interacted closely with the medical personnel. He visited the hospital every day, and personally appointed Jim Mark and later Arthur Moon as Senior Medical Officers.¹³¹ By no means all commanding officers were as effective as Toosey in supporting and protecting medical services, but standard army discipline undoubtedly helped the camp doctors in their difficult tasks in most camps. For example, Major Nelson’s meticulous account of Linson Camp (medical and otherwise) included extraordinary detail. Equipment (down to the last “medium ladle”) was itemised, disciplinary measures recorded (“28 days in cells for stealing medical instrument”), personalities detailed (for example “barber, looks shifty - and is!”), medical equipment and drugs listed (“kaolin 200g, belladonna ¼ grain tablets 8”), and medical activities extensively recorded (referring in particular to the work of Captains Bill Hetreed and Hugh de Wardener).¹³²

Though good camp COs involved themselves closely in camp medicine, the central organisation of medical services was left to the POW doctors. Though a number of the medics were “generalists” (Pavillard and Hardie, for example), there were a number of specialist surgeons and physicians. Several surgeons have already been mentioned (Dunlop, Coates, Markowitz etc), but the physicians were no less important. They had a difficult job, as they were largely dependent on drugs to

practice their speciality, and these were of course always in short supply. Thus, at Tarsoa Camp in late 1943, the physician Dr Cyril Vardy wrote that “the morning ward rounds are becoming more and more difficult as more and more patients, with no drugs to help them, gradually sink.”¹³³ Whatever their speciality, all doctors had a very difficult task, and were particularly prone to slappings and beatings from the Korean and Japanese guards, usually for trying to protect their patients from being forced out to work. Morning tenko was a tedious, difficult and hazardous time for POW medics as they bargained with the guards for “fit numbers”.¹³⁴

The camp hospitals had relatively sophisticated organisational structure, often including officers and committees responsible for administration and finance. Good hospitals organised recreation and entertainment; Moon did this at Tamarkan, and at Tarsoa, Vardy set up an Entertainments Committee.¹³⁵ All had hospital workshops staffed by craftsmen of all sorts and types, protected as much as possible from railway work. There was no shortage of skill, though as Vardy observed “bricks cannot be made without straw, and the need for more materials of all sorts is constant”.¹³⁶

Organisationally, patients were segregated into separate atap hut “wards” by disease. These huts could be huge and inside them was often a further bizarre segregation by nationality. Thus, the “Amoebic Ward” (No. 5) at Nakom Paton housed about 200 patients with amoebic dysentery. At one time, the left hand end contained 66 Australians, next were 22 Dutch, then 112 British, and at the far right were 9 officers (interestingly multi-national, with 5 British, 4 Dutch and a single Australian all housed together!).¹³⁷

The work of the POW doctors was universally admired and appreciated – the Australian POW George Aspinall wrote “all the doctors were magnificent, you won’t find any ex-prisoner-of-war who has anything but the highest praise for the way the

medicos looked after us").¹³⁸ However, the medical orderlies deserve special mention for their own remarkable contribution. Though some were trained members of the RAMC, many were simply volunteers who chose to take on this difficult and dangerous work. They were the constant point of contact for the sick, day and night; feeding, supporting, helping with bedpans, and cleaning soiled bodies. Their work with dysentery and cholera victims, particularly in the coolie camps, also put them at considerable personal risk.¹³⁹ The skill acquired by some of the medical orderlies was remarkable. Private Gordon Vaughan, with no previous medical experience at all, regularly gave anaesthetics and performed a variety of minor operations. He also invented an inflatable retaining device for ileostomy tubes. Markowitz, with whom he worked closely, wrote that "he was as valuable as a house surgeon".¹⁴⁰ In a retrospective account of his experiences on the railway, the Scottish ex-Far East POW Tom McGowran wrote "these individuals deserve our admiration and deepest respect ... where are these men now? I do not recall seeing their names in the lists of honours".¹⁴¹ Unsung heroes they may have been, but the medical orderlies were certainly appreciated by their patients, and also the doctors who worked with them.

Another important support group for the men were the army chaplains. All camps, no matter how primitive, had a hut or tent "church", and services were held regularly (see for example the plan of Lower Sonkrai Camp, Figure 9 of Chapter 2). The POW padres played a major part in the pastoral care and general support of the men, in addition to their standard religious duties. The two padres at Sonkrai, Noel Duckworth and Foster Haigh, were often to be found working on the cholera victim funeral pyres, as well as visiting the sick and giving the last rights. Padre Duckworth became a legendary figure on the railway, he was a short and energetic man with a disdain for officers which endeared him to the men (amongst whom he became

known as the “Mighty Atom”)¹⁴² He was an ex-Cambridge and Olympic rowing cox, and a gifted lecturer and entertainer. The padres all visited the camp hospitals on a daily basis, and complemented the work of the doctors and orderlies by their compassion and support. The medical orderly Idris Barwick commented that “ these tireless men were a constant source of comfort and hope”.¹⁴³

An unusual aspect of Burma Railway POW medicine was that it brought together large numbers of doctors from widely differing cultures and nationalities. British, Australian and Dutch medical officers frequently worked closely with one another, particularly in the base hospitals. They seemed to get on remarkably well, joined in a difficult but important task, and sharing similar basic medical training.¹⁴⁴ The Australian POW Rohan Rivett expressed great respect for the British pathologist Major Marsden,¹⁴⁵ and Australian doctors such as Moon and Dunlop were greatly admired by the British POWs.¹⁴⁶ There were also examples of close friendships and mutual respect between nationalities – examples include Toosey and Moon at Tamarkan, and Chalker and Dunlop at Chungkai.

The Australian historian Rosalind Hearder has explored the differences, rather than similarities, between Australian and British medical officers, particularly with regard to their relationships with patients and other ranks.¹⁴⁷ She regarded the British doctors as formal and rank conscious, compared with their more friendly and adaptable Australian counterparts (who sometimes called their patients by their first names). Such differences undoubtedly existed, but whether the Australian approach was more advantageous (as Hearder suggests) is open to question. These variations in approach to the unique conditions of the Thai–Burma Railway extend beyond medical scenarios, and perhaps represent national and military cultural differences. The answer may be that there was no right or wrong way to adapt to railway POW

conditions. For the British it was a strict maintenance of discipline and command, and for the Australians it was a more adaptable and informal approach. The important point, as mentioned previously, was that doctors from both countries worked together with effectiveness and respect. Padre Noel Duckworth described this in more general terms as “the coming close together in friendship and mutual understanding between the men of the United Kingdom and the men of Australia”. Duckworth called this “the one cheering result of this dismal epoch of our lives”.¹⁴⁸

Perhaps the most interesting demonstration of how the railway doctors interacted positively with each other was their organised meetings to discuss problem issues and patients. At some base hospitals, “Courts of Enquiry” were held to investigate untoward medical events. Thus, at Nakom Paton, such a court met on 17 July 1944 to investigate side effects of spinal anaesthesia, and on 5 January 1945 to discuss the cause of an unexpected death.¹⁴⁹ There were also regular “Grand Rounds” meetings – a time-honoured medical practice where cases are presented and discussed, for both educational and patient benefit. At Nakom Paton these meetings were well structured and evolved into what became known as the *Nakom Paton Medical Society*.¹⁵⁰ Detailed minutes were kept, some of which are shown below:

13 Sept 1944 Captain Donaldson showed a patient with a mitral diastolic and systolic murmur. The patient had a history of severe pain in the leg, especially in the calf and hamstrings, and later shock with an area of pain and tenderness in the left chest, where crepitations appeared. Captain Donaldson was of the opinion that this was a case of coronary infarct. Captain McConnachie thought that it was a case of pulmonary embolus. Lt Col Dunlop said it was a case of mitral stenosis with emboli i.e. infective endocarditis, with an embolus in the leg and in the chest ie paradoxical embolus.

Captain Markowitz thought that there was a pulmonary embolus. Major Fisher said that it was surprising that the heart sounds were missed earlier on, that the patient had a mitral stenosis of chronic rheumatic origin, probably with super..... infection. There was a

20 Sept 1944 Lt Col Dunlop showed a man with multiple serpiginous ulcers starting as indurated nodules under the skin and healing with tissue-paper scars. There was no history of VD. He had some enlarged lymph glands in the inguinal region and in the posterior triangle of the neck. It did not resemble tropical phagaedema but it almost exactly resembled syphilis. Three weeks of potassium iodide and injections of M&B had cleared the lesions almost completely.

Lt Col Larsen thought that in the absence of a history or signs of VD, yaws must be considered, though the skin lesions would not have been so marked. Tuberculosis of the skin and leprosy (where scars are anaesthetic) must be remembered.

Further extracts from these remarkable records are included in Appendix 1. They reflect the team efforts of a multinational group of doctors, using time-honoured systems of medical practice, to support their own efforts and provide the best possible patient care.

Smuggling and supply

The supply of drugs and food was a continuous problem in all railway camps. The Japanese practice of “health follows will” and “no work no food”,¹⁵¹ put a great strain on camp food rations for all personnel. Most of the POW forces leaving Changi in 1942-43 took up to three months of estimated medical supplies with them (causing some depletion of medical stores at Roberts Hospital),¹⁵² but the health problems soon encountered in Burma and Thailand rapidly depleted these supplies. Red Cross parcels – both of food and medicines – were rarely made available to POWs until late 1944 and 1945, and medicine and equipment from the Japanese was scarce and erratic.

The dual shortages of food and medicine had an adverse effect on camp mortality from early days on the railway. However, help came from an unusual source – a covert smuggling operation known as the “V Scheme” or the “V

Organisation". The contact was first made at Banpong in September 1942, when Lance Corporal RG Payton of Nong Pladuk Camp was on a ration detail. A Chinese civilian passed a note to him, and back at camp he handed this to his CO, Major RS Sykes. The note said that some civilian internees at Bangkok had heard of the difficult conditions in the POW camps, and wanted to know if they could help. "Paddy" Sykes was put in a difficult position, as this could have been a deliberate plant by the Kempeitai. After consulting with fellow officers, he decided the risk was worth it and wrote a reply giving full details of conditions in Nong Pladuk and elsewhere, and what supplies were urgently needed. Sykes' reply was passed to the Chinese contact in Banpong at the next visit for rations, and the link was made with the V Organisation. Monthly packages were soon being delivered, including in particular 250 to 400 ticals each time, and precious supplies of emetine.¹⁵³ Links were subsequently made with other camps further up the line including Toosey and Moon at Tamarkan, and even with some of the up-country camps.¹⁵⁴

The key instigator of the V Scheme was Mr KG (Ken) Gairdner of the Siam Architects Imports Company, aided by Mr EP (Peter) Heath of the Borneo Company. Both were interned at Vejiravudh College in Bangkok, but Gairdner was married to a Thai citizen (Milly Gairdner) who could move freely, and was instrumental in many POW camp contacts. Heath and Gairdner later split, as Heath wanted to expand the operation more than Gairdner felt wise. With his friend RD Hempson (of the Anglo-Siam Company), Heath pushed the supply operation far up the line. Unfortunately, both groups used the name "V" which has led to some historical confusion.¹⁵⁵ Both the systems used a number of courageous local Chinese and Thais who were particularly involved with deliveries and message collection. The best known of these was Nai Boon Pong, a Kanchanaburi trader. Boon Pong in fact made initial contact

with Chungkai quite separately from either V scheme. Corporal RC Johnson (a POW in Chungkai) recognised him as a former employee of the Anglo-Siam Company in Bangkok (Johnson was of mixed English and Thai origin). They discussed medical problems in the camp, and Boon Pong obtained drugs from a Chinese doctor he knew in Bangkok, and delivered them to Johnson. As demand grew, Boon Pong made contact with Heath and Hempson, and his store in Kanchanaburi became a staging post to supply the up-river camps.¹⁵⁶ Boon Pong was a major player in the V Scheme; his trading barges legitimately travelled on the river, selling food to local people and to POWs, but he was also secretly supplying money and medicine to the camps, and taking cheques to be cashed in Bangkok.¹⁵⁷ He understandably became a hero to many POWs, particularly as the other links in the V chain were mostly unseen. Many of the ordinary ranks of POWs came to know Boon Pong. At Chungkai, Private CHG Kinahon recalled Boon Pong cashing a £50 cheque for him, and as well as providing money and drugs. Batteries and spares were also supplied to keep the network of secret radios going.¹⁵⁸

Detailed records and reports of the V Scheme were compiled post-war by Philip Toosey¹⁵⁹ and Ewart Escritt¹⁶⁰ (an officer at Nong Pladuk when the first V contact was made). Letters to and from V frequently used a variety of code-names; for example “M”, “G”, “Menang”, “Leander”, “Pop” and “Three Flowers”.¹⁶¹ Contact between Gairdner and his wife, Heath and Hempson also involved pseudonyms which were often more colourful – frequently involving confectionery, for example “Dear Acid Drop” or “Dear Liquorice Allsort”!¹⁶²

An extract from a letter to V from an up-country camp (the names of the camps were rarely mentioned in such letters) is as follows:¹⁶³

7/4/43

Dear V,

We are most grateful for the money which has enabled us to buy medical stores, tinned and dried meat etc which was very urgently required – and presumably will continue to be so. You can rely on our utmost discretion. Regarding that, the fewer letters the better – this should be the last except for something exceptional.

We are frequently changing camps and neighbouring units rations are poor, although they have improved recently – they differ much in different camps – those at the end of the line suffering most.

A tremendous lot of malaria has caused anaemia, debility and prolonged illness. The incidence of dysentery is very high. There are a lot of vitamin deficiencies – the whole of the B complex, and under nourishment due to lack of proteins and no resistance to infection – we are most of us near the borderline. Accommodation is very bad. In spite of all this – needless to say, our spirits remain high. We cannot thank you enough – your kindness has made a tremendous difference.

M & J

At Tamarkan, Toosey was briefer and to the point in his first letter to V:¹⁶⁴

No 1 POW Camp
Tamarkan

11 June 1943

There are 1730 sick men in this camp; 29 died during the last month. We have no money and the men do not receive pay. We are urgently in need of money for food and medicines. The amount of money required by this camp is Tcs 4,000 per month. We should be very grateful for any help. This camp has no connection with Chungkai Hospital Camp.

PH Toosey
Lt Col commanding No 1 POW camp

V (probably Heath) replied on 30 June 1943 by a letter smuggled into Tamarkan, promising help. He advised Toosey to adopt a “nom-de-plume”, and asked for continued information on deaths and sickness. Heath and Hempson later described the Tamarkan links as “probably the most successful contact”.¹⁶⁵

As well as supplying money and medicines, the V organisers actively sought information on camp conditions, and managed to pass this information on to external bodies including the Swiss Embassy in Bangkok, the Swiss Red Cross, the British Red Cross, and even the Vatican.¹⁶⁶ For the POWs however, these activities were largely unknown, and it was the supply of money and medicines which was most important. Many letters to V express such gratitude – for example, “we are infinitely grateful” and “you are saving many lives”.¹⁶⁷ An example of the packages of medicines smuggled into the camps regularly is shown in Table 8. (this was a single consignment received in 1943, though there were many others). The drugs and equipment were probably separated into small parcels to reduce their size and to aid movement into the camp. The full itinerary was returned to V with the footnote “Received the above with thanks. Leander”. Leander was Capt RC Johnson RAMC, of medical staff at Chungkai. Further examples of V letters and drug supply lists are shown in Appendix 2. The contribution of the V Scheme to POW survival was incalculable. That their activities escaped Japanese detection was also remarkable, and reflects the high level of security practised by Heath, Hempson and Gairdner. The fact that there were effectively two V organisations was almost entirely unknown to the POW Camp officers. Indeed, after they had gone their own ways, Gairdner did not know of Heath’s own extensive network until after capitulation. Ewart Escritt, who dealt frequently with Heath and Boon Pong, was convinced that the organisation was linked to British Intelligence, and he was also

largely unaware of Gairdner's own contribution. This in no way reflects naivety on

Table 8. Parcels of medicines received at Chungkai Camp in one consignment from the V Organisation.¹⁶⁷

Parcel No. 1	Parcel No. 5
2 lb cotton wool	11 bottles iodine
28 x 4" bandages	2 bottles castor oil
12 x 2½" bandages	31 x 2½" bandages
24 x 2" bandages	12 x 2" bandages
3 x 3" bandages	3 pkts boric lint
	1 x 4" bandage
Parcel No. 2	1 x 3" bandage
3½ lb cotton wool	1 x 3½" bandage
8 oz lint	Parcel No. 6
12 oz boric lint	2 lb cotton wool
1 lb Vaseline	14 x 3½" bandages
1 lb pot permanganate	1 pkt cotton wool
Parcel No. 3	1 bottle Blaud pills
2 bottles Sanitas	10 foot roll of lint
1 bottle castor oil	1 bottle iodine
1 bottle Lysol	Parcel No. 7
Parcel No. 4	6 bottles Lysol
2 bottles iodine	1 pkt lint
3 bottles Sanitas	5 bottles Blaud pills
	1 bottle pot permanganate

Note: The consignment included 5 other parcels, which included chloroform, novocaine, quinine, morphine and M & B

Escritt's part, rather it demonstrates the level of secrecy which was a major part of the success of the V scheme.¹⁶⁸ All the key players in the organisation received OBEs or MBEs from the British government after the war. What Britain did not do, however, was to honour the many cheques cashed by Boon Pong and others. It has been estimated that around £20,000 had been raised by the V Organisation either directly or

through cashed cheques. The debt was eventually repaid by the International Red Cross, with a contribution from the Australian government.

As a final comment on the V schemes, a quote from Lt Col Knights (the original contact by V) demonstrates how the system supported the work of POW doctors, and helped them alleviate suffering and save lives:

I do not think it has been sufficiently realised what a wonderful job of work this organisation did. It was instrumental in saving, at least, hundreds of lives, for without this assistance the devoted and outstanding efforts of the Allied doctors to successfully cope with the colossal problems which they had to face, would have been, to a great extent, in vain.¹⁶⁹

Conclusions

Survival on the Thai-Burma Railway depended on many factors – luck and location particularly. Most POWs also developed a system of “mates” – a friend to help you to the latrines when you had dysentery, and get you food when you were sick and on half rations.¹⁷⁰ Sheer bloody-mindedness helped also – the ability not to give up at any cost. At one camp two men were seriously ill with bacillary dysentery, and thinking that both were too delirious to hear or understand him, the attending doctor discussed with the medical orderly who should get M & B – there was not enough for both of them. In the end the man they chose to treat died anyway, and the POW who did not receive treatment survived. In fact, he had heard the conversation, and after recovery approached the MO and said, “Major you’re a bastard, when I heard what you said, I thought - fuck you, I’ll survive!” The doctor involved did not pull rank, and took the comment without rebuke or reprisal.¹⁷¹ Though the story may in part be humorous, it reflects real ethical dilemmas faced continually by the medical officers. With limited drugs, it regularly had to be decided who did or did not get treatment. Emetine for amoebic dysentery was a common example, and required

doctors to decide who may benefit and who may not – always a difficult and often impossible task.¹⁷²

This chapter has also examined the importance of command systems, and personal and professional relationships in aiding the efficiency and effectiveness of medical treatment. The army command structure helped greatly to maintain hospital and medical systems in these difficult circumstances, and the careful and appropriate involvement of good camp commanders (notably Toosey) in medical matters was crucial. The medical historian Mark Harrison calls this the “culture of command”, and quotes General Slim of the Burma Campaign, who dryly remarked that, “Good doctors are no good without good discipline. More than half the battle against disease is fought not by doctors but by regimental officers”.¹⁷³ Personal liaisons, leisure and educational activities also played a huge part in maintaining morale, and a positive forward attitude. All the base hospitals had programmes of games and recreation for their patients. Camp organisations included the “University of Chungkai”, and even the bizarre “Nong Pladuk Cycle Club”!¹⁷⁴ Albert Coates records learning differential calculus from a patient who was an engineer, as well as attending classes on English poetry and astronomy.¹⁷⁵

Arguably, however, it was the systems of medical invention and ingenuity which contributed most to survival. The system depended on doctors defining a need, and then the civilian experts in the camp solving the problem. In the early days of Nakom Paton Hospital Camp “carpenters, metal workers and artisans of all kinds ... began to produce a range of highly effective artefacts and equipment for hospital and general camp purposes”.¹⁷⁶ Coates devoted an entire appendix of his biography to “Improvisation and Invention”, paying tribute to the work of the skilled artisans, craftsmen, and scientists who contributed so much – “the chemist van Boxtel,

Cambridge scientist Chapman, Dutch botanist Kostermans ... and mechanic Dixon".¹⁷⁷ Many of these conscripted experts were of the lowest ranks, and it was to the credit of the camp commanders that they were given elevated status in the interests of the sick. Chapman, for example, was simply "Private GW Chapman", but he held an MA and PhD from Cambridge University, and at Nakom Paton was made the "Camp Scientist" with his own department and staff.¹⁷⁸

The importance of the Citizen's Army in managing disease on the Thai/Burma Railway cannot be over-emphasised. The diversity of skills was remarkable. Steve Cairns recalls that soon after joining up in 1939 he was sent to a training camp at Arrowe Park on the Wirral, prior to sailing for Singapore. "There was everyone from Earl's sons to doctors not finished their university courses, solicitors, bricklayers; you name it, they were all together".¹⁷⁹ Or, as Jack Chalker put it, "you put a geneticist and a pharmacist and a tinsmith, all those people together, and you've begun to move a bit of a mountain".¹⁸⁰

- 1 Major TM Pemberton. Various contemporary records. Imperial War Museum, Department of Documents (IWM) IWM P437
- 2 *Ibid*
- 3 E Holden. IWM 94/4/1, p 11; and AE Coates. Clinical lessons from prisoners of war hospitals in the Far East (Burma-Siam). *Medical Journal of Australia (Med J Aust)*; 1 June 1946, pp 752-759
- 4 S Pavillard. *Bamboo Doctor*. (London, 1960), pp 143-144
- 5 *Ibid*, p 144.
- 6 A Goodman. *The Will to Survive*. (Kent, 2002), pp 65-66
- 7 CR Boyton. IWM 97/6/1. Retrospective account, handwritten in the early 1950s by a POW from the Indian Army.
- 8 RD Rivett. *Behind Bamboo. An inside story of the Japanese prison camps*. (London, 1946), p 298
- 9 The "holding down" of men undergoing curettage of tropical ulcers is described by S Dawson, a journalist who served in the ranks of the 18th Field Division (IWM 95/9/1). He added. "the memory of it makes one want to vomit as did the odour of putrefying flesh which marked the ulcer wards of camps down-country."

- 10 J Chalker. *Burma Railway Artist. The war drawings of Jack Chalker.* (London, 1994), p 95
- 11 *Ibid*, opposite p 65
- 12 S Dawson, p 190. See also an account of “maggot therapy” by C Lyons, an RAMC doctor at various railway camps (IWM 10752/3, p 24)
- 13 Stanley Pavillard “did not approve of it ... the sight of a bubbling mass of big fat maggots crawling in and out of even the strongest-minded POW’s ulcer would be enough to send him round the bend”. See : Pavillard, p 143
- 14 See website *Maggots in Wartime* (www.larvae.com/letters/)
- 15 ES Benford. IWM 86/35/1. See also : L Toseland. *Line of Lost Lives.* (Northants, 1988), p 92; R Braddon. *The Naked Island.* (New York, 1953), p 212; and L Rawlings. *And The Dawn Came Up Like Thunder.* (Herts, 1972). p 75
- 16 L Toseland. Telephone interview with G Gill, 1 March 1998
- 17 R Laird. Telephone interview with G Gill, 12 March 1998
- 18 D Warwick & J Warwick. The Doctor Fish – a cure for psoriasis? *Lancet* 1989; 2: 1093-1094; and L Under, MA Akpınar & A Yanikoglu. Doctor Fish and psoriasis. *Lancet* 1990; 1: 470-471. See also: *The Guardian*, 10 April 2007
- 19 Capt RBC Welsh. Diary. IWM 66/225/1, p 251.
- 20 EE Dunlop. Clinical lessons from prisoner of war hospitals in the Far East *Med J Aust*; 1 June 1946, pp 761-766
- 21 Miscellaneous Reports (Nakom Paton). UK National Archives (NA) WO 222/1389. This large archive contains medical drawings by Jack Chalker (pages not numbered)
- 22 Dunlop (1946); and Chalker. p 105
- 23 G Smith. *War Memories. A medical student in Malaya and Thailand.* (Eastbourne, 2008), p 121
- 24 J Markowitz. A series of over 100 amputations of the thigh for tropical ulcer. *Journal of the Royal Army Medical Corps (J Roy Army Med Corps)* 1946; 86: 159-170
- 25 Misc Reports (Nakom Paton). NA WO 222/1389. This previously cited archive contains many drawings of various types of artificial limbs. Though unsigned, the sketches are probably by Jack Chalker
- 26 *Ibid*
- 27 Coates; and LRS MacFarlane. *Unusual aspects and therapy in amoebic dysentery.* IWM P152, p 12. This is a typewritten (immediately post-war) report presented as an MD thesis. Handwritten contemporary preparatory documents are at the Wellcome History of Medicine (HOM) Library, RAMC 122.
- 28 Coates. p 754
- 29 *Ibid*
- 30 G Smith. p 122; and JG Smith. *War Memories.* IWM 04/17/1, p 60
- 31 Dunlop (1946). p 763

- 32 *Ibid*
- 33 Coates (1946). p 754
- 34 MacFarlane. pp 18-19
- 35 Quarterly Reports Feb-April 1945. Tamuang Camp. Wellcome HOM Library. RAMC 496 (pages not numbered).
- 36 A Coates & N Rosenthal. *The Albert Coates Story. The will that found the way.* (Melbourne, 1977), pp 103-104
- 37 AE Coates. Surgery in Japanese prisoner camps. *Australian and New Zealand Journal of Surgery (ANZJS)* 1946; 15: 147-158. See also: EE Dunlop. Surgical treatment of dysenteric lesions of the bowel among allied prisoners of war in Burma and Thailand. *Brit Med J* 1946; 1: 124-127; and: Medical Report on the Ubon Camp, Thailand. Wellcome HOM Library, RAMC 1900 (File 5)
- 38 Chalker (1944). p 70
- 39 Dunlop (1946). p 764
- 40 MacFarlane. p 20
- 41 *Ibid.* This thesis was also published in the *Journal of the Royal Army Medical Corps (J Roy Army Med Corps)* 1947; 89: 233-254 (part 1) and 255-273 (part 2)
- 42 DM Dunlop, SP Davison & JW McNee. *Textbook of Medical Treatment.* (Edinburgh, 1946), pp 214-216
- 43 Coates 1946) *ANZJS*, p53
- 44 Lt Col HS Flower. Diary. IWM 86/98/1. p 31
- 45 Philip Toosey. Oral history interview transcript. Imperial War Museum Sound Archive (IWM-SA) 12749/52/25 (recorded 1975)
- 46 *Ibid*
- 47 H Howarth. *Where Fate Leads.* (Bolton, 1983). p 216
- 48 L Toseland. *River Kwai Yasumee Nai!* (Northamptonshire, 1994). pp 142-143
- 49 GP Adams. *No Time for Geishas.* (London, 1974). pp 124-125
- 50 EE Dunlop. *The War Diaries of Weary Dunlop.* (Hertfordshire, 1981). p 237
- 51 Toseland. p 143
- 52 J Summers. *The Colonel of Tamarkan. Philip Toosey and the Bridge over the River Kwai.* (London, 2005). p 157
- 53 N Courtney-Lendon. *Disease among prisoners of war.* Wellcome HOM Library. RAMC 1042, p 36
- 54 Summers. p 237; see also : Howarth, p 235; and Courtney-Lendon, p 36

- 55 EW Markham. IWM 86./35/1. p 99. A retrospective account, written in the 1950s of experiences mostly at Tarso Camp
- 56 MV Roberts. The plague in Framlingham 1910/11. *Journal of the Framlingham and District Local History and Preservation Society (JFLHPS)* 2000; 210: 13-16
- 57 J Black & D Black. Plague in East Suffolk 1906-1918. *JFLHPS* 2000; 10: 7-12
- 58 DC Chavasse, RP Shier, OA Murphy *et al.* Impact of control on childhood diarrhoea in Pakistan: community-controlled trial. *Lancet* 1999; 353: 22-25
- 59 Lt Col C Wilkinson. Diary. IWM 81/7/1. See also: D Selby. Liddle Collection, University of Leeds. POW 3. Selby recalled that during cholera epidemics "although starved and hungry, if a fly settled on your rice ... the food was discarded"
- 60 Lt Col TH Newey. Diary. IWM 85/50/1. p 10
- 61 This story is told by Dr FE deW Cayley RAMC, in a retrospective account written in the 1960s. IWM 98/19/1
- 62 S Gimson. IWM 66/328/1
- 63 Pavillard. p 133
- 64 Smith. p 120
- 65 *Ibid.* p 119
- 66 Dunlop. p 762
- 67 HE de Wardener. Cholera epidemic among prisoners of war in Siam. *Lancet* 1946; 1: 637-640; and HE de Wardener. Diary. IWM 67/202/1. See also: British File. NA WO 222/1390.
- 68 J Stitt. Interview 17 October 1980. IWM-SA 4771 (Reel 4)
- 69 C Bailey. Interview 16 June 1980. IWM-SA 4647/12 (Reel 5). p 38 of transcript
- 70 Capt P McArthur. Diary. IWM 66/218/1, p 162
- 71 EE Dunlop. *The War Diaries of Weary Dunlop*. (Hertfordshire, 1987). p 201
- 72 Dr I MacDonald. Prisoner of war recollections. National Army Museum Archives (NAM) 9407-204. A retrospective account (pages not numbered) dated 1988 of this RAMC Major.
- 73 Dunlop (1946). p 477
- 74 Pavillard. p 136
- 75 T Sheldon. Gerrit Bras. Holland's Dr Cholera. *British Medical Journal (BMJ)* 2008; 336: 896
- 76 J Markowitz. Experiences with cholera in a Jungle camp in Thailand. *J Roy Arm Med Corps* 1948; 86: 150-158
- 77 *Ibid.* p 156
- 78 Dunlop (1946). p 484
- 79 *Ibid.* p 167

- 80 *Ibid*
- 81 *Ibid.* p 484
- 82 IL Duncan. Makeshift medicine. Combating disease in Japanese prison camps. *Med J Aust* 1983; 1: 29-32
- 83 T Wilson. Diary. IWM 66/227/1. pp 17-18
- 84 See: Dunlop (1946), p 484; and Summers, p 155
- 85 H Payne. IWM-SA 4748 (Reel 3); Recorded 1 October 1980. See also: Major DW Gillies. IWM 84/18/1. p133. In this diary, Gillies was at Kanburi for two weeks in 1944 and “never had less than ten eggs a day”
- 86 Pavillard. p 99
- 87 JH Marsh. IWM-SA 4674. Recorded 1980
- 88 Recounted by Stanley Saddington, telephone interview with G Gill, 19 March 1998
- 89 W Brandt. Personal papers. Liverpool School of Tropical Medicine (LSTM) records
- 90 T Wilson & JA Reid. Malaria amongst prisoners of war in Siam (“F” Force). *Transactions of the Royal Society of Tropical Medicine & Hygiene (Trans Roy Soc Trop Med & Hyg)* 1949; 43: 257-272
- 91 *Ibid.* p 265
- 92 FE deW Cayley. Retrospective account. IWM 98/19/1
- 93 Wilson & Reid. p 267
- 94 *Ibid*
- 95 Capt DR MacPherson. Diary. IWM 85/50/1. p 3
- 96 R Beattie. *The Death Railway. A brief history.* (Bangkok, 2005). p52. Peter Dunston’s mortality data is held at the IWM
- 97 *Ibid*
- 98 G Daws. *Prisoners of the Japanese.* (London, 2006). p 223
- 99 Beattie. p 49
- 100 Toseland (1994), pp 83-84. See also: S Wood-Higgs IWM-SA 5267/4
- 101 The data for this table is adapted from unpublished figures researched by Rod Beattie of the Thai-Burma Railway Centre (TBRC) using multiple sources.
- 102 J Stitt. IWM-SA 4771. Recorded 1980
- 103 de Wardener. p 638. See also: H de Wardener. Interview with M Parkes, August 2007. p 16 of transcript. LSTM records. In this interview, de Wardener describes the Dutch as having “almost zero hygiene” but no cholera mortality, which he firmly ascribes to their better vaccination status
- 104 Pavillard. pp 97-98

- 105 Chalker. p 64
- 106 IL Duncan. Makeshift Medicine Combating disease in Japanese prisoner camps. *Med J Aust* 1983 (8 Jan), pp 29-32
- 107 Quarterly Report Feb-April 1945 Tamuang Camp. Wellcome HOM Library. RAMC 496
- 108 Coates (1946). *Med J Aust.* p 7
- 109 Operation lists. IWM Misc 169 (2603). This useful contemporary source includes extensive surgical and anaesthetic details from Chungkai, Takanum and Tamuan Camps, compiled by Captain G Holland RAMC.
- 110 A Goodman. *The Will to Survive.* (Kent, 2002). pp 118-120
- 111 R Hearder. *Careers in Captivity. Australian prisoners-of-war medical officers in Japanese captivity during World War II.* PhD thesis 2003, University of Melbourne. p 111
- 112 J Markowitz. Resuscitation under spinal anaesthesia without drugs. *J Roy Army Med Corps* 1946; 86: 147-149
- 113 LJ Godden. *History of the Royal Army Dental Corps.* (Aldershot, 1971). pp 144-147
- 114 Gimson (IWM 66/328/1)
- 115 The data on dental treatment at Tamarkan is included in the report of Major Arthur Moon (Senior Medical Officer at Tamarkan), and is included in the Philip Toosey archive (IWM 93/14/7).
- 116 *Ibid*
- 117 D Arkush. Dentistry in a POW camp in the Far East. *British Dental Journal* 16 Aug 1946; 128-129
- 118 *Ibid.* p 129
- 119 *Ibid*
- 120 EA Dixon. Retrospective memoir. IWM 91/35/1. p 25
- 121 Wilson & Reid
- 122 See: Smith. *War Memories.* pp 94 & 110; and Smith. IWM 04/17/1 pp 56 & 58
- 123 Brandt. p 5
- 124 Pavillard. pp 160-161
- 125 J Markowitz. Transfusion of defibrinated blood in POW camps at Chungkai and Nakom Paton, Thailand. *J Roy Army Med Corps* 1946; 86: 187-189
- 126 Smith. IWM 04/17/1. p 56
- 127 Markovitz (1946). Transfusion
- 128 Smith. p 56
- 129 LL Baynes. *The Other Side of Tenko.* (London, 1984). p 135

- 130 B Best. *Secret letters from the Railway. The remarkable record of Charles Steel – a Japanese POW.* (Barnsley, 2004). p 57; R Burton. *Railway of Hell. War captivity and forced labour at the hands of the Japanese.* (Barnsley, 2002). pp 111 & 123; and L Rawlings. *And the Dawn came up like Thunder. The circle.* (Herts, 1972). p 82
- 131 Summers. pp 133 & 183
- 132 Major FJH Nelson. *Linson POW Camp.* LSTM records
- 133 Dr EC Vardy. *Contemporary records.* IWM 67/166/1. p 246B
- 134 J Markowitz. The RAMC in Thailand. *J Roy Army Med Corps* 1946; 86: 141-146. See also : J Bradley. *Cyril Wild. The tall man who never slept.* (Sussex, 1991). p 60. Bradley records interpreters and doctors as being the most prone to Japanese beatings
- 135 Vardy. p 246B
- 136 *Ibid*
- 137 Thailand POW Camps. UK National Archives (NA). WO 222/1390 (Appendix)
- 138 T Bowden. *Changi Photographer – George Aspinall's record of captivity.* (Sydney, 2001). p 119. George Aspinall took secret photographs at Changi and on the Burma Railway. He was a member of F Force and survived Sonkrai Camp. His words of gratitude were directed to doctors of all nationalities
- 139 See : IJ Barwick. *In the Shadow of Death. The story of a medic on the Burma Railway 1942-45.* (Barnsley, 2005). Idris Barwick was a medical orderly on the railway, and in his book gives a reserved and self-effacing account of his work.
- 140 G Vaughan. Personal papers. LSTM
- 141 T McGowran. *Beyond the Bamboo Screens. Scottish prisoners of war under the Japanese.* (Fife, 1999). p 57
- 142 Barwick. pp 211-212
- 143 *Ibid.* p183
- 144 Header. pp 206-209
- 145 R Rivett. *Behind Bamboo.* (London, 1946). p 291
- 146 *Ibid.* p 287
- 147 Header. pp176-182
- 148 This quote is from “Japanese Holiday”, the transcript of a broadcast on 12 September 1945 from Singapore to London by Padre JN Duckworth and is included on the website <http://homepages.enterprise.net/wynnbr/3pagodas/index.htm>
- 149 Thailand POW Camps.
- 150 Miscellaneous Reports. (Nakom Paton). NA WO 222/1389
- 151 S Alexander. *Sweet Kwai Run Softly.* (Bristol, 1995). 140-141
- 152 DE Home. Improvised pharmaceutical work in Malaya. *The Pharmaceutical Journal* 1946; 10: 265-266

- 153 See : PN Davies. *The Man behind the Bridge. Colonel Toosey and the River Kwai*. (London, 1991). pp 124-137. Also : C Kinvig. *River Kwai Railway*. (London, 1992). pp 149-152
- 154 Lt Col AE Knights. Retrospective account (date uncertain). IWM 97/23/1
- 155 Davies. p 131. See also: S-J Flower. Peter Heath (obituary). *The Times*, 28 January 2003
- 156 Davies. p 133
- 157 Kinvig. p 152
- 158 CHG Kinahon. Retrospective account (written in 1990). IWM 90/15/1. p 13
- 159 Brigadier Sir Philip Toosey. IWM 91/14/7. This extensive archive contains a detailed report on the V Organisation, including letters, receipts and lists of drugs received.
- 160 Captain CE Escritt. Various documents. IWM 93 7/2. Escritt was a Japanese-speaker and later an Oxford academic. His archive contains various interesting items. including post-war records of his personal involvement with the V scheme.
- 161 Toosey
- 162 V Report (Appendices). British Red Cross Archive (RCA). ACC 0033 A/3. This is part of an extensive and highly useful archive of original V organisation records.
- 163 Toosey
- 164 *Ibid*
- 165 V Report and Associated Items. Original V Report File 1. RCA, ACC 0033 A/1
- 166 *Ibid*
- 167 V Report and Associated Items. Original V Report File 2. RCA, ACC 0033 A/2
- 168 Escritt. pp 6-7
- 169 Knights
- 170 WM Innes-Ker. Diary. IWM 84/45/1. p 6. This account of an F Force POW describes many aspects of Burma Railway life, including the widespread "buddy" system. Sadly one of Bill Innes-Ker's buddies died, despite his valiant support.
- 171 This story is told in an interview with John Marsh RASC. IWM SA 4674 (Reel 3). Recorded 26 August 1980. Marsh was involved with medical administrative and support services on the railway. At the end of his account of this tale, he observed "it was all a matter of will to live".
- 172 Colonel Coates records discussions between MOs on the difficult distribution of treatment for chronic dysentery – with differing opinions. See: Coates (1946). p 5
- 173 M Harrison. Medicine and the culture of command: the case of malaria control in the British Army during the world wars. *Medical History* 1996; 40: 437
- 174 Charles Steel records joining this unusual society in September 1943. It of course had no bicycles, but meetings were held up to twice weekly, with talks and quizzes relating to cycling. It was very popular, and had members from the British, Dutch and Australian camp contingents. See: Best. pp 91-92
- 175 Coates & Rosenthal. p 105

- 176 Chalker. p 105
- 177 Coates & Rosenthal. pp 182-185
- 178 GW Chapman. Report of the Camp Scientist. In: Miscellaneous Reports (Nakom Paton). NA WO 222/138
- 179 S Cairns. Interview with M Parkes 15 August 2008. p 2 of transcript. LSTM Record
- 180 J Chalker. Interview with M Parkes 2 November 2007. p 11 of transcript. LSTM Records

CHAPTER 5

AFTERMATH

**Post-war effects of the
Far-East POW experience**

Hopes for an end to the war were rising on the Thai/Burma Railway during 1945. News from secret radios and the V Organisation told of the war turning in favour of the Allies, and this was supported by increasing bombing raids on the railway, often causing considerable POW casualties. As expectations of release heightened in mid-1945, rumours circulated of a Japanese massacre of POWs as a “final solution”. In fact, when the Japanese eventually announced to POW Camp Commanders that the war was over, the transfer of power was generally orderly. Reprisals were few, and army discipline and command structure held together. The Japanese surrender was officially 15 August 1945, but news took some days to filter through to many railway camps.

Parachute drops of food and medicines soon took place, and later allied troops arrived. Suddenly there were adequate, or more than adequate supplies of food. Most POW doctors advised men not to over-eat suddenly, but to gradually increase their food intake, as it was known that “binging” after starvation or semi-starvation could cause collapse and even death. This was certainly seen amongst survivors of the German holocaust concentration camps, but only occasional cases occurred amongst Far East POWs.¹ The condition is now known as “Refeeding Syndrome” and is due to complex metabolic changes, including in particular a dramatic lowering of phosphate levels in the blood. Its rarity amongst Japanese POWs was probably because their diets had mostly improved in the last few months of the war, as well as the medical advice given to not eat too much too quickly.

Returning home

Most POW's on the railway were evacuated to Bangkok, and on to Kuala Lumpur or Singapore. Some, on the Burma side of the line were taken to Rangoon.

The journey home by sea was lengthy, as release had come suddenly and the Allies had no clear plans for arranging transport home. Delays and stopovers were frequent, but it allowed the men's nutrition to improve, as well as to slowly get used to the pleasures of hot water, beds and sheets and (in particular) a meal without rice! Most men arrived home in November 1945; Liverpool was a common port of arrival, and Idris Barwick described the welcome as "wonderful". They were greeted by crowds of local people, and the Lord Mayor read out a message from the King.²

BUCKINGHAM PALACE

The Queen and I bid you a very warm welcome home.

Through all the great trials and sufferings which you have undergone at the hands of the Japanese, you and your comrades have been constantly in our thoughts. We know from the accounts we have already received how heavy those sufferings have been. We know also that these have been endured by you with the highest courage.

We mourn with you the deaths of so many of your gallant comrades.

With all our hearts, we hope that your return from captivity will bring you and your families a full measure of happiness, which you may long enjoy together.

September 1945

George R

Barwick was one of a minority who later had "medical boards and a period at a Civilian Resettlement Camp".³ The system was a sensible one (and was adopted more vigorously by the Dutch, Australians and Americans for their own returning Far East POWs), but it was voluntary and involved a potentially prolonged spell away from friends and family shortly after return.⁴ For many of those who did attend, the experience was a positive and helpful one.⁵ Most ex-prisoners had a more variable

return - the “medical” they frequently had was relatively pointless; their condition had improved enormously on the return journey and few were willing to complain of anything as they knew this could well stop them returning to their homes. Some experiences bordered on the farcical – Steve Cairns was a “late-homer”, not getting back to Britain until well into December. Just before release, Cairns had undergone torture at the hands of the Kempeitai, and was hospitalised in Rangoon before travelling home. Despite protesting his health, he was sent to a cottage hospital in Amersham (Cairns himself came from Manchester). Set to spend Christmas in this isolated establishment, he escaped and caught a train back home. Arriving in Manchester at 3 pm on Christmas Eve, he was apprehended at the station by the Military Police, who fortunately took a lenient view and even drove him to his mother’s in time for Christmas!⁶

A major problem faced by returning Far East POWs in general, and those who had faced the horrors of the Thai-Burma Railway in particular, was that they were returning to a country which had no idea of what they had experienced. Harry Howarth recalled, after his disembarkation at Liverpool:

*The ship was enveloped in a melancholic silence. We had come home and we felt as if we didn't belong, it was a very strange feeling. The only people who understood us were ourselves, and over the years this would become more and more true. We had come back from the dead, and only the dead understand the dead.*⁷

Howarth’s sentiments were understandable. The public had little or no knowledge of what had happened in Japanese imprisonment. Information had been received in Britain concerning POW conditions from two sources - firstly reports from the V Organisation (via the Swiss Consulate and Red Cross), and secondly from first-hand reports given by 60 rescued British POWs who survived the sinking of the

Rakuyo Maru en route from Singapore to Japan in late 1944.⁸ However, only limited information was released in early 1945, and the situation was not helped by many returning POWs being advised not to talk of their experiences. Bill Reed recalled a final talk he and other released POWs received on board shortly before they docked at Liverpool. They were specifically told not to talk to the press about their experiences, and warned that if they did, they may lose their entitlement to a war pension. He emphasised that the war was now over, and “the public didn’t want to hear any more about it ... they especially don’t want to be upset by your stories”.⁹

Such repression was destined to aggravate future psychological reactions to the POW experience. Also, as early as December 1945, at least one medical voice in the correspondence columns of the *British Medical Journal* was drawing attention to the inadequacy of medical screening of returning Far East POWs. Dr FE deW Cayley (himself a former Burma Railway POW doctor) pointed out the high rates of intestinal parasitic infections amongst these men (notably amoebiasis) and in particular recommended routine microscopic examination of stool specimens.¹⁰ Such examinations were almost never done, the only relevant precautionary measure being an information leaflet given to some returning Far East POWs:

**INFORMATION LEAFLET FOR THE MEDICAL ATTENDANTS OF A
REPATRIATED PRISONER**

Some diseases, which do not normally occur in this country, are present in the countries in which you have been serving. It is essential for the protection of yourself, your family and your friends and to prevent any possible epidemics of disease in this country, that any illness from which you may suffer while you are on leave, or after your release from the Services, should receive immediate medical attention.

Notes for Medical Practitioners

The following diseases commonly occur in the Far East – Malaria, Dysentery (including Amoebic Dysentery), nutritional deficiencies, skin diseases and worm infestations.

The text of the leaflet was designed to warn POWs and their medical practitioners of the possibility of exotic tropical disease in such repatriated personnel. The purpose was not entirely philanthropic, however, as a major purpose of the exercise was to “prevent any possible epidemics of disease in this country”.¹¹

The rather haphazard system of repatriation adopted for British Far East POWs was in contrast to that adopted by other nationalities, notably the Americans. The US Surgeon General organised intensive medical screening of returning Far East POWs at various centres throughout the USA. This included full nutritional, parasitological and even psychological assessment. The results were published¹² and provided vital baseline data for future health studies. On a more simplistic, but no less vital level, the exercise provided a comprehensive list of returned POWs. The lack of even this simple information in the UK was to hamper POW-related research far into the future.

The Roehampton experience (1946-1968)

As predicted by Cayley and other doctors,¹³ many ex-POWs from the Far East soon began to suffer health problems, and the military hospital in south London, Queen Mary's Roehampton, took the lead in their care (Figure 1). Most were suffering from recurrent malarial attacks or chronic amoebic dysentery, and such were the numbers that the Ministry of Health set up a Department of Tropical Diseases under the direction of Dr JP Caplan. By 1950 this unit had 120 beds, ran a Certificate in Tropical Nursing course and took postgraduate students from the London School of Hygiene and Tropical Medicine.¹⁴

Many hundreds of Far East POWs (or FEPOWs as they increasingly came to be known) attended Roehampton over the next two decades. Initially, this was simply because of the hospital's tropical expertise, but later because of the unit's experience

and understanding of the broader problems of returned FEPOWs. The Roehampton experience with these men stretched from 1946 to 1968, during which time they



Figure 1. Queen Mary's Hospital, Roehampton in the late 1940s. This military hospital cared for large numbers of ex-Far East POWs in the early post-war years.

admitted a remarkable 4,686 FEPOWs. The experience is recorded in a 1971 report to the UK Department of Health and Social Services (DHSS) by Drs Walters, Caplan and Hayward – unfortunately not published in the public domain.¹⁵ Its fascinating content remained available only to the DHSS, and (thanks to the authors) a number of senior FEPOW leaders. A summary breakdown of the major diagnoses of the Roehampton cohort is shown in Table 1. The intestinal parasitic diseases were usually chronic amoebic dysentery (particularly in the early post-release years) and infections with *Strongyloides stercoralis*. Though not appreciated at the time (largely because it was essentially untreatable), this worm was to become the most celebrated of FEPOW medical sequelae, and will be discussed in the next section on the Liverpool FEPOW experience. Similarly, the significance of the liver disorders seen in Roehampton FEPOWs was uncertain at the time, but future virological advances were later to

reveal the true nature of these hepatic disorders as almost certainly hepatitis B-related (again, this is covered in the next section). The frequency of peptic ulcer disease was

Table 1. The Queen Mary's Roehampton FEPOW Survey, 1946-1968 (4,684 FEPOWs)¹⁵

Psychiatric syndromes	41%
Intestinal parasites	18%
Liver disease	17%
Neuropathies	14%
Peptic ulcer	11%
Tuberculosis	5%

Note: The total percentages came to more than 100%, as a number of FEPOWs had more than one medical problem.

to be confirmed in later studies, and may be relevant to the frequent dyspepsia observed on the Thai/Burma Railway (“rice tummy”).

Much of the Roehampton report deals with liver disease and nutritional neuropathic syndromes (which were clearly persisting post-release despite return to normal nutritional status). Despite the frequency of psychiatric syndromes (41%), almost no detail is given of these conditions.¹⁶ Post-traumatic stress disorder (PTSD) was not fully recognised until the early 1990s, but syndromes of “combat stress” had been known since the First World War. Mental disease certainly carried a significant stigma in the 1940s and 1950s, and psychiatric services for returning military personnel were poor. Nevertheless, the failure of the Roehampton group to even record the characteristics of the psychiatric sequelae they observed is strange.

Overall, the Roehampton experiences with FEPOWs was large and valuable.

It was however very unfortunate that their clinical data was not recorded in the peer-reviewed medical literature. This omission undoubtedly delayed for many years an appreciation by both doctors and politicians that the FEPOW experience was associated with serious long-term health effects.

The Liverpool experience (1968-1999)

The Liverpool School of Tropical Medicine had had a small involvement with FEPOW health from soon after the end of the war. This was largely due to Philip Toosey, who after release returned to his native Merseyside and resumed his business career in Liverpool. A number of ex-POWs previously under him on the railway began to approach him with problems of health, work and rehabilitation into civilian life. He started meetings of local FEPOWs at a Wirral pub, and made contact with Professor Brian Maegraith, who held the Chair of Tropical Medicine at the Liverpool School of Tropical Medicine.¹⁷ Through this link a number of ex POWs had expert tropical assessments at the School (Figure 2).



Figure 2. The Liverpool School of Tropical Medicine in the late 1960s, when significant numbers of FEPOWs began to be assessed.

Significant numbers, however, were not seen at Liverpool until 1968, at which time Queen Mary's Roehampton changed from a military to National Health Service (NHS) hospital. The FEPOWs seen in Liverpool were increasingly sent for war pension assessments, and numbers rapidly grew, peaking in the 1980s. A total of 2,152 POWs were seen over the total 32 year experience (see Table 2). During the

Table 2. Number of FEPOWs medically assessed at the Liverpool School of Tropical Medicine between 1968 and 1999 (in 4 year blocks).

Year	Number
1968-71	66
1972-75	266
1976-79	312
1980-83	459
1984-87	581
1988-91	355
1992-95	102
1996-99	9
Total	2152

peak period, the School was seeing 4 or 5 men per week, which was maximum capacity. Demand was higher than this, and other tropical and military institutions became involved. These included NHS infectious diseases units at Edinburgh and Birmingham, the London Hospital for Tropical Diseases, and several military hospitals (eg Woolwich, Ely, Haslar, Plymouth and Halton). In Liverpool the POWs were mostly admitted to the tropical beds at Sefton General Hospital, about 3 miles south-

east of the city centre, though the unit later moved to the more central Royal Liverpool University Hospital. As the numbers being seen rose in the early 1980s a more streamlined out-patient system of assessment was arranged. Many FEPOWs remember fondly being put up in the *Lord Nelson Hotel* next to Lime Street Station from a Monday to Thursday or Friday. They would have a full clinical assessment at the Tropical School, and then have other investigations and consultations during the week as necessary. In particular, three fresh stool samples were required to be delivered to the School's Diagnostic Laboratory.

The FEPOWs came from various parts of the UK, as part of what became known as a "TDI" (Tropical Disease Investigation) funded by the DHSS for war pension assessment purposes. The key FEPOW organiser and instigator of the system was Steve Cairns, who had become National Welfare Officer for the UK FEPOW Federation. He was fortunate in having a strong friend and ally at the Tropical School in Dr Dion Bell – Senior Lecturer (and later Reader) in Tropical Medicine and Honorary Consultant Physician. Bell was a gritty, pragmatic and good-humoured Yorkshireman, who was a gifted teacher and first-rate tropical clinician. He took it upon himself to take responsibility for the POW assessments, and the vast majority of the 2,152 FEPOWs seen in Liverpool were personally under the care of Dion Bell. He also gathered a group of sympathetic specialists in Liverpool, willing to give rapid expert opinion on POWs (for example in psychiatry, orthopaedics, and ear nose and throat). Most importantly, he spent up to two hours with each FEPOW at the initial interview and examination, when horrific and traumatic memories were often recounted for the first time since release.¹⁸ It was not surprising that Bell developed iconic status amongst the national FEPOW community.

As well as providing a comprehensive, expert and sympathetic service for the

FEPOWs, the Liverpool team had another remit. Unlike the Roehampton doctors, they set out to record their experience in detail in peer-reviewed medical journals. This was both for intrinsic scientific reasons, but also because the Liverpool doctors knew that published work on post-war FEPOW health would greatly help claims for pensions and compensation. The main initial findings published were based on an analysis of 602 men seen in Liverpool during the first 11 years of their experience, from 1968-1978 inclusive, and published in 1980-81.¹⁹ Later papers followed, and finally reviews of the total 1968-99 experience appeared in 2004 and 2009.²⁰ The major persisting health problems found in the main survey of 602 FEPOWs is shown in Table 3, with the conditions divided into tropical and non-tropical problems, though all were felt to be directly or indirectly associated with the FEPOW experience.

Table 3. Persisting post-war illness amongst FEPOWs – the Liverpool survey 1968-1978 (602 men)¹⁹

A. Tropical illness	
Strongyloidiasis	15%
Nutritional neuropathy	5%
Others (including recurrent malaria, chronic beriberi heart damage, unhealed tropical ulcers and intestinal amoebiasis)	3%
B. Non-tropical illness	
Anxiety/depressive disorders	35%
Ostoarthroses	33%
Chronic bronchitis*	22%
Duodenal ulcer	8%
Ear disease	5%

- Chronic bronchitis is now widely known as “COPD” (chronic obstructive pulmonary disease)

The most important health sequelae will be dealt with in detail later in this chapter – notably strongyloidiasis (infection with the nematode worm *Strongyloides stercoralis*), nutritional neuropathies, and psychiatric problems. The 3% of men with “other” tropical problems included small numbers with persisting (or recurrently breaking down) tropical ulcers, permanent heart damage due to severe cardiac beriberi, relapsing quartan malaria, and a single patient with persisting intestinal amoebiasis.²¹ Of the non-tropical diseases, the results agreed closely with the Roehampton data regarding psychiatric disease and duodenal ulceration. Interestingly, FEPOW surveys from Australia and Canada also found the intriguing increase in duodenal ulcer prevalence, the reasons for which are unknown.²² Beatings and traumatic accidents during POW life probably led to an increased risk of osteoarthritis, and blows to the head often caused rupture of the tympanic membrane (ear drum) with long-term risks of future deafness or chronic ear infection. Again, other surveys outside the UK have supported increased rates of osteoarthritis and ear disease in former FEPOWs.²³ The suggested high rate of chronic bronchitis (now known as “chronic obstructive pulmonary disease”, or COPD) in the Liverpool experience was based on uncontrolled data, and has not been supported elsewhere. Smoking rates, especially post-war, were very high amongst FEPOWs and this may have been a major causative factor.

The Liverpool survey of 1980 covered a large cohort of FEPOWs (over 600) assessed at an average period since release of 30 years. Such longstanding effects of imprisonment and privation had not been previously appreciated or recorded. The published evidence backed up many pension claims, and led the DHSS to encourage other FEPOWs to attend for tropical assessment – indeed in the early 1980s they set up a “FEPOW Unit” at their offices in Norcross (near Blackpool, Lancashire).

Major FEPOW health effects

Strongyloidiasis The worm *Strongyloides stercoralis* has no common name (eg tapeworm, hookworm, roundworm etc), but is one of the most advanced parasites of man. It has several microscopic larval stages in the soil, particularly in damp and hot areas. Larvae can penetrate the skin of humans – usually by walking barefoot or with inadequate shoes. POWs in the Thai and Burma jungles were thus at clear risk from infection. Having penetrated the skin, larvae travel through the body tissues to the lungs, then up the bronchial tree to be swallowed into the gut. Here adult worms develop, which reproduce sexually and form further larvae which are passed out in the faeces, re-entering the soil and completing the life-cycle. Unusually, the worm has an alternative cycle of “auto-infection”, whereby lower bowel larvae can penetrate the mucous membrane of the rectum or the perianal skin, re-entering the body and allowing a continuing cycle without the need for fresh re-infection from the soil.²⁴

Strongyloides infections, diagnosed by stool microscopy, were known on the railway, but rarely caused interest as the infection was not thought to be associated with significant symptoms, and anyway had no effective treatment. An outbreak was recorded at Nakom Paton Camp, believed to be due to “ground treated with human faeces”. Symptoms included a “creeping eruption with acute respiratory symptoms”.²⁵ In 1949, two simultaneous reports in the medical press drew attention to this creeping eruption as a feature of *Strongyloides* infection in FEPOWs from Roehampton.²⁶ The rash was described as a linear wheal moving under the skin of the buttocks, thighs or trunk, which was intensely itchy and was thought to represent migration of larvae. Creeping eruption was known to occur in some other worm infections, and the authors believed this to be a similar manifestation. They were also struck by the persistence of the infection up to 4 years after leaving the tropics. In fact, in the Roehampton

FEPOW Survey of 1970, they reported a patient with previously diagnosed strongyloidiasis who still had persistence of the typical rash, strongly suggesting continuing infection, in 1968 (23 years post-release).²⁷

Cases of strongyloidiasis with skin eruptions continued to be seen in Liverpool, and in 1997 the group there reported 11 cases out of 100 consecutively seen FEPOWs.²⁸ Two years later, a larger series of 88 cases amongst 602 Liverpool FEPOWs (a prevalence of 15%) was published.²⁹ These reports drew attention to the following:

- The vast majority of cases had the typical “creeping eruption” rash, which was attributed to migrating auto-infective larvae (Figure 3). The rash had often been previously reported to doctors but always misdiagnosed.
- The rash was quite distinct from previously reported “creeping eruptions”, due to non-human hookworm infections, which occur mostly on the feet, and are relatively static rather than transient. The modern term for such a rash is “larva migrans”, whereas the strongyloid rash is now known as “larva currens”.

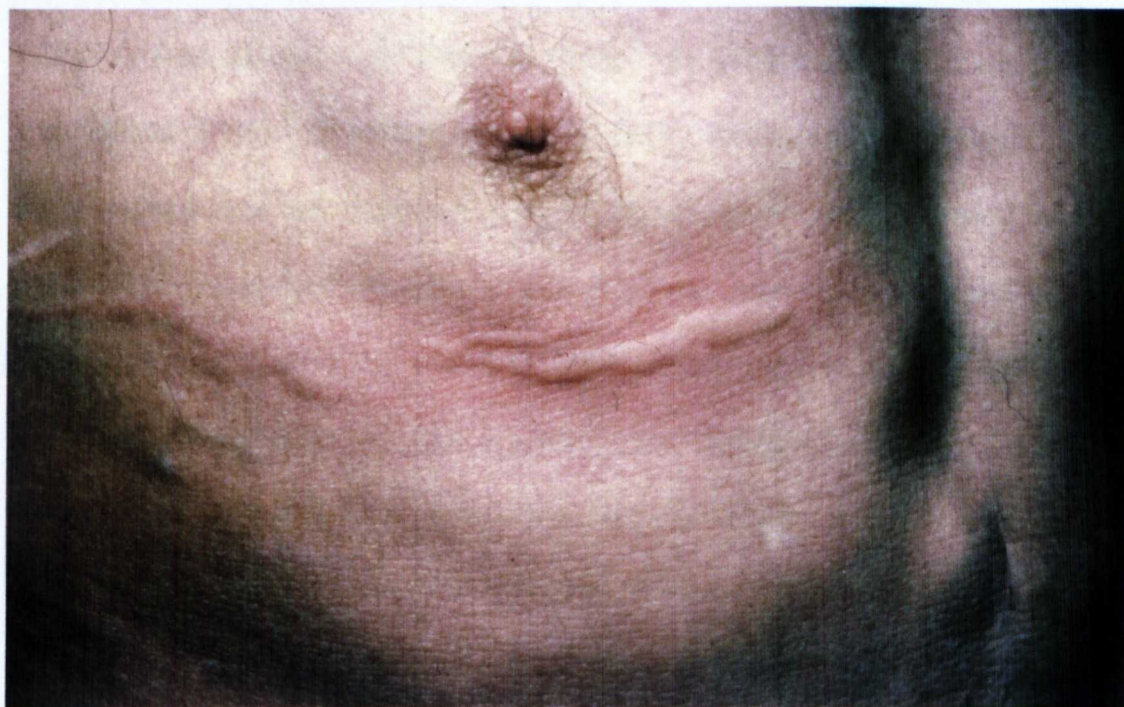


Figure 3. The “creeping eruption” or “larva currens” rash on the trunk of an ex-Far East POW diagnosed with strongyloidiasis in Liverpool over 30 years since leaving the Far East (Photograph – Liverpool School of Tropical Medicine)

- The longevity of the infection was again defined, with cases now being diagnosed well over 30 years since exposure. Such chronicity was in sharp distinction to other worm infections, and reflected the auto-infective cycle.
- As in the earlier post-war reports,³⁰ the Liverpool group confirmed that parasitological diagnosis on stool samples was often difficult, and better indicators were the typical rash and/or raised eosinophil cell counts in the blood.³¹

The Liverpool team continued their interest in this fascinating infection. Dr Wendi Bailey of the School's Diagnostic Laboratory developed in the late 1980s a new and specific serological test for the disease, which with minor modifications is still in use today.³² New anthelmintic ("anti-worm") drugs were also trialled successfully in infected FEPOWs, making final cure a reality.³³

Following the first Liverpool reports of persisting strongyloidiasis in British FEPOWs, similar research was stimulated in other parts of the world. Papers appeared in the medical literature confirming the occurrence of chronic strongyloidiasis in FEPOWs from Australia (published in 1980)³⁴, the USA (1984),³⁵ Canada (1985)³⁶ and Holland (1990).³⁷ The features were all similar to the Liverpool patients, though the prevalence rates varied depending on the place of imprisonment and local infective risks. This was particularly demonstrated in a final report from Liverpool in 2004, analysing a huge series of 248 cases of FEPOW strongyloidiasis. Nearly 80% of these cases were amongst men who had worked on the Thai-Burma Railway, which was shown to be a major risk for infection, compared with other locations of imprisonment in the Far East.³⁸ This report also documented cases occurring over 50 years after return from the tropics, probably the longest recorded chronicity of the infection.

Detection and treatment of strongyloidiasis in FEPOWs does not just cure a troublesome rash, it removes the rare but potentially fatal risk of what is known as "hyperinfection syndrome", which can occur when the patient's immunity is

suppressed – usually by steroid drugs.³⁹ In this situation, larval worms multiply and migrate widely around the body – into the liver, lungs and brain for example. This can result in collapse, shock, septicaemia and/or meningitis. Treatment is difficult and death often results. Fortunately the condition is rare, but two cases have been reported amongst FEPOWs, one from Australia⁴⁰ and one from England.⁴¹ It seems likely, however, that more undetected and undiagnosed cases may have occurred, emphasising again the importance of this ubiquitous affliction of FEPOWs.

Nutritional neuropathy Persistence of nutritional neuropathic syndromes (notably peripheral neuropathy and amblyopia) in the early post-war years was described in the Roehampton survey,⁴² where a total of 14% of FEPOWs suffered these problems. Early reports from Canadian former POWs of Hong Kong also reported neuropathy frequently present in 1947, and persisting up to a follow-up study nine years later.⁴³ Similar persistence of amblyopia (optic atrophy) was also found.⁴⁴

The numbers with symptomatic neurological damage appear to have dropped over the years, but a small group with apparent permanent disability remained. In 1982, the Liverpool group published detailed neurological assessment of a large cohort of 898 FEPOWs assessed up to 36 years after release.⁴⁵ There were 49 (5.5%) with definite symptomatic neurological syndromes persisting from imprisonment, the details of which are shown in Table 4. In addition to these symptomatic POWs, a further 38 (4.2%) showed evidence of persisting neurological damage on examination or investigation which was not symptomatic – giving a total prevalence of 9.7% for any degree of neuropathy, persisting up to 36 years post-release.

A London report in 1980 suggested a possible increased late risk of Parkinson's Disease amongst ex-FEPOWs.⁴⁶ This was not seen in the Roehampton or

Liverpool surveys, nor in a later FEPOW mortality study,⁴⁷ and the question remains

Table 4. Persisting nutritional neuropathic syndromes in 49 of 898 (5.5%) POWs assessed in Liverpool up to 36 years after release.⁴⁵

Peripheral neuropathy	24
Optic atrophy	19
Sensory deafness	13
Cord syndromes	2
Total	58 (in 49) FEPOWs

Note: In nine patients there was more than one syndrome. Cord syndromes usually involved varying degrees of leg weakness or incoordination

open. Finally, a small but intriguing joint study from Liverpool and Newcastle-upon-Tyne, suggested that nutritionally-induced neurological damage may be more severe than presenting symptoms suggest.⁴⁸ Five FEPOWs with known persisting nutritional neurological syndromes, for which they were receiving pensions, were investigated in detail in the early 1980s. Tests included brain scanning, lumbar puncture (to examine the fluid surrounding the brain and spinal cord), psychometric evaluation, and evoked potential and nerve conduction studies (tests to measure the function of the optic, auditory and peripheral nerves). As well as the known neurological deficit, a variety of previously unrecognised abnormalities were found, suggesting that past malnutrition could induce widespread sub-clinical damage to the nervous system.

These studies on British FEPOWs demonstrated a long-term persistence and clinical diversity of nutritional neurological damage not appreciated before. As with strongyloidiasis, the FEPOW “model” for study had extended medical knowledge. Unlike strongyloidiasis, however, the persisting neuropathic syndromes were not

amenable to treatment. A small but significant number of FEPOWs have had to suffer permanent “happy feet” symptoms of pain and tingling, or reduced vision due to amblyopia. Dr Stanley Pavillard, for example, suffered amblyopia as a POW and his eyes never entirely recovered. In post-war photographs of him, he almost always wore tinted glasses to protect his weakened eyes from sunlight.

Liver disease Episodes and sometimes small outbreaks of “jaundice” (probably viral hepatitis) occurred commonly on the railway.⁴⁹ The recognition that there are several hepatitis viruses (in particular hepatitis A and B) was not to come until well after the war. Jaundice and abnormal serological tests of liver function were frequently seen in the Roehampton survey, as well as some cases of established cirrhosis and even hepatoma (liver cancer). These problems were not seen in the Liverpool reports. Interestingly, an American study of US FEPOWs showed an excess mortality from cirrhosis from after the war to the mid-1950s, but not thereafter.⁵⁰

Hepatitis B is common in the tropics, and is particularly spread by blood contact (eg transfusions, surgery etc). It is also especially prone to lead to later cirrhosis and even hepatoma. It was surmised that this infection may have been common in Far East imprisonment, leading to the observed post-war liver disease. Two serological surveys in FEPOWs in the late 1980s appeared to confirm this theory – one from Australia⁵¹ and the other from Liverpool.⁵² Both showed very high markers of past hepatitis B infection (50% in the Liverpool study). The latter research compared rates both in FEPOWs, and in a control group of Burma Star Veterans – soldiers from the World War II Burma Campaign, with similar tropical wartime exposure, but not imprisonment. Rates were much lower in this group. Amongst the

FEPOWs, there was a particular risk of past hepatitis B for those who had worked on the Thai/Burma Railway.⁵³

These results suggest that hepatitis B infection was common during imprisonment, probably transmitted by blood transfusions and inadequately sterilised surgical implements. This caused a number of the cases of hepatitis seen during imprisonment, and led to post-war cirrhosis (sometimes liver cancer) and increased mortality from these conditions. The return of FEPOW liver disease mortality to normal in the mid-1950s, and the absence of liver disease as a problem seen in the Liverpool surveys, is probably because all of those at risk from potentially fatal hepatitis B complications died in the decade after the war.

Psychiatric disease An American report in 1946 found surprisingly good mental health amongst recently released US FEPOWs,⁵⁴ but significant problems appeared soon after, as shown in the Roehampton survey⁵⁵ and further American studies comparing the mental health of US FEPOWs with Korean War veterans.⁵⁶ In Australia, a mortality enquiry of released Far East POWs had also shown an excess of deaths from suicide up to 1963.⁵⁷

The Liverpool survey, showing 35% of UK FEPOWs to have significant psychiatric disturbance, has helped to define the features of the syndrome, shown in Table 5.⁵⁸ In his prolonged and empathetic interviews with British FEPOWs, Dion Bell frequently uncovered many of these features decades after release. Bell always had a box of tissues in the consulting room, as frequently men would break down as they told of recurrent nightmares of the dysentery latrines or the cholera pyres. Only their wives had previously known of these disturbing night terrors. Earlier, writing

Table 5. Features of the post-release psychiatric syndrome in ex-Far East POWs.⁵⁸

- anxiety and agitation
- depression and melancholia
- mood disturbance
- fluctuation of symptoms
- flashbacks and nightmares
- sleep disturbance
- low self-esteem
- mental retardation
- difficulty in social reintegration
- memory disturbance
- guilt at survival

in 1960, Dr Stanley Pavillard had recorded a similar effect of the POW experience:

In describing these days, I may have given an impression of callousness, as though I and the other doctors were past feeling and suffering the situation. In a sense our emotions were anaesthetised: we could not have remained sane otherwise. But then and for a long time afterwards we were liable to find memory reasserting itself at night-time, and to wake up screaming from the black depths of a nightmare: this still happens to me from time to time, and once again I see the jungle, the rain, and my friends turning liquid in a pit of flies and maggots.⁵⁹

Meanwhile, in Liverpool, Bell realised that FEPOWS with this significant and disabling psychiatric syndrome needed professional help. He forged a liaison with Dr Kamaluddin (“Kamal”) Khan, a consultant psychiatrist on the Wirral peninsula, just across the River Mersey. Khan saw hundreds of the Liverpool cohort, and provided professional sympathetic support and expert psychiatric treatment. He became a much respected supporter of the FEPOW community, and was fondly remembered by many FEPOWs who, for the first time, realised they had an illness rather than a “weakness”. Uniquely, Kamal Khan also conducted a randomised controlled trial of the psychiatric health of a large group of FEPOWs compared with a matched control group of Burma

Veterans, and presented this as a PhD thesis in 1987.⁶⁰ As well as conducting structured interviews, Khan used objective psychometric questionnaires including assessments of depression and anxiety. All these scored adversely in FEPOWs compared with Burma Veterans (the differences were also statistically significant). Post-release psychiatric problems were especially associated with physical disease, as well as especially stressful experiences during imprisonment. A further important defined feature of the syndrome was that symptoms of anxiety and/or depression after release were typically intermittent rather than constant.

By the late 1980s, the concept of “post-traumatic stress disorder” (PTSD) was being increasingly recognised and defined, and in 1992 it became an accepted diagnosis.⁶¹ The features of the FEPOW psychiatric disorder became recognised as essentially PTSD (or at least a variant of PTSD) in several studies from both the USA⁶² and Australia.⁶³ Sadly, treatment of PTSD so late after the initiating psychologically traumatic experience is difficult. Modern systems of early debriefing, counselling and cognitive therapy were mostly not available to returning FEPOWs, and psychiatric sequelae have been the commonest and most disabling long-term effect of imprisonment.

Post-war mortality patterns Most information on the effect of Far East imprisonment on future mortality risk has come from outside the UK. This is largely due to the variable demobilisation procedure for British FEPOWs referred to earlier. The lack of baseline POW lists and information made follow-up studies difficult or impossible. In 1981, two British epidemiologists, in a review of long-term health effects of wartime deprivation, observed that “currently the Department of Health and Social Security has no mechanism for identifying a veteran as a former POW”.⁶⁴

The increase in liver disease deaths in the first decade after release,⁶⁵ and in suicide deaths up to the early 1960s,⁶⁶ has already been referred to. Further information is available particularly from US surveys, where the Veteran's Administration (VA) system of healthcare allowed close tracking of ex-POWs.⁶⁷ These studies showed increased mortality from tuberculosis and accidents, and an overall increased early post-war mortality, returning to normal in the mid-1950s. In the US reports, POWs from other theatres of war were used for comparison. A Canadian report comparing FEPOW mortality with the general population up to 1954, showed a slight mortality increase due to accidents, TB and coronary heart disease.⁶⁸ A very similarly constructed Australian study, however, showed no overall increased mortality risk⁶⁹, though interestingly there was an increase in deaths due to TB, cirrhosis and accidents; offset by a significant reduction in coronary deaths. One British study traced deaths from a large FEPOW group identified from pension claims between 1952 and 1997, and compared death rates with the general population.⁷⁰ Intriguingly, an overall reduction in mortality was found, including due to causes such as coronary artery disease and malignancy.

Generally, the picture is somewhat confusing,⁷¹ and research is hampered by difficulties with ideal comparative groups, as well as what is known as the "survivor effect" – the problem that to have survived Far East imprisonment at all implies that groups followed post-war may be necessarily fitter than average. Nevertheless, some conclusions can be made from the available evidence. FEPOW mortality does appear to have been increased in the 10 years after the end of the war, the causes being TB, cirrhosis, suicide and accidents. The latter were generally traffic or alcohol-related accidents and may relate to psychiatric disturbance. After 1955, mortality risk appeared to return to non-FEPOW levels, though the two reports of a later reduction in

coronary artery disease deaths are of great interest.⁷² Could it be that three-and-a-half years of weight loss, dietary restriction and high levels of exercise may have lasting coronary benefit? The Liverpool group of researchers investigated this further by assessing coronary disease prevalence and serum lipid patterns in groups of FEPOWs and Burma Veterans, 40 years after repatriation.⁷³ The rates of coronary disease were similar in both groups, but cholesterol levels were lower in the FEPOWs. In particular, the beneficial “HDL” type of cholesterol was higher in FEPOWs compared with Burma Veterans. The FEPOW lipid profile was generally much more cardio-protective. However, the question remains open as to whether this was a direct effect of the POW experience or part of a generalised “survivor syndrome”.

Conclusions

Released FEPOWs after the war responded very variably to the POW experience. Some, like Steve Cairns and Harold Payne, instigated the formation of the National FEPOW Federation, both *To Keep Going the Spirit that Kept us Going* (their motto), and to campaign for compensation and pensions. Ex-FEPOWs such as Stanley Pavillard, Leo Rawlings and Geoffrey Adams recorded their experiences in books. Some were happy to forget the past and get on with their lives; Jack Chalker, for example, allowed Weary Dunlop to use his sketches in post-war medical papers, but otherwise concentrated on developing his career as a professional artist. He did not emerge back into the FEPOW community until well into the 1980s, when he became known as the celebrated “Burma Railway Artist”. Hugh de Wardener wrote two landmark medical papers on cholera and Wernicke’s encephalopathy, was treated for tuberculosis, and then concentrated on his medical career. He became a professor, an international expert on kidney disease, and wrote a standard textbook on the subject.

Unlike Chalker, who did eventually write on his experiences,⁷⁴ de Wardener never did. In a recent interview he said, “I don’t see the point ... there are so many books written”.⁷⁵

Attitudes to the Japanese by FEPOWs after release varied from hatred to contempt. Most avoided anything Japanese for the rest of their lives. Japanese speakers, such as Escritt and Wild were a little less negative, perhaps because they understood somewhat better the cultural background to POW treatment. A very few sort to meet their captors later, for example Geoffrey Adams (author of *No Time for Geishas* in 1973) who visited Japan and met some of his guards – to the displeasure of some of the British FEPOW community. Perhaps the best known act of reconciliation was that of Eric Lomax, who 50 years afterwards met the Kempeitai soldier who had tortured him in Thailand. For both, it was a cathartic meeting. Lomax later wrote, “If I’d never been able to put a name to the face of one of the men who had harmed me, and never discovered that behind that face there was also a damaged life, the nightmares would always have come from a past without meaning”.⁷⁶ The records of those who made this difficult journey of facing past captors remain an invaluable source.

Finally, it should not be forgotten that many FEPOWs, whilst acknowledging the general brutal inhumanity and disrespect shown by the Japanese, recognised and reported a number of individual charitable actions amongst their captors. Jack Chalker, for example, recalled a Japanese guard who took an interest in his artwork, and (at great danger to himself) found some sheets of paper for him, as well as a tin of condensed milk when he was ill with dysentery. “These little acts of kindness you never forget” he later said.⁷⁷ Philip Meninsky, in a 1980 interview, mentioned a guard who he described as a “most charming little man”. The guard spoke good English,

having previously worked in Canada and said “we all feel its terrible the way you fellows are being treated.” He later passed biscuits and cigarettes to Meninsky and his friends.⁷⁸

This chapter has dealt in some detail with the severe and prolonged syndrome of PTSD suffered by many FEPOWs. Closely related to this, but affecting almost all returning Far East prisoners, was a little discussed problem of serious difficulty in reintegrating into their family and social framework. Julie Summers’ book *Stranger in the House* examines these issues from the perspective of wives, fiancés and girlfriends.⁷⁹ Her enquiries give a powerful insight into the difficulties of family life with a husband and/or father who had been imprisoned by the Japanese. In an interview with the daughter of a FEPOW who served on the Thai-Burma Railway and in Japan, a comment was made which gave Summers the title of her book; “Dad was really a stranger in the house.....life was difficult in the extreme. Most of his life he was prone to violent outbursts. He used to suffer from terrible outbursts.... I would sometimes hear him in the night throwing furniture and smashing cups and saucers”⁸⁰

In many ways the post-war story of the Thai-Burma Railway has been as remarkable as the wartime experience itself. The diversity of health consequences is remarkable, and what began as simple early clinical observations later progressed to academic scientific enquiry on both sides of the Atlantic.⁸¹ What Colonel Marsden of the RAMC, a Burma Railway doctor, called “a large scale human experiment” in malnutrition and deprivation, was to unexpectedly continue for many decades after release.⁸² Indeed, the unravelling of the health consequences of Far East imprisonment again exemplifies the medical advantages of war. Without this experience, the extreme chronicity of *Strongyloides stercoralis* infections, the permanent neurological damage caused by malnutrition, and the seriousness and

diversity of the psychiatric aftermath, would never have been known.

The FEPOW fraternity itself also deserves acknowledgement, and in particular Steve Cairns, their National Welfare Officer. From early post-war days Cairns doggedly fought for the rights of UK FEPOWs to be tropically assessed and considered for pensions in the light of appropriate expert advice. His pragmatic northern grit and common sense, coupled with the growing medical evidence, led to the DHSS taking the FEPOWs health issue seriously. Cairns was largely responsible for some 18,000 FEPOW tropical assessments, and the eventual agreement for a £10,000 compensation payment from the UK government to all surviving FEPOWs in 1998. Steve Cairns met with Prime Ministers, shared gin and tonics with Queen Elizabeth the Queen Mother, and was deservedly awarded both the OBE and MBE.⁸³

The story of disease and medicine on the Thai-Burma Railway is one of survival against the odds. It is one of providing medical care by compromise, team work, and the innovative use of a remarkable spectrum of expertise in the surrounding ranks. The ingenious ways in which railway doctors coped with these difficulties has much to teach modern doctors and medical historians. Their meticulous record-keeping, in most difficult circumstances also provided a unique record of this natural experiment on the effect of tropical disease exposure and malnutrition on a non-indigenous community. What these doctors did not know was that medical lessons from their experiences were destined to continue for over 50 years after the war ended. The FEPOW story, both in captivity and afterwards, has relevance for returning veterans in general, and POWs in particular, from more recent conflicts. Hopefully, lessons can be learnt from this fascinating and uplifting experience.

- 1 J Black *Rather a Mixed Crowd. Military Medicine in India and south-east Asia 1944-47.* (York, 2003). p 31
- 2 IJ Barwick. *In the Shadow of Death. The story of a medic on the Burma Railway 1942-45.* (Barnsley, 2005). p 275
- 3 *Ibid*
- 4 B Shepherd. *A War of Nerves. Soldiers and psychiatrists 1914-1994.* (London, 2000). pp 320-321
- 5 *Ibid.* p 321-322
- 6 S Cairns. Interview with M Parkes, 15 February 2008. pp 16-17 of transcript. Liverpool School of Tropical Medicine (LSTM) records.
- 7 H Howarth. *Where Fate Leads.* (Bolton, 1983). p 270
- 8 Siam-Burma Railway. British statement. In : *The Prisoner of War.* January 1944. pp 6-7. United Kingdom Red Cross Archive (RCA), London. See also: J Wyatt. Liddle Collection, Leeds. POW 64. This archive includes *Hansard* extracts from 17 & 19 December 1944 in which the Secretary of State, Sir James Griggs, made a statement on POW conditions in Siam, following the return of the rescued prisoners from *Rakuyo Maru*. In the margin, Wyatt has added freehand " The government per the Red X knew of our position in Siam but kept it dark..... until forced to disclose when the rescued boys came home"
- 9 B Reed & M Peeke. *Lost Sons of the River Kwai.* (Barnsley, 2004). p 102
- 10 FE deW Cayley. Latent disease in Far East POWs. *British Medical Journal (Brit Med J)* 1945; 2: 822
- 11 DE Home. Information pamphlet. Archive of the Royal Pharmaceutical Society (ARPS). IR 1992.5
- 12 HJ Morgan, IS Wright & AV Ravensway, Health of repatriated prisoners of war from the Far East. *Journal of the American Medical Association (JAMA)* 1946; 130: 995-999
- 13 See Cayley; also : DF Moore. Diminution of vision in returned prisoners of war. *Brit Med J* 1945; 2: 400-401
- 14 B Weedon. *A History of Queen Mary's University Hospital Roehampton.* Privately published by Richmond, Twickenham and Roehampton Healthcare NHS Trust (undated, post-1996). p 26
- 15 JH Walters, JP Caplan & EW Hayward. *A FEPOW Survey.* Report to the DHSS from Queen Mary's Hospital, Roehampton. 1971
- 16 *Ibid*
- 17 J Summers. *The Colonel of Tamarkan. Philip Toosey and the Bridge on the River Kwai.* (London, 2005). p 338
- 18 N Beeching & G Gill. Dion Ralph Bell (obituary). *Brit Med J* 2005; 330: 1153
- 19 See : GV Gill. *Long-term Health Effects in Former Prisoners of War of the Japanese.* MD Thesis, University of Newcastle-upon-Tyne, 1980; GV Gill & DR Bell. Persisting tropical diseases amongst former prisoners of war of the Japanese. *Practitioner* 1980; 224: 801-803; and GV Gill & DR Bell. The health of former prisoners of war of the Japanese. *Practitioner* 1981; 225: 531-538

- 20 GV Gill, E Welch, JW Bailey, DR Bell & NJ Beeching. Chronic *Strongyloides stercoralis* infections in former British Far East prisoners of war. *Quarterly Journal of Medicine (QJM)* 2004; 97: 789-795; and : D Robson, E Welch, NJ Beeching & GV Gill. Consequences of captivity: health effects of Far East imprisonment in World War II. *QJM* 2009; 102: 87-96
- 21 Gill & Bell (1980)
- 22 The evidence for increased duodenal ulceration risk amongst FEPOWs is summarised in Robson et al.
- 23 See : Robson et al. for summarised evidence of osteoarthritis and ear disease risk in FEPOWs
- 24 LX Liu & PF Weller. Strongyloidiasis and other intestinal nematode infections. *Infectious Disease Clinics of North America* 1993; 7: 655-683
- 25 Miscellaneous Reports (Nakom Paton). UK National Archives (NA). WO 222/1389. p 3 of "Report on the Medical Aspects of Nakom Paton Base Hospital"
- 26 JP Caplan. Creeping eruption and intestinal strongyloidiasis. *Brit Med J* 1949; 1: 396; and LE Napier. *Strongyloides stercoralis* infection. Part II. Strongyloidiasis among ex-prisoners of war. *Journal of Tropical Medicine and Hygiene (J Trop Med Hyg)* 1949; 57: 46-68
- 27 Walters, Caplan & Hayward
- 28 GV Gill, DR Bell & HA Reid. Strongyloidiasis in ex-Far East prisoners of war. *Brit Med J* 1977; 1: 1007
- 29 GV Gill & DR Bell. *Strongyloides stercoralis* infection in former Far East prisoners of war. *Brit Med J* 1979; 2: 572-574
- 30 Caplan; and Napier
- 31 Gill & Bell (1979)
- 32 WA Bailey. A serological test for the diagnosis of *Strongyloides* antibodies in ex-Far East prisoners of war. *Annals of Tropical Medicine and Parasitology* 1989; 83: 241-247
- 33 LK Archibald, NJ Beeching, GV Gill, JW Bailey & DR Bell. Albendazole is effective treatment for chronic strongyloidiasis. *QJM* 1993; 86: 191-195
- 34 DI Grove. Strongyloidiasis in Allied ex-prisoners of war in South-East Asia. *Brit Med J* 1980; 1: 598-601
- 35 LL Pelletier. Chronic strongyloidiasis in World War II Far East ex-prisoners of war. *American Journal of Tropical Medicine and Hygiene* 1984; 33: 55-61
- 36 EM Proctor, JL Isaac-Renton, WB Robertson & WA Block. Strongyloidiasis in Canadian Far East War veterans. *Canadian Medical Association Journal (Can Med Assoc J)* 1985; 133: 876-878
- 37 GP Verburg & A de Geus. Strongyloidiasis in former prisoners of war and internees in Southeast Asia during World War II. *Nederland Tijdschrift Geneesk* 1990; 134: 2529-2533
- 38 Gill, Welch, Bailey, Bell & Beeching. p 792
- 39 PB Keiser & TB Nietman. *Strongyloides stercoralis* in the immunocompromised population. *Clinical Microbiological Reviews* 2004; 17: 208-217

- 40 S Kennedy, RM Campbell, JE Lawrence, GM Nichol & DM Rao. A case of severe *Strongyloides stercoralis* infection with jejunal perforation in an Australian ex-prisoner of war. *Medical Journal of Australia (Med J Aust)* 1989; 150: 92-93
- 41 JB Stewart & BJ Heaps. Fatal disseminated strongyloidiasis in an immunocompromised former war prisoner of the Japanese. *Journal of the Royal Army Medical Corps* 1985; 131: 47-49
- 42 Walters, Caplan & Hayward
- 43 JD Adamson & CM Judge. Residual disability in Hong Kong prisoners of war. *Canadian Services Medical Journal (Can Serv Med J)* 1956; 12: 837-850
- 44 PG Bell & JC O'Neill. Optic atrophy in Hong Kong prisoners of war. *Can Med Ass J* 1947; 56: 475-481; and JT Baird & D MacDonald. Survey of optic atrophy in Hong Kong prisoners of war after ten years. *Can Serv Med J* 1956; 12: 485-493
- 45 GV Gill & DR Bell. Persisting nutritional neuropathy amongst former war prisoners. *Journal of Neurology, Neurosurgery and Psychiatry* 1982; 45: 861-865
- 46 FB Gibberd & JP Simmonds. Neurological disease in ex-Far East prisoners of war. *Lancet* 1980; 2: 135-137
- 47 CR Gale, EA Braidwood, PD Winter & CN Martyn. Mortality from Parkinson's disease and other causes in men who were prisoners of war in the Far East. *Lancet* 1999; 354: 2116-2118
- 48 GS Venables, JL Welch & GV Gill. Clinical and sub-clinical nutritional damage in former war prisoners of the Japanese. *Transactions of the Royal Society of Tropical Medicine & Hygiene (Trans Roy Soc Trop Med & Hyg)* 1985; 79: 412-414
- 49 ATH Marsden. Observations by a pathologist during three-and-a-half years as a prisoner of war in Malaya and Thailand. *Med J Aust* 1946 (1 June); 766-769
- 50 RJ Keehn. Follow-up studies of World War II and Korean conflict prisoners. III Mortality to January 1, 1976. *American Journal of Epidemiology (Amer J Epidemiol)* 1980; 111: 194-211
- 51 CJ Smith, F Patterson, KJ Goulston et al. Evidence of hepatitis virus infection among Australian prisoners of war during World War II. *Med J Aust* 1987; 147: 229-230
- 52 GV Gill, DR Bell & EM Vandervelde. Horizontal transmission of hepatitis B virus among British 2nd World War soldiers in south-east Asia. *Postgraduate Medical Journal* 1991; 67: 39-41
- 53 *Ibid*
- 54 NQ Brill. Neuropsychiatric examination of military personnel recovered from Japanese prison camps. *Bulletin of the US Army Medical Department* 1946; 5: 429-438
- 55 Walters, Caplan & Hayward
- 56 GW Beese. Follow-up studies of World War II and Korean War prisoners. II Morbidity, disability and maladjustments. *Amer J Epidemiol* 1975; 101: 400-422
- 57 G Freed & PB Stringer. Comparative mortality experience 1946-1963 among former Australian prisoners of war of the Japanese. Repatriation Dept, Central Medical Research Advisory Committee, Melbourne, Australia, 1968.
- 58 Gill & Bell (1981)

- 59 S Pavillard. *Bamboo Doctor*. (Glasgow, 1960). pp 137-138
- 60 K Khan. *Psychiatric Morbidity amongst ex-Far East Prisoners of War more than Thirty Years after Repatriation*. University of Liverpool PhD Thesis (Cohen Library 8751/KHA). 1987.
- 61 JI Bisson. Post-traumatic stress disorder. *Brit Med J* 2007; 334: 789-793
- 62 JC Kluznik, N Speed, C van Valkenburg & R McGraw. Forty-year follow-up of United States prisoners of war. *American Journal of Psychiatry (Amer J Psychiat)* 1986; 143: 1443-1446; G Goldstein, W van Kammen, C Shelley, DJH Miller & DP van Kammen. Survivors of imprisonment in the Pacific theatre during World War II. *Amer J Psychiat* 1987; 144: 1210-1213; N Speed, B Egdahl, J Schwartz & R Eberley. Post traumatic stress disorder as a consequence of the POW experience. *Journal of Nervous and Mental Disorders (J Nerv Ment Dis)* 1989; 177: 147-153; and WF Page, BE Egdahl & RE Eberly. Prevalence and correlates of depressive symptoms among former prisoners of war. *J Nerv Ment Dis* 1991; 179: 670-677
- 63 C Tennant, K Goulston & O Dent. Clinical psychiatric illness in prisoners of war of the Japanese forty years after release. *Psychological Medicine* 1986; 26: 833-839
- 64 DL Patrick & PJD Heaf. *Long Term Effects of War-Related Deprivation on Health*. (London, 1981). p 21
- 65 Keehn
- 66 Freed & Stringer
- 67 BM Cohen & MZ Cooper. *A Follow-Up Study of World War II Prisoners of War*. Washington DC. Veteran's Administration Medical Monograph. US Government Printing Office, 1955. See also: MD Nefzger. Follow-up studies of World War II and Korean conflict prisoners. I Study plan and mortality findings. *Amer J Epidemiol* 1970; 91: 123-138
- 68 HJ Richardson. *Report of a study of Disabilities and Problems of Hong Kong Veterans*. Report to Canadian Pension Commission, 1964-65
- 69 Freed & Stringer
- 70 Gale et al
- 71 The mortality research discussed in this section, as well as other papers, are reviewed and discussed in more detail in Robson et al
- 72 Freed & Stringer; Gale et al
- 73 GV Gill & DR Bell. Stress and long-term coronary risk. *Lancet* 1997; 350: 1247-1248
- 74 J Chalker. *Burma Railway Artist. The war drawings of Jack Chalker*. (London, 1994)
- 75 H de Wardener. Interview with M Parkes, August 2007. p 329 of transcript. LSTM records
- 76 E Lomax. *The Railway Man*. (London, 1995). p 276
- 77 J Chalker, Interview with M Parkes, 2 November 2007, p6 of transcript. (LSTM records)
- 78 P Meninsky. Oral history interview, recorded 1980. Imperial War Museum Sound Archive (IWM -SA) 4791/5, pp 42-43 of transcript.
- 79 J Summers. *Stranger in the House. Women's stories of men returning from the 2nd World War*. (London, 2008). pp 211-239

- 80 Ibid. p 229
- 81 See: Patrick & Heaf. Also: WF Page. *The Health of Former Prisoners of War*. (Washington, 1992)
- 82 Marsden
- 83 The remarkable contributions of Steve Cairns to FEPOW welfare post-war are partially recorded in an interview with M Parkes, 15 February 2008. LSTM records.

APPENDIX 1**THE NAKOM PATON MEDICAL SOCIETY**

This appendix includes selected extracts from the minutes of meetings of the Nakom Paton Medical Society (May 1944 to August 1945). They are from the *Miscellaneous Reports, Nakom Paton* file in the United Kingdom National Archives, WO 222/1389. The text is transcribed as originally recorded, and includes a number of medical spelling inaccuracies (eg “berry berry” for beriberi, and “freins syndrome” for Froin’s Syndrome), suggesting that the minutes were taken by a medical orderly rather than one of the doctors.

The subject matter in these extracts includes amoebic dysentery, nutritional syndromes, tropical ulcer and even (unusually) psychiatric disease. The discussions and debate between the medical officers is very enlightening. On amoebic dysentery, there was a clear division of opinion between the physicians and surgeons as to the best way to treat chronic disease, the surgeons as expected promoting early ileostomy (5 September 1944). There is an impression from the minutes that many of the presentations were of high quality - “Captain Vardy was thanked for his paper”. The doctors also realised they were involved in a unique medical experience, and that “valuable contributions to medical science might well be made”.

The meetings had clear positive results. Thus, after Vardy’s presentation on vitamin supplementation for nutritional syndromes (12 July 1944), it was agreed that his treatment guidelines should be circulated to all doctors. Following presentation of a case of paraplegia on 25 October 1944, and subsequent discussions, a decision was made to operate on the patient the next day.

On a lighter note, an extraordinary meeting of the society is recorded, held on New Year’s Eve 1944. A clearly light-hearted discussion was held, largely related to Scottish issues entirely unrelated to medicine!

Clinical Meeting 5.5.1944

A case was presented by Captain Street – chronic dysentery, treated by appendectomy and lavage. This man had had 11 months dysentery, was emaciated and resisted medical treatment. Following the operation he improved and gained weight. Proctoscopic examination today revealed rectal ulcers not yet healed and moderate proctitis. By contrast, a case of chronic dysentery (Dutch) was shown illustrating the severe degree of ulceration and proctitis which resisted to medical treatment. Lt Col Coates drew attention to the fact that chronic colon disease, sequel to dysentery had been a cause of heavy mortality among POWs in the past two years, and that at present out of three thousand POWs in the camp here, 735 were dysentery, also that of 13 deaths since the camp opened, 12 had been dysentery and that as an example of dysentery cases in Group 1, 72 were light sick and 48 heavy. He (Lt Col Coates) considered that in view of the heavy incidence of the disease and the steady mortality, that some other form of treatment should be considered. He pointed out that many of the cases showed mixed infection – amoebic and bacillary, but the fact remained that men who had blood and pus in their stools for a year or two and were chronic invalids were actually suffering from ulcerative colitis, whatever the original cause. Many of them improved on good diet and lavage etc, as was evidenced by the cases recently arrived in Group 3. But on the other hand there was a residue of cases which steadily deteriorated and made their way to the cemetery. It was this residue which might be helped by diverting the faecal stream and resting the colon. The principle of rest for the inflamed organ was not new. Examples of the value of the operation were quoted from civil practice, and the case of Harmisser illustrated the life saving effects of ileostomy. This operation was to be preferred to caecostomy or appendectomy for the reason that amoebae and other anaerobic organisms inhabited

the colon in these cases, and the ileum was relatively clean. Amoebiasis and anaerobic infection of the abdominal wall was a serious matter. Two examples of this condition were cited by Lt Col Coates from his experience. The advantage of ileostomy was also illustrated in the contrast of the two cases shown. Stress was laid on the careful after treatment to ensure full function of the ileostomy, and to avoid skin infection and maceration. It was suggested that dressing with quinine or Eusol pdr might help to minimise skin infection.

Physicians would appreciate the difficulties, but now that facilities for operating are available Lt Col Coates thought that a review of the chronic dysentery problem in the light of the changed conditions was now feasible. Lt Col Larsen referred to the cases of diarrhoea of deficiency origin (Pellagra etc). He said he was encouraged by the improvement he had observed in many dysentery cases, in the first three months on the improved diet of Tamarkan camp. He pointed out that the bugbear of amoebic infection should not be over emphasised that most cases of amoebic dysentery were now mixed infections and that the failure of response to Emetine in these cases showed that there was more than the amoebic infection present. He stressed the difficulty of selecting cases for operation, because patients often relapsed with malaria or other strain and later improved. He stated that the operation was well known as a useful procedure in the DEI and that there were some cases here who would fall into the category for that treatment.

Major Fisher emphasised the fact that many of these cases got better on good food and rests. He agreed that ileostomy was the treatment for chronic ulcerative colitis. He urged delay to enable MOs to see the effect of good feeding, before submitting them for operation. He stated that ten times as much judgement was required by the physician as was technical ability in the operation by the surgeon.

Capt Vardy stated that he considered that there had been ample time already to study these long standing cases of chronic colitis, that it was not wise to allow some men to die, who might benefit from the operation, just to be sure that operation was absolutely the last resort. He urged an attack surgically on the problem now.

Major Krants congratulated Lt Col Coates on the results of the surgical cases shown at the meeting, and suggested that Col Coates should perform any operation of this kind and thus establish technique which could be developed by the other surgeons.

Captain Street stressed the necessity of having a clean caecum if appendectomy were to be done. He was surprised to find the severity of proctitis in one case, despite the clinical improvement, and he thought that ileostomy was the operation of preference.

Report of clinical meeting held in the theatre 12.7.1944

The speaker was Captain Vardy of RAMC and his subject was the use of vitamin-drugs.

Captain Vardy stated that it was not his purpose to discuss the clinical aspect of the deficiency diseases, but to indicate the manner in which he was employing the vitamin preparations received in the medical supplies which had arrived 10 days previously from the American Red Cross Society.

Dealing with the vitamin B-1 he stressed the importance of distinguishing between Berry-berry and nutritional oedema and added that a careful search for signs of a cardiac lesion would help to avoid serious wastage of vitamin B-1 preparations in cases of the latter type.

Referring to neuritic or dry berri-berri, he pointed out that many of the severe neuritic berri-berri cases in hospital were examples of severe nerve degeneration and

that massive doses of vitamin B-1 would not hasten regeneration in any way.

The third condition under the heading of vitamin B-1 deficiency was Wernicke's Encephalopathic syndrome. This has been proved to be due to vitamin B-1 deficiency and to respond to doses of 9000 units daily. Captain Vardy dealt in some detail with the clinical manifestation of the syndrome reminding MOs that it was most commonly seen as a complication of severe bacillary dysentery.

Captain Vardy then discussed vitamin B-2 deficiency or ariboflaviniosis. He quoted the work of Landor and Pallester with whom he was associated in Malaya. He showed 6 cases to demonstrate the remarkable curative effects of riboflavin in scrotal dermatitis.

A point of some importance in this disease was its rarity among dark-skinned people. Captain Vardy said that he had rarely seen it in Tamils and this had been confirmed by the rarity of the characteristic lesions in the Eurasian members of the Dutch forces.

The third preparation to be described was nicotin acid. Captain Vardy dealt briefly with the signs and symptoms of pellagra. In justifying the small doses of nicotin acid which he recommended, he stressed the fact that in this hospital we are rarely confronted with a full-blown case of pellagra and that doses of up to 500 mg or more were rarely necessary in the treatment of the cases which he had to treat.

In conclusion Captain Vardy dealt with the various preparations in detail as regards dosage and stressed again the fact that while exercising caution and economy in their use, excellent results could be obtained.

Lt Col Larsen thanked Captain Vardy for his paper and invited discussion, indicating that was proposed to deal with the clinical manifestations of the deficiency diseases in detail at a later date.

Captain van der Heyden discussed the use of nicotinic acid in nutritional oedema and of riboflavin in optic neuritis.

Regarding the former Captain Vardy said he considered the improvement to be due to the recovery of the power of protein-absorption on the gut. He declined to give any opinion on the latter.

Lt Col Coates said that Captain Vardy's discourse had filled in many gaps in his knowledge of the deficiency diseases. He spoke of the oedema of the peripheral nerve in pellagra. This he had noted in performing a nerve section for relief of the pain when no nicotinic acid was available. This oedema he said was present in the absence of oedema elsewhere. Lt Col Coates made the following recommendations which were immediately accepted.

1. That Captain Vardy's suggested use of the vitamin drugs be circulated for the guidance of the MOs.
2. That speakers at the clinical meetings have their discourses recorded in detail (in the hospital diary).
3. That discussions of subjects put before the clinical meetings be similarly recorded. Lt Col Coates stated that with the material available in the camp, valuable contributions to medical science might well be made and that these measures would ensure that such contributions would not be lost.

Captain Markowitz discussing the B-1 deficiencies spoke of the pistol shot sound heard on auscultation over the femoral artery in cardiac berri-berri. This sign, also merely indicating a low diastolic pressure and an increased pulse pressure was of some diagnostic significance.

Captain Markowitz went on to speak of the use of kaolin in commercial preparation of vitamin B-1. He maintained that the use of massive doses of kaolin in severe bacillary dysentery played at least a contributory note in the production of

berri-berri in such cases by preventing its absorption from the gut. There was no further discussion of importance and meeting closed. A copy of the doses of vitamin preparation to be found in the diary.

Report of the clinical meeting held in the theatre 2.8.1944

Lt Col Dunlop then showed several cases of the bad results of tropical ulcer which showed the importance of securing early epithelialisation by skin graft. This measure prevented extensive scarring and contraction. He emphasised the importance of using iodoform dusted over the graft to prevent retrogression. Even in cases where the graft did not take entirely, a marked improvement was obtained. Lt Col Dunlop added that where possible the only treatment of the ulcer was excision down to the deep fascia and curetache and iodoform dressing. He showed a case of severe deformity following a relatively small ulcer which healed after 13 months without surgery. Lt Col Coates complimenting Lt Col Dunlop on his results, asked for his opinion on the functional results with loss of tendon Achilles. Lt Col Dunlop suggested that fibres tissue might act in place of the tendon.

Capt Markowitz quoted a case of separate tendon for the seelus to the oscalsis seen after excision of the tendon Achilles. He suggested that this might exist in many other cases.

Capt van der Heyden (DAMC) showed cases of scrotal dermatitis treated for 2 weeks with grass extract. He said that itching and weeping stopped after two or three days treatment. He described the preparation of grass-extract. Major Hazelton said that he had heard of the grass extract which was of some value, although not dramatic. He indicated that his patients had improved recently on the existing diet. Captain McConnachie described the use of infusion of hibiscus leaves used successfully for

the treatment of scrotal dermatitis in Changi. He said that in Changi chloroform was used to preserve the extract for 3 days.

Lt Col Dunlop quoted "Readers Digest" which gave the figures for the vitamin-values of grass. These figures were very high.

Lt Poh stressed the importance of not overcooking the green vegetables with which we are provided. Captain Markowitz pointed out that the use of grass was logical as cows milk obtained its very considerable vitamin-value from grass. There was no further discussion and the meeting closed.

Report of clinical meeting 4.10.1944

Lt Col Barrett RAMC showed 4 cases of mental diseases. He gave a classification of mental diseases, and stressed the importance of distinguishing the psychoneurosis, who must not be regarded as insane, and the psychosis who are out of touch with reality and who are the truly insane patients.

Case 1 - a melancholic type, demonstrating the slowing of mental processes and the self-accusatory tendency. Patient had at one time attempted suicide.

Case 2 - a patient who had been acutely melancholic and suicidal; again with the tendency to self-accusation and a feeling of insufficiency (always blotting his copybook).

Case 3 - a case of simple mania, showing a certain degree of incoherence, with a tendency to endeavour to tell an impressive story. The patient gave a history of Wernicke's encephalopathy 2 years ago, and had responded to some degree to vitamin B-1 therapy in the past few weeks.

Case 4 - a patient showing delusions of persecution.

Lt Col Larsen asked Lt Col Barrett if he thought that a vitamin B-2 deficiency might have played a part in the etiology of the cases, especially the first 2 who had at one time attempted suicide. They discussed the progress of mental disease.

In answer to some questions by Lt Col McFarlane, Col Barrett discussed certification of insane people. He stressed the importance of ensuring that adequate grounds for certification were present e.g. suicide, homicide, etc. Captain McConnachie asked about plastic operations to conceal scars caused by attempted suicide. Col Barrett said that he thought that it was usually better to leave them and even allow the patient to fabricate some excuse for their existence.

Report of clinical meeting held on 25.10.1944

The meeting was opened by Capt van der Heyden, demonstrating a case of spastic paraplegia. The patient's symptoms began in May 1944. By July his symptoms had fully developed. He showed the signs and symptoms of spastic paraplegia from level of the 4th to the 6th thoracic segments downwards. Examination of CSF showed a yellow fluid with globulin and a cell count of 2½ per cubic mm. A careful differential diagnosis was discussed and the demonstrator concluded that the cause of the paraplegia was compression of the cord, the exact nature of which could only be found by laminectomy. Captain Markowitz asked if it was considered that freins syndrome was present. Major Marsden said that he thought it was. Major Fisher placed the lesion between the 4th and 6th thoracic vertebrae. He pointed out that pain was not a marked feature of the case, and therefore suggested an intramedullary lesion probably glioma. Lt Col Dunlop regretted loss of time before operation. Lt Col Coates in summing up expressed his belief in the possibility of an extramedullary lesion and intimated that operation was arranged for the following day.

Nakom Paton Medical Society

An extraordinary meeting of the Nakom Patom Medical Society was held on

31.12.44. All members attending. Lt Col Larsen opened proceedings giving a brief resume of the growth of the hospital from the beginning, when led to expect an equipped hospital, all that had been discovered were a few bamboo huts set down in a padi field. He paid tribute to the work of the CMO Lt Col Coates and members of the medical staff. Lt Col Coates, in reply, made a reference to an incident in the life of Mark Antony and Cleopatra, expressed his thanks to the medical staff, and wished all a Happy New Year.

Lt Col Dunlop opened a discussion on racial characteristics and customs with special reference to Scotland. Lt McPherson pointed out differences in various clans, drawing a sharp distinction between the Scots and the English. Capt Meldrum also spoke on this subject, illustrating his remarks with quotations from a poet, Mr Robert Bruce. Capt Markowitz pressed to expound on Canadians, gave an allegorical reason for his inability to do so. Lt Col Malcolm told of an incident in Persia with an unfortunate ending. Major Fisher speaking of Australia, remembered an anecdote which, it was gathered, had some reference to Capt Vardy. Capt Brauer gave anthropological experiences in New Guinea. Capt Leigh spoke of his experience in London, finishing with a lengthy account of a shipwreck in which a considerable loss of life occurred. A number of other members also spoke.

At the expiration of the allotted time, Lt Col Coates moved a vote of thanks to the Committee, Lt Col Larsen and Capt Vardy, and especially to Major Krantz, whose technical skill had helped so materially the success of the meeting.

Meeting 4.7.1945

Major Fisher read a paper on the results of blood transfusion in 66 cases of malarial anaemia and cachexia. He said that the patients returned to this camp from the jungle on June 4th and were suffering from malaria with severe anaemia, great loss

of weight and commencing deficiency disease. Owing to lack of sufficient iron and the inadequate amount of extra food available, it was decided to treat the anaemics by means of blood transfusion on a large scale. The cases selected for transfusion were those whose haemoglobin percentage was 60 or under. They were divided into 3 classes, those whose Hb was from 20 to 35%, those from 35 to 50% and those from 50 to 60%. Those of the first class received 3 or 4 transfusions, those of the 2nd class at least 2 and those of the latter class 1, and in some cases 2 transfusions.

The period of transfusion extended over 4 weeks, almost all the cases and especially those in the 1st class, showed a marked rise in Hb percentage. The majority of patients having a Hb percentage of at least 60 by the end of the 4 weeks. Those patients showing no improvement suffered with malarial relapse or some intercurrent condition, such as empyema in one case, and jaundice in another. In only 2 cases was there no apparent cause for the lack of improvement in the Hb%.

The 66 patients showed an average increase in weight over this period of over 4 kilos. No serious reactions occurred, but about one third of the cases were involved in transient reaction, mainly shivering, lasting for a short time, or a rise in temperature. Two case showed an extremely transient haemoglobinuria. Slight sepsis in the cubicle fossa occurred in 2 cases.

The value of blood transfusion therapy in the above cases was fully established.

APPENDIX 2

THE V ORGANISATION

This appendix first contains a selection of letters and receipts between V (Peter Heath) and Tamarkan and other camps on the Thai-Burma Railway (from the archives of Brigadier Phillip Toosey, Imperial War Museum 93/14/7). The letters are presented with the original layout and spelling (eg “Nakawn Pathom”). The messages demonstrate the use of pseudonyms (eg “Pop”, “Three Flowers” etc) which are sometimes confusing – for example Toosey called himself “V” for a while. Some of the letters demonstrate handover difficulties (“please arrange that this is handed over only to a man bearing our signatures”), and the extremely perilous nature of the system on both sides (“conditions are very dangerous now”). There are many expressions of extreme gratitude to the V scheme for its support, for example “we are infinitely grateful” and it is impossible to express my gratitude”.

The final part of this appendix are lists of secret supplies of drugs and medical equipment sent to Chungkai Camp on 5 June 1943, and to Tonchan Camp on 11 August 1943 (from : Appendix C to *The V Report*. UK Red Cross Archives. ACC 0033 A/3). The lists demonstrate the size and diversity of materials sent, and also that single consignments had to be split into several “parcels” to reduce their size and to help avoid detection.

Yours 30/6 received 11/7

Cash has arrived safely. We are infinitely grateful. This will save many lives.
Sick now 2,205, will shortly be 3,000. Deaths 66.
Emetine badly needed.
Thank you again.

“V” (Toosey)

26th July 1943

The present numbers are: sick men 3,109, deaths 95.
Your help is wonderful, but we still need Emetine badly. There is a man
named Cpl J Darling in this camp who has two friends called “Robert Phung
Pharkhoun” (Police Dept) and “Yimphung Phrakhoun” (Legation). Would
they help?
Thank you again

“V”

9th August 1943
Tamarkan Camp

Yours undated, reply to ours of 30/6 recd. Herewith Tcs 5,000/-.
Medicines are on their way, 8 parcels marked 1-8. Each parcel has a
list of contents. Please check and acknowledge receipt.
Once again, please do not mention this help to anyone.
Best wishes.

P.S. Please mark the outside of your notes as follows:
To “V”

9th August 1943

The figures are now: sick 3,082, deaths 123.
We are still in urgent need of money.

“V”

18th August 1943

Your letter received, also parcels 1-8 and Tcs 5,000. It is impossible now fully to express my gratitude. You are saving many lives. Numbers are now: sick 3,068, deaths 127
I enclose my Senior Medical Officer's report.
Thank you again.

“V”

Extra diet possible during past month has made big improvement. Medical supplies just received are all correct and in good condition. This supply will give untold help in solving the pressing problems of dysentery and spreading tropical ulcers. We have been using Dover's Powder and Quinine – the former with some controlling effect.

Our two urgent problems now are tropical ulcers of legs and bad cases of wet beri-beri. Several limbs may soon require amputation. The supplies of sulphanilamide and Vaseline will help tremendously.

Some vitamin B1 injections, or tablets, or yeast tablets or Marmite would help a lot.

Death rate from dysentery is lower, beri-beri higher. I expect a definite decrease in death rate during the next months. I cannot adequately express our thanks.

23rd August 1943

Yours July 26th and August 9th, received. In the meantime hope you have received our August 9th, together with enclosures.
Herewith 144 ampoules Emetine. Please acknowledge as usual.

25th August 1943
“V”, Tamarkan Camp

Yours 26/7, 9/8 and 18/8 with MOs report received. Many thanks. Herewith 216 ampoules Emetine. We hope to send further drugs including those mentioned in the MO's Report next month with the usual cash.
Are you in touch with Kanburi? What is their monthly cash requirements.
Best wishes.

1st September 1943

Yours 25/8 received, also 216 ampoules Emetine. Very many thanks.
 Kanburi has 1,000 patients, their monthly requirements about one third of ours; we are not in touch with them.
 Our figures are: sick men 2,992, deaths 149.
 Thank you again very much.

“V”

8th September 1943

“V”, Tamarkan Camp

Herewith Tcs 5,000 together with 7 parcels of medicines. Please check carefully and acknowledge as usual. Continue to let us know what you are in most urgent need of and we will try and fulfil your requests.
 Very best wishes.

16th September 1943

Figures are now: sick men 2,915, deaths 170

“V”

15th October 1943

Yours 8.9.43. received with Tcs 5,000 and parcels - and 9. Very many thanks. Figures: sick men 2,199, deaths 197. 1,000 fresh sick expected soon. We are most grateful. Thank you.

“V”

Total deaths:	197	Beri-beri	64
Amputations for ulcers	10	Bacillary dys	53
Results of operations satisfactory		Amoebic dys	16
Probably 12 more amputations		Malaria	21
Beri-beri and chronic diarrhoea		Diphtheria	4
causing most deaths at present		Leg ulcers	6
		Pellagra	2

Dysentery problem, both bacillary and amoebic well controlled.
 Many thanks

Urgent needs

Ampoules vitamin B or "Metabolin" (Takeda)
 Further supplies M & B and sulphanilamide
 Large ampoules sterile sodium citrate for blood transfusion
 Tubes of plain cat gut surgical sutures. No O and No T
 Silkworm gut surgical sutures
 Nicotinic acid or "Appelagrin" (Takeda)
 Evipan or sodium dentothal for anaesthetic
 Further supplies "Yatren" or "Stovarsol".

General camp conditions re food, water, hygiene, fairly satisfactory.
 Many thanks.

SMO

Nakawn Pathom Camp, 26 November 1944

Dear V,

Yours of 22.11.44 received.

1. I gratefully acknowledge receipt of four thousand Ticals for feeding sick in this camp.
2. My name and regiment are: Lt Col J.D. Sainter, 6/1st Punjab Regiment, Indian Army (Regular)
3. In future I shall use the nom de plume you suggest.
4. Lt Col Toosey is commanding Nong Pladuk Camp. He did expect to command at Nakawn Pathom but the Japanese nominated myself.
5. As regards the reliability of my representative I will communicate with you further. But meanwhile assure you that I have received both sums you have sent, namely total of five thousand Ticals to date.

I am sending this sealed with one seal – a bird.

"R" J.D. Sainter, Lt Col
 Commanding Nakawn Pathom Camp

"V"

I, W.B. Price, have opened the note from "Three Flowers", because I am risking my life to deliver these notes and I must know what is inside. In all future transactions I will be shown the message before it is sealed and so the seal will be unbroken. This has been arranged already with "Three Flowers" but this note had already been sealed.

Yours sincerely,

"B"

Nakawn Pathom 27/11/44

Dear

Pat wrote you several weeks ago asking could you, if possible, arrange funds for camp and ourselves. At beginning November Tcs 1,000, and later Tcs 4,000 were received here without any reference to his communication.

We rely on troops to collect from contact locally and we are NOT satisfied with behaviour and information of the man who met contact by accident. The man collected the money alright but he induced the camp commandant to pay Tcs 500 as reward for his services.

If you are responsible for money being sent then we suggest you instruct agent of yours at this town to hand money etc. over only to a man who carries our joint signatures. This will accredit the carrier and receipt can be signed by whosoever you direct independently.

We are communicating through a local friend K and TSH (late of our office). K has previously told us that as a result of Pat's chit to you, money was being arranged either for the camp or ourselves or both. If this is true please arrange that this is handed over only to a man bearing our signatures.

About a week ago we sent a list of group's names via K to KV and we are told that a copy of this was made and handed to the local contact who brought the Tcs 5,000. We are also informed (by the man who collected the money), that this contact can get money for us personally but only if we write a note certifying that the man is reliable – a bit of blackmail we are not prepared to pay!

Can you reply to this and let us know how we stand.

We are well and cheerful although both of us have chronic amoebic dysentery.

If communication is possible between us we will use the name Eddie Brown in future – suggest you use John Walker.

Yours very sincerely

Pat and Eric Non

P.S. TSH has sent us two lots of Tcs 5,000 in the last few months which we have divided.

4th January 1945

Dear Friend,

Your note received and has been shown to the person you named. The full meaning of your note is not quite clear (i.e. reference to ST ?) but I shall expect to hear from you again soon. Three Flowers will be shown any note you send in.

Your Friend,

Pop

6th January 1945

Dear C

Conditions are very dangerous now. It is not wise to send further signature or to give the name of the carrier. You should carefully note his face so that you know him by sight. He is a reliable man. My use of the name "three flowers" should satisfy V that you are in touch with the correct person. Thank you very much for your offer to get more money.

Three Flowers

PACKING AND DELIVERY OF PARCELS TO CHUNGKAI**Sent: 5.6.43.****Acknowledged 26.6.43.****PARCEL 1**

2	lb cotton wool
28	4 in bandages
12	2½ in bandages
24	2 in bandages
3	3 in bandages

PARCEL 2

3½	lb cotton wool
8	oz lint
12	oz boric lint
1	lb vaseline
1	lb potassium permanganate

PARCEL 3

1	lb bottle castor oil
1	lb bottle Lysol
2	1 lb bottles Sanitas

PARCEL 4

1	½ lb bottle iodine
1	1 lb bottle iodine
3	½ lb bottles Sanitas

PARCEL 5

11	1 oz bottles iodine
2	4 oz bottles castor oil
31	2½ in bandages
12	2 in bandages
3	4 oz packets boric lint
1	4 in bandage
1	3½ in bandage
1	3 in bandage

PARCEL 6

2 lb	cotton wool
14	3½ in bandages
1	4 oz packet cotton wool
100	Blaud pills
10	foot lint
1	4 oz bottle iodine

PARCEL 7

- 6 bottles Lysol (1 lb 12 oz)
- 1 2 oz packet lint
- 500 Blaud pills
- 1 1 oz bottle potassium permanganate

PARCEL 8

- 60 tablets quinoid
- 3 1 oz bottles potassium permanganate
- 249 tablets acetyl salicylic acid
- 60 tablets aspirin
- 20 tablets cafespin
- 165 tablets anti-kamnia
- 100 tablets escafena
- 20 tablets saridon
- 10 tablets aspirola
- 5 tablets Aspro
- 9 ampoules Novocaine
- 100 tablets vitamin B

PARCEL 9

- 2 bottles chloroform
- 7 botles atebrin
- 34 boxes Stovarsol (1020 tablets)
- 1 bottle Dover's powders (200 tablets)
- 1 bottle quinine hydro (300 tablets)
- 1 bottle quinine Plasmoguin (200 tablets)

PARCEL 10

- 1 tin Atebrin
- 2 boxes Atebrin
- 1 tin sulphanilamide (500 tablets)
- 2 boxes Emetine (24 ampoules)
- 1 box potassium bromide (1 lb)
- 3 boxes Novocaine (30 ampoules)

PARCEL 11

- 15 boxes Emetine (180 ampoules)
- 12 boxes Novocaine (120 ampoules)

PARCEL 12

20 boxes morphine (200 ampoules)
 1 4 oz bottle mercurochrome
 1 4 oz bottle Acriflavine
 1 4 oz bottle Spt. Ammon Arom
 1 1 oz bottle quinine sulphas acidus
 1 bottle sulphonamide powder
 1 bottle eye drops

PARCEL 14

9 syringes
 42 hypo needles
 6 surgical knives
 1 bottle tincture Warburg
 1 flask ethyl chloride
 300 Dovers powders

PACKING AND DELIVERY OF PARCELS TO TONCHANG

Sent: 11.8.43

Acknowledged: 26.8.43

PARCEL 1

1 1 lb packet cotton wool
 2 tins zinc ointment
 2 tins sulphur ointment
 12 oz bottle Sanitas
 200 tablets Atebrin
 60 tablets sulphonamide
 20 ampoules morphine
 30 tablets quinine
 1 big bottle bismuth carbonate
 100 Blaud pills
 12 ampoules Emetine
 6 bandages
 75 tablets quinine

PARCEL 2

14	bandages
12	ampoules quinine dihydrochloride
12	ampoules Emetine
10	ampoules morphine
1	2 oz bottle Sanitas
1	1 lb bottle potassium permanganate
1	1 lb bottle iodine
160	tablets quinine
1	4 oz packet cotton wool
1	bottle boracic powder
150	tablets Dovers powders
100	tablets Atebrin

PARCEL 3

1	tin zinc ointment
1	tin sulphur ointment
2	1 lb tin white Vaseline
12	ampoules
1	tin magnesium sulphate
100	Blaud pills
50	Atebrin tablets
12	ampoules quinine dihydrochloride

PARCEL 4

1	tin magnesium sulphate
12	ampoules Emetine
100	tablets Atebrin
100	tablets sulphanilamide
12	bandages
1	bottle magnesium sulphate
1	box boracic powder
1	bottle potassium permanganate
1	1 lb packet cotton wool

PARCEL 5

1	bottle bismuth carbonate
12	ampoules quinine dihydrochloride
10	ampoules morphine
12	ampoules Emetine
3	bandages
100	tablets Atebrin
50	tablets sulphanilamide
1	1 lb bottle potassium permanganate
1	4 oz bottle Lysol
1	tin zinc ointment
1	tin sulphur ointment

PARCEL 6

14	bandages
24	ampoules Emetine
100	tablets Atebrin
10	ampoules morphine
1	½ lb bottle Lysol
1	1 lb bottle iodine
1	1 lb packet cotton wool
200	tablets Dovers powders

PARCEL 7

2	tins zinc ointment
1	tin sulphur ointment
1	bottle bismuth carbonate
1	bandage
1	1 lb bottle Lysol
10	ampoules morphine
24	ampoules Emetine
1	½ lb bottle Sanitas
40	tablets sulphanilamide
100	tablets aspirin
50	tablets Atebrin

PARCEL 8

1	gallon disinfectant
---	---------------------

APPENDIX 3

**BIBLIOGRAPHY OF
SECONDARY SOURCES**

Below are the secondary sources cited in the thesis. They appear in the order in which they are quoted in the text.

L Rees. *Horror in the East*. (London, 2000).

C Kinvig. *River Kwai Railway*. (London, 1992)

A Warren. *Singapore. Britain's greatest defeat*. (London, 2002)

M Tsuji. *Japan's Greatest Victory, Britain's Worst Defeat*. (New York, 1993)

C Bayly & T Harper. *Forgotten Armies. The Fall of British Asia 1941-1945*. (London, 2004)

R M Horner. *Singapore Diary*. (Gloucestershire, 2006)

P Thompson. *The Battle for Singapore. The true story of the greatest catastrophe of World War II*. (London, 2006)

F Owen. *The Fall of Singapore*. (London, 1960)

N Barber. *Sinister Twilight: the fall of Singapore*. (Glasgow, 1968)

C Kinvig. *Scapegoat: General Percival of Singapore*. (London, 1996)

G K Marshall. *The Changi Diaries. Singapore 1942-45*. (Surrey, 1988)

J Black. *Rather a Mixed Crowd. Military medicine in India and south-east Asia 1944-47*. (York, 2003)

R. Hardie. *The Burma-Siam Railway. The secret diary of Dr Robert Hardie 1942-45*. (London, 1983)

SS Pavillard. *Bamboo Doctor*. (London, 1960)

JSG Blair. *Centenary History of the Royal Army Medical Corps (1898-1998)*. (Edinburgh, 1998)

M Harrison. *Medicine and Victory. British Military Medicine in the Second World War*. (Oxford, 2004)

RPW Havers. *Reassessing the Japanese Prisoner of War Experience. The Changi POW Camp, Singapore 1942-45*. (London, 2003)

D Nelson. *The Story of Changi, Singapore*. (Perth, 1973)

T Kitching. *Life and Death in Changi*. (Perth, Scotland, 1993)

P. Towle, M. Kosuge & Y. Kibata (Eds). *Japanese Prisoners of War*. (London, 2000)

FAE Crewe. *The Army Medical Services Campaigns Vol II*. (London HMSO, 1957)

B MacArthur. *Surviving the Sword. Prisoners of the Japanese 1942-45*. (London, 2005)

J. Chalker. *Burma Railway Artist. The war drawings of Jack Chalker*. (Barnsley, 1994)

C. Kinvig. *Death Railway*. (London, 1973)

C. Kinvig. *River Kwai Railway. The story of the Burma-Siam Railroad*. (London, 1992)

P. Towle, M. Kosuge & Y. Kibata. *Japanese Prisoners of War*. (London, 2000)

D Tett. *A Postal History of the Prisoners of War and 'Civilian Internees in East Asia during the 2nd World War. Vol 3: Burma, Thailand and Indonesia 1942-1946*. (Hertfordshire, 2005)

S Saddington. *Escape Impossible*. (Stockport, 1997)

J Bradley. *Towards the Setting Sun*. (Chichester, 1982)

R Lamont-Brown. *Kempeitai. Japan's dreaded military police*. (Gloucestershire, 1998)

J Bradley. *Cyril Wild. The tall man who never slept*. (Sussex 1991).

D Wall. *Heroes of F Force*. (New South Wales, 1993)

P Davies. *The Man Behind the Bridge. Colonel Toosey and the River Kwai*. (London, 1991)

J Summers. *The Colonel of Tamarkan. Phillip Toosey and the Bridge on the River Kwai*. (London, 2005)

B. Moore & K. Fedorowich *Prisoners of War and their Captors in World War II*. (Oxford, 1996)

JT Gross. *Neighbours. The destruction of the Jewish community in Jedwabne, Poland*. (Princeton, 2001)

CR Browning. *Ordinary Men. Reserve Police Battalion 101 and the final solution in Poland*. (Middlesex, 2001)

EE Dunlop. *The War Diaries of Weary Dunlop*. (Hertfordshire, 1987)

H Howard *Where Fate Leads*. (Bolton, 1983)

- R Beattie. *The Death Railway. A brief history.* (Bangkok, 2005)
- R Searle. *To the Kwai and Back. War drawings 1939-1945.* (London, 1986)
- JS Cosford. *Line of Lost Lives.* (Northampton, 1988)
- T Bowden. *Changi Photographer. George Aspinall's record of captivity.* (Sydney, 1984)
- J Chalker. *Burma Railway. Images of War. The original war drawings of Japanese POW Jack Chalker.* (London, 2007)
- LJ Godden. *History of the Royal Army Dental Corps.* (Aldershot, 1971).
- A Goodman. *The Will to Survive.* (Kent, 2002)
- RD Rivett. *Behind Bamboo. An inside story of the Japanese prison camps.* (London, 1946)
- L Toseland. *Line of Lost Lives.* (Northants, 1988)
- R Braddon. *The Naked Island.* (New York, 1953)
- L Rawlings. *And The Dawn Came Up Like Thunder.* (Herts, 1972)
- G Smith. *War Memories. A medical student in Malaya and Thailand.* (Eastbourne, 2008)
- A Coates & N Rosenthal. *The Albert Coates Story. The will that found the way.* (Melbourne, 1977)
- H Howarth. *Where Fate Leads.* (Bolton, 1983)
- L Toseland. *River Kwai Yasumee Nai!* (Northamptonshire, 1994)
- GP Adams. *No Time for Geishas.* (London, 1974)
- G Daws. *Prisoners of the Japanese.* (London, 2006)
- A Goodman. *The Will to Survive.* (Kent, 2002)
- LL Baynes. *The Other Side of Tenko.* (London, 1984)
- B Best. *Secret letters from the Railway. The remarkable record of Charles Steel – a Japanese POW.* (Barnsley, 2004)
- R Burton. *Railway of Hell. War captivity and forced labour at the hands of the Japanese.* (Barnsley, 2002)

IJ Barwick. *In the Shadow of Death. The story of a medic on the Burma Railway 1942-45.* (Barnsley, 2005).

T McGowran. *Beyond the Bamboo Screens. Scottish prisoners of war under the Japanese.* (Fife, 1999)

R Rivett. *Behind Bamboo.* (London, 1946)

S Alexander. *Sweet Kwai Run Softly.* (Bristol, 1995).

B Shepherd. *A War of Nerves. Soldiers and psychiatrists 1914-1994.* (London, 2000)

B Reed & M Peeke. *Lost Sons of the River Kwai.* (Barnsley, 2004)

E Lomax. *The Railway Man.* (London, 1995)

WF Page. *The Health of Former Prisoners of War.* (Washington, 1992)

APPENDIX 4**BIBLIOGRAPHY OF
PRIMARY SOURCES**

Listed below are the primary sources used in the thesis in the order in which they are quoted in the text. Interviews unavailable in recognised archives are not included. Medical papers of relevance to railway medicine published between 1945 and 1950 are included here as primary sources.

Chapter 1

The Straits Times, 13 February 1942

The Straits Times, 14 February 1942

The Sunday Times (Singapore), 15 February 1942

Telegram from Wavell to Percival, 10 February 1942. Imperial War Museum, Department of Documents IWM 66/218/1

Changi Medical Reports 1942-43. IWM Misc 19 (373)

WR Lang. Vitamin deficiencies in ex-prisoners of war in Japan. *New Zealand Medical Journal* 1946; 45: 296 – 307

Chapter 2

Changi diary of Capt RM Horner (IWM), but also published as: RM Horner. *Singapore Diary. The hidden journal of Captain R M Horner* (Strand, 2006)

CE Escritt. Map of the Thai-Burma Railway. Hand drawn map dated 1978, which appeared in a privately published pamphlet by GPO Adams. *The Thailand to Burma Railway. An Illustrated History*. (Poole, 1979)

R Dix. Imperial War Museum Sound Archive (IWM – SA) 4991/3

I MacDonald. *Dr Ian MacDonald's prisoner of war recollections*. National Army Museum Archive (NAMA) 9407-204

Futamatsu Yoshihiko. *Across the Three Pagoda's Pass*. Part of the archive of Capt CE Escritt (IWM 93/7/2)

Capt FS Robinson. IWM 99/31/1

Lyons. IWM-SA 10752/3

PJD Toosey. *Report on Malay and Thailand Prisoner of War Camps*. IWM 93/14//7

Changi Medical Reports 1943-44. IWM Misc 19 (373)

PU Coates, RSMP Neild. *Chronological diary. Up country with F Force*. Liverpool School of Tropical Medicine (LSTM) records

CHD Wild. *Narrative of F Force in Thailand, April-December 1943*. LSTM records

Major WJF Phillips RAMC. Report on the medical aspects of conditions prevailing in F Force camps in Thailand and Burma. *Changi Medical Reports 1943-44*. IWM Misc 19 (373)

Diary of Capt Harry Silman. IWM 66/226/1

Stanley Gimson. Interview transcript, recorded 1991. IWM-SA 5196/8

CR Boyton. Handwritten account, written in the 1950s. IWM 97/6/1

H Force in Thailand – Medical Report. UK National Archives (NA) WO 222/1356

Lt G Stanley Gimson. Contemporary war diary. IWM 66/328/1

Lt JA Richardson. War diary. IWM 87/58/1

SE Wood-Higgs. Journal typescript. IWM 81/32/1

Major Arthur Moon *Report on Tamarkan POW Hospital*. Part of the Philip Toosey archive, IWM 93/14/7

Capt RBC Welsh. Transcript of diary. IWM 66/225/1

8th Division in Captivity – K Force. Australian War Memorial (AWM) archive. AWM 54 544/9/1

Lt Colonel Sir Treffery O Thompson. Post-war report. IWM 97/32/1.

Chapter 3

Lt Col C Wilkinson. Diary. IWM 81/7/1

RJS Wilson. *Deficiency Optic Neuropathy*. MD thesis, Trinity College Dublin, 1947

AD Leigh. *Neurological Disorders Resulting from Malnutrition During Japanese Captivity 1942 -1945*. MD thesis, University of London, 1947

Churchill CMH. Dietary deficiency diseases among prisoners of war. *Journal of the Royal Army Medical Corps (J R Army Med Corps)* 1945; 85: 294-298

GNQ Forward Report. Immediate post-war report on Thailand and Indo-China released POWs. NA WO 222/1358

JA Reid & T Wilson. Report on nutrition and discussion of the main causes of death, "F" Force, Thailand. *J R Army Med Corps* 1947; 89: 149-165

Quarterly Report Feb-April 1945, Tamuang Camp. Wellcome History of Medicine (HOM) Library, RAMC 496

H Force in Thailand – Medical Report. NA WO 222/1356

Major FJH Nelson. *Linson POW Camp. Report and Diary*. LSTM records

H Force in Thailand NA WO 222/1356.

MH Churchill. Dietary deficiency diseases among prisoners of war. *J R Army Med Corps* 1945; 85: 294-298

EK Cruickshank. Painful feet in prisoners-of-war camps in the Far East. Review of 500 cases. *Lancet* 1946; 2: 369-372

JA Page. Painful feet syndrome among prisoners of war in the Far East. *British Medical Journal (Brit Med J)* 1946; 2: 260-262

J Simpson. Burning Feet in British prisoners of war in the Far East. *Lancet* 1946; 2: 959 –961

AR Hazleton. The nature of starvation amblyopia. *J R Army Med Corps* 1946: 86: 171-178

AW Frankland. Deficiency scrotal dermatitis in POWs in the Far East. *Brit Med J* 1948; 1: 1023-1026

HE de Wardener & B Lennox. Cerebral beriberi (Wernicke's Encephalopathy). *Lancet* 1947; 1: 11-17

S Dawson. *Memoirs of experiences on the Thai/Burma Railway*. Written in 1946. IWM 95/9/1

Captain FVB Dumoulin. IWM 97/6/01

Lt Col HS Flower. Railway diary. IWM 86/87/1

Dr N Courtney-London. *Disease among Prisoners of War*. Wellcome HOM Library, RAMC 1042.

- Captain Harry Silman. Diary. IWM 66/226/1
- Capt P MacArthur. Diary. IWM 66/218/1
- Capt RBC Welsh. Diary. IWM 66/225/1
- DCL Lewis. IWM 95/9/1
- Lt Col LRS MacFarlane. *Unusual Aspects and Therapy in Amoebic Dysentery*. MD thesis dated 19/12/46 (part of IWM P152). The thesis was also published in *J R Army Med Corps* 1947; 89: 233-254 (Part 1), and 255-273 (Part 2)
- EA Dixon. IWM 91/35/1
- Francis Maguire. Interview recorded 1 November 1982. IWM-SA 6374 (Reel 2)
- Thomas Woodhouse. Interview transcript. IWM-SA 184/5
- Brigadier CH Kappe. AWM 3DRL/2695
- ES Benford. IWM 86/35/1
- F Whalley. IWM 98/79/1
- Capt Cyril Wild. *Narrative of "F" Force in Thailand, April-December 1943*. LSTM records
- EE Dunlop. Medical experiences in Japanese captivity. *Brit Med J* 1946; 2: 474-484
- J Markowitz. Experiences with cholera in a jungle camp in Thailand. *J R Army Med Corps* 1946; 86: 150-58
- HE de Wardener. Cholera epidemic among prisoners of war in Siam. *Lancet* 1946; 1: 637-640
- P Meninsky. IWM-SA 12049 (Reel 4), interview recorded 29 May 1991
- C Petrovsky. IWM-SA 16423 (Reel 1), interview recorded 25 October 1982
- E Holden. IWM 94/4/1.
- JWR Donovan. IWM 90/15/1
- EA Coates. Clinical lessons from prisoners of war hospitals in the Far East (Burma and Siam). *Medical Journal of Australia (Med J Aust)* 1946 (1 June), pp 752-759
- J Markowitz. A series of over 100 amputations of the thigh for tropical ulcer. *J R Army Med Corps* 1946; 86: 159-170
- RBC Welsh. IWM 66/225/1

WB Young. Report to Colonial Office. In the archive of Col HC Benson. IWM 86/67/1

T Wilson & JA Reid. Malaria amongst prisoners of war in Siam ("F" Force). *Transactions of the Royal Society of Tropical Medicine and Hygiene (Trans Roy Soc Trop Med & Hyg)* 1949; 43: 257-272

W Hunter. Retrospective account. Liddle Collection (University of Leeds) POW 5

JR Houghton. Diary. IWM 93/8/1

EW Markham. IWM 86/53/1

ATH Marsden. Observations by a pathologist during three and a half years as a prisoner of war in Malaya and Thailand. *Med J Aust* 1946 (1 June), pp 766-769

C Lyons. IWM-SA 10752/3

GS Riddell. Cutaneous diphtheria. Epidemiological and dermatological aspects of 365 cases amongst British prisoners of war in the Far East. *J Roy Army Med Corps* 1950; 95: 64-87

KW Todd. European into coolie. *J Roy Army Med Corps* 1946; 86: 179-185

S Gimson. IWM-SA 5195/8

EE Dunlop. *8th Division in Captivity – D Force*. AWM 54 554/5/1

J MacLaren. List of patients, Mental Ward, Nakom Paton. LSTM records

8th Division in Captivity. *Other Thailand forces*. AWM 54 554/17/2

Chapter 4

Major TM Pemberton. IWM P437

E Holden. IWM 94/4/1

AE Coates. Clinical lessons from prisoners of war hospitals in the Far East (Burma-Siam). *Med J Aust*; 1 June 1946, pp 752 - 759

CR Boyton. IWM 97/6/1

ES Benford. IWM 86/35/1

Capt RBC Welsh. Diary. IWM 66/225/1

EE Dunlop. Clinical lessons from prisoner of war hospitals in the Far East. *Med J Aust*; 1 June 1946, pp 761-766

Miscellaneous Reports (Nakom Paton). NA WO 222/1389.

J Markowitz. A series of over 100 amputations of the thigh for tropical ulcer. *J R Army Med Corps* 1946; 86: 159-170

LRS MacFarlane. *Unusual aspects and therapy in amoebic dysentery*. IWM P152. This is a typewritten (immediately post-war) report presented as an MD thesis. Handwritten contemporary preparatory documents are at the Wellcome HOM Library, RAMC 122

JG Smith. *War Memories*. IWM 04/17/1

Quarterly Reports Feb-April 1945. Tamuang Camp. Wellcome HOM Library, RAMC 496

AE Coates. Surgery in Japanese prisoner camps. *Australian and New Zealand Journal of Surgery (ANZJS)* 1946; 15: 147-158

EE Dunlop. Surgical treatment of dysenteric lesions of the bowel among allied prisoners of war in Burma and Thailand. *Brit Med J* 1946; 1: 124-127

Medical Report on Ubon Camp, Thailand. Wellcome HOM Library, RAMC 1900 (File 5)

Lt Col HS Flower. Diary. IWM 86/98/1.

Philip Toosey. Oral history interview transcript. IWM-SA 12749/52/25 (recorded 1975)

N Courtney-Lendon. *Disease among prisoners of war*. Wellcome HOM Library, RAMC 1042

EW Markham. IWM 86./35/1

Lt Col C Wilkinson. Diary. IWM 81/7/1

D Selby. Liddle Collection POW 3

Lt Col TH Newey. Diary. IWM 85/50/1.

Dr FE deW Cayley RAMC. IWM 98/19/1

S Gimson. IWM 66/328/1

HE de Wardener. Cholera epidemic among prisoners of war in Siam. *Lancet* 1946; 1: 637-640

HE de Wardener. Diary. IWM 67/202/1

British File. NA WO 222/1390.

J Stitt. Interview 17 October 1980. IWM-SA 4771 (Reel 4)

C Bailey. Interview 16 June 1980. IWM-SA 4647/12 (Reel 5)

Capt P McArthur. Diary. IWM 66/218/1

Dr I MacDonald. Prisoner of war recollections. National Army Museum (NAM) Archives 9407-204.

J Markowitz. Experiences with cholera in a Jungle camp in Thailand. *J Roy Arm Med Corps* 1948; 86: 150-158

H Payne. IWM-SA 4748 (Reel 3); Recorded 1 October 1980

Major DW Gillies. IWM 84/18/1

JH Marsh. IWM-SA 4674. Recorded 1980

T Wilson & JA Reid. Malaria amongst prisoners of war in Siam ("F" Force). *Trans Roy Soc Trop Med & Hyg* 1949; 43: 257-272

FE deW Cayley. Retrospective account. IWM 98/19/1

Capt DR MacPherson. Diary. IWM 85/50/1

S Wood-Higgs IWM-SA 5267/4

J Stitt. IWM-SA 4771. Recorded 1980

Quarterly Report Feb-April 1945 Tamuang Camp. Wellcome HOM Library. RAMC 496

Operation lists. IWM Misc 169 (2603)

J Markowitz. Resuscitation under spinal anaesthesia without drugs. *J Roy Army Med Corps* 1946; 86: 147-149

D Arkush. Dentistry in a POW camp in the Far East. *British Dental Journal* 16 Aug 1946; 128-129

EA Dixon. Retrospective memoir. IWM 91/35/1

J Markowitz. Transfusion of defibrinated blood in POW camps at Chungkai and Nakom Paton, Thailand. *J Roy Army Med Corps* 1946; 86: 187-189

Major FJH Nelson. *Linson POW Camp*. LSTM records

Dr EC Vardy. IWM 67/166/1

J Markowitz. The RAMC in Thailand. *J Roy Army Med Corps* 1946; 86: 141-146

Thailand POW Camps. NA WO 222/1390 (Appendix)

G Vaughan. Personal papers. LSTM records

DE Home. Improvised pharmaceutical work in Malaya. *The Pharmaceutical Journal* 1946; 10: 265-266

Lt Col AE Knights. IWM 97/23/1

CHG Kinahon. Retrospective account (written in 1990). IWM 90/15/1

Brigadier Sir Philip Toosey. IWM 91/14/7

Captain CE Escritt. Various documents. IWM 93/7/2

V Report (Appendices). British Red Cross Archive (RCA) ACC 0033 A/3.

V Report and Associated Items. Original V Report File 1. RCA ACC 0033 A/1

V Report and Associated Items. Original V Report File 2. RCA ACC 0033 A/2

WM Innes-Ker. Diary. IWM 84/45/1

GW Chapman. *Report of the Camp Scientist*. In: *Miscellaneous Reports (Nakom Paton)*. NA WO 222/138

Chapter 5

Siam-Burma Railway. British statement. In : *The Prisoner of War*. January 1944. RCA London

J Wyatt. Liddle Collection POW 64

FE deW Cayley. Latent disease in Far East POWs. *Brit Med J* 1945; 2: 822

DE Home. Information pamphlet. Archive of the Royal Pharmaceutical Society IR 1992.5

HJ Morgan, IS Wright & AV Ravensway, Health of repatriated prisoners of war from the Far East. *Journal of the American Medical Association* 1946; 130: 995-999

DF Moore. Diminution of vision in returned prisoners of war. *Brit Med J* 1945; 2: 400-401

Miscellaneous Reports (Nakom Paton). NA WO 222/1389

JP Caplan. Creeping eruption and intestinal strongyloidiasis. *Brit Med J* 1949; 1: 396

LE Napier. *Strongyloides stercoralis* infection. Part II. Strongyloidiasis among ex-prisoners of war. *Journal of Tropical Medicine and Hygiene* 1949; 57: 46-68

ATH Marsden. Observations by a pathologist during three-and-a-half years as a prisoner of war in Malaya and Thailand. *Med J Aust* 1946 (1 June); 766-769

P Meninsky. Oral history interview, recorded 1980. IWM-SA 4791/5