

# **British Army Logistics in the Burma Campaign 1942-1945**

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PhD

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2006



**MAP ONE**  
**INDIA AND**  
**SOUTH EAST ASIA**



● Kunming

INDIAN OCEAN

BAY OF BENGAL

ANDAMAN SEA

GULF OF THAILAND

INDIA

CEYLON

SUMATRA

MALAYA

THAILAND

FRENCH  
INDO-  
CHINA

BURMA

BENGAL

CHINA

YUNNAN

ASSAM

Brahmaputra

Chindwin  
Irrawaddy

Ganges

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## ABSTRACT

The logistical challenges facing the British imperial Army in the Burma campaign of 1942-1945 were formidable, yet there has been no comprehensive, scholarly study of the campaign from a logistic point of view. The aim of this thesis, therefore, is to examine logistic influences on the design, conduct and outcome of British operations in Burma in order to demonstrate the relative importance of logistics to the final victory. The thesis comprises three parts. Part one looks at the British retreat from Burma in 1942, as well as India's economic and military position at that time, in order to establish the foremost logistic problems that had to be solved before the war could be taken back to the Japanese. India was ill-fitted to become the strategic base for further operations; the operational lines of communication in the north east of the country were inadequate; and, at the tactical level, suitable means of maintaining forces in the jungle were lacking. Part two examines the building of the base infrastructure in India; the improvement of the lines of communication; and the evolution of air, water and animal-borne supply during 1942 and 1943. Part three assesses the impact of these developments on the conduct and outcome of operations in 1944 and 1945. It shows that the strategic timetable of the campaign until 1944 was dictated mainly by the progress achieved in assembling the resources and solving the problems identified in part one. It reveals that the direction of operations thereafter was determined as much by the alignment and capacity of the lines of communication, and the need to control them, as by strategic intentions and enemy actions. It demonstrates the crucial importance of the methods developed in tactical supply to the achievement of success on the battlefield. Overlaid on all the above, the thesis indicates that the priority attached to maintaining and expanding the supply line to China, as well as the shortage of amphibious and air transport resources, had a decisive impact on the strategic and operational conduct of the campaign.

## ACKNOWLEDGEMENTS

For their assistance in my documentary research, I should like to thank the staff of the National Archive, Kew; the British Library; the National Library of Scotland; the Indian United Services Institute, Delhi; the Imperial War Museum; the National Army Museum; the 2<sup>nd</sup> Division Museum, York; the library of Churchill College, Cambridge; the Liddell Hart Centre for Military Archives; the Hartley Library of the University of Southampton; the library of the School of Oriental and African Studies, University of London; the Second World War Experience Centre, Leeds; and the Army Tactical Doctrine Retrieval Cell. I should like to thank also Patrick Cadell, Archivist of the Hopetoun Trust. I am most grateful to Colonel Benz Jacob and the officers of the 2<sup>nd</sup> Battalion, the Assam Rifles, Kohima garrison, for their warm hospitality to an unexpected British visitor and for a superb briefing on the battle of Kohima. I feel rather ashamed of the almost certain knowledge that an equally unexpected visitor from India would be uncommonly fortunate to find such a level of assistance in this country. The Commonwealth War Graves Commission provided me with the details of Khem Chand, for which I am most grateful, as I am, also, for the hospitality and assistance of their staff at Kohima. I should thank U Kan and his driver, 'Mr Glue', for taking me so efficiently and informatively around Burma, and for putting up with numerous changes in the planned itinerary to visit obscure places well off the normal tourist route. I received invaluable advice, assistance and recollection from Paddy Vincent, Chairman of the Burma Star Association; Sir Eric Yarrow, Chairman of the Burma Star Association in Scotland; Stuart Guild, Chairman of the Burma Star Association, Edinburgh Branch; George MacDonald Fraser; John Winstanley; Donald Easten; the late David Wilson; John Nunneley; Walter Faulds; Rex King-Clark; Bill Weightman; Bill Towill; Howard Woodcock; William Gutteridge and Philip Malins; all of whom served in Burma. I am most thankful to them all for giving me their time and answering my various communications. My many visits to London to consult the archives would have been made infinitely more difficult and expensive had it not been for the hospitality of Colin and Wendy Price; Michael and Lynda Rose; my father and stepmother, Colin and Liz; my brother and sister in law, Angus and Rosie; my son and daughter in law, William and Celia; and my daughter, Stephanie; all of whom very kindly accommodated me at different times during those visits, and to whom I am most grateful. Last but far from least I must, of course, thank Jeremy Crang and Paul Addison, my supervisors, for their guidance, encouragement and faith that I would manage to complete this project on time.

## AUTHOR'S NOTE

The British Army that fought in South East Asia between 1941 and 1945 was not just British. It comprised Indians of at least four faiths, Nepalis, east and west Africans of various nationalities, and Burmese. When referring collectively to the forces of the British Empire and Commonwealth, however, I have used the generic term 'British' in order to avoid clumsiness. Individual divisions I refer to occasionally by their nationality in order to distinguish them. From time to time, I identify particular groups of soldiers by their nationality. I believe that it will be clear where the distinctions lie.

The terms 'strategy', 'operations' and 'tactics' appear in different guises, which might need a bit of explanation. In military doctrine the conduct of war is divided into four hierarchical levels: grand strategic, military strategic, operational and tactical. Grand strategy is the application of national resources to achieve policy objectives. It is the highest level of the direction of war, involving every department of state in total war. At the national level during the Second World War it was the business of the War Cabinet and the Chiefs of Staff. Military strategy is the application of military resources to achieve the military aspects of grand strategy. It was at this level that campaign objectives for each theatre of war were set and resources allocated. During the Second World War it was largely the business of the national Chiefs of Staff and the theatre level national Commanders in Chief and, where appropriate, Supreme Allied Commanders. At the operational level, military resources are directed within a theatre of war to achieve theatre level strategic campaign objectives. Broadly, in the Second World War, the operational level concerned the theatre, army group and army levels of command. At the tactical level, forces are employed to win battles.<sup>1</sup> The tactical level concerned army level and below. The boundaries between the levels of war are not normally precise and commanders at boundary level are likely to find themselves having to think at two levels – but that is a feature of any command.

The term 'strategy' is also used to describe the manner in which a problem might be approached or dealt with; the term 'operations' is used to describe the activities of a unit or formation and the term 'tactics' is used also to describe the way in which formations, units and individuals fight. Again, I believe the distinctions will be clear in the text.

The terms 'unit' and 'formation' appear frequently. A unit, in military parlance, is a battalion or equivalent. A formation is any tactically organised group of units from brigade upwards, but it is normally applied to brigade and divisional level.

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Note:

<sup>1</sup> Army Code 71451, Design for Military Operations: the British Military Doctrine, 1996.

## GLOSSARY OF ABBREVIATIONS

AAD	Advanced ammunition depot
ABD	Advanced base depot
ABDACOM	American, British, Dutch and Australian Command
ABSD	Advanced base supply depot
ALFSEA	Allied Land Forces South East Asia
AOD	Advanced ordnance depot
AT	Animal or army transport
ATC	Air Transport Command
B & AR	Bengal and Assam Railway
CAATO	Combined Army Air Transport Organisation
CAI	Chinese Army in India
CBI	China-Burma-India Theater (the US national theatre, as opposed to SEAC, which was the allied theatre)
CEF	Chinese Expeditionary Force
CCTF	Combat Cargo Task Force
C-in-C	Commander in Chief
CIGS	Chief of the Imperial General Staff
CGS	Chief of the General Staff (of India)
COS	Chiefs of Staff (the abbreviation refers to the collective Chiefs of Staff committees in London and Washington. Individual appointments of Chief of Staff are spelled out in full to distinguish them)
FAMO	Forward air maintenance organisation
FMA	Forward maintenance area
FSD	Forward supply depot
GHQ(I)	General headquarters (India)
GOC	General officer commanding
GPT	General purpose transport
GRAF	General reserve engineer force
IWT	Inland water transport
L of C	Line of communication
LGOC	London General Omnibus Company



LRP	Long range penetration
LST	Landing ship, tank
MGA	Major general, administration
NCAC	Northern Combat Area Command
PAO	Principal administrative officer
PBS	Prefabricated bituminous surfacing
POL	Petrol, oil and lubricants
POW	Prisoner of war
RAMO	Rear air maintenance organisation
SEAC	South East Asia Command
TCC	Troop Carrier Command
USAAF	United States Army Air Force
VLR	Very long range

## INTRODUCTION

The Burma campaign was the longest continuous campaign fought on land by the British Army during the course of the Second World War, but it was near the bottom of allied strategic war priorities and far from the minds of anyone not closely concerned with it. Consequently, British troops having given themselves the wry title of the 'forgotten army' during the campaign, the term 'forgotten' has come to be associated with almost anything to do with wartime Burma. Indeed, in some rather surprising areas of the historiography of the Second World War, the theatre has been in danger of being forgotten. Basil Liddell Hart, for example, consigned the Malaya and Burma campaigns to just thirty five pages in his 713-page *History of the Second World War*.<sup>1</sup> John Keegan devoted no more than nine pages to them in his 498-page *The Second World War*.<sup>2</sup> John Ellis is even more brutal in his *Brute Force*, disposing of Burma in a four page appendix attached to his 541 pages of text.<sup>3</sup> By and large, though, the campaign in Burma is actually anything but forgotten. A wealth of historical literature, professional, technical, academic and popular, has been published since the end of the war and it still continues to be written prodigiously. An apparent gap in the work so far, however, is an examination of the campaign from a logistic perspective. Indeed, the south east Asian theatre does not seem to be alone in this position, for logistic histories of any campaigns are hard to find, except as chapters or sections in campaign histories supporting the operational account, or as examples in works on logistics as a subject in its own right. Martin Van Creveld thought that, logistics being so closely associated with 'cold, hard calculation', the subject might not appeal to the imagination of military historians.<sup>4</sup> In the same vein, as David Moore reflects in *The Oxford Companion to Military History*, it has been said that:

Logisticians are a sad race of men, very much in demand in war, who sink back into obscurity in peace. They deal only with facts but must work for men who merchant in theories. They emerge during war because war is very much fact. They disappear in peace because, in peace, war is mostly theory.<sup>5</sup>

The official but un-published War Office account of administrative planning in the British Army during the war, observed that: 'military administration, at any rate,

tended to be regarded in the same light as poor relations or sanitation; inevitable and even indispensable, but not talked about in the best circles'.<sup>6</sup> Strategy, operations and the tactical business of fighting battles capture the imagination quite easily, but none of those things work without logistics, so to study them in isolation of that aspect is to view an incomplete and possibly distorted picture. As General Omar Bradley is reported to have observed: 'Amateurs study strategy; professionals study logistics'.<sup>7</sup>

The study of logistics is not just about the 'cold, hard calculations' of consumption rates, tons of supplies, movement tables and stacks of blankets. Equally, if not more important, especially in respect of the Burma campaign, is an account of the ingenuity, courage and sheer physical effort required of the people charged with maintaining an army in battle, especially when the rear area was no comfortable, safe haven. It is a record of the achievement of building roads, railways and airfields out of nothing in a hostile wilderness; of improvisation in the face of critical shortages. It is about the turning of an entire national economy from virtual subsistence level to one capable of sustaining total war, and the balancing act of sharing scarce resources between conflicting demands. These are some of the most important aspects of campaigning and yet, it seems, their story has been told, if at all, on the fringes of the exciting stuff of blood-letting. This thesis, therefore, approaches the Burma campaign specifically from the logistic perspective, with a view to demonstrating the influence of logistics on the outcome of operations in that theatre.

This introduction proceeds with a short chronological overview of the war in Burma to put the rest of the work in context. Thereafter, it examines briefly the most appropriate historiography of the campaign in order to show where the gap lies in the coverage of logistics, thereby leading to the aim of this work. It explains the objectives, parameters and structure of the thesis, and identifies the sources consulted in the research. It establishes a working definition of the term 'logistics' and it concludes, again by way of background, with a brief explanation of the logistic systems in use in the British and Indian Armies at the start of the war in south east Asia.

## *Overview of the Burma campaign*

On 20 January 1942, with the invasion of Malaya already well advanced, the Japanese 15<sup>th</sup> Army, commanded by Lieutenant General Shojiro Iida, crossed the Thai border into Burma near Moulmein, to the east of Rangoon (see Map Two). The Japanese quickly overcame early British resistance and captured Rangoon on 8 March 1942. By that time, the Chinese Expeditionary Force (CEF), approximately the numerical equivalent of a British corps, had intervened in an attempt to help defend the one remaining overland supply route to China, which ran through Burma. The combined British and Chinese Burma Army then attempted to hold north Burma in order to maintain contact between India and China. Over the following two months, however, the Japanese forced the allies relentlessly northwards until they were forced to split and withdraw from the country into Assam and China.<sup>8</sup> Meanwhile, after the fall of Singapore, the Japanese fleet had sortied out into the Bay of Bengal, attacking Ceylon and ports on the east coast of India. The Japanese sank two British cruisers and an aircraft carrier, along with over 90,000 tons of allied merchant shipping.<sup>9</sup> India then found herself unexpectedly on the front line of the war against Japan on land, at sea and in the air. India Command, unprepared for the threat to the country's eastern frontier, was forced onto the defensive while the operational, tactical and logistic means were developed to take the war back to the Japanese in Burma. The task of achieving that in sufficient strength was to take over two years. Nevertheless, during the summer of 1942, General Wavell, the Commander in Chief (C-in-C) India, drew up a plan, Operation ANAKIM, for the re-invasion of the country by amphibious assault along the Arakan coast and in the vicinity of Rangoon and Moulmein.<sup>10</sup>

At the same time as Wavell started to formulate his plans for ANAKIM, the Americans began to develop air transport operations in north east Assam to re-open their supply line to China, which had been severed with the loss of Rangoon. Later on, they started to mount offensive air operations, based in unoccupied China, against enemy shipping in the China Sea and ground forces in the occupied part of the country. The Americans planned eventually to use China as a base for a strategic air offensive against the Japanese mainland. In the interim, they provided an extensive military assistance programme for Chiang Kai Shek's armies as well as organising, equipping and training the Chinese Army in India (CAI), which comprised troops

who had escaped from Burma into India. All this activity was intended to keep China actively in the war in order to draw Japanese forces away from the Pacific.<sup>11</sup>

Wavell had originally hoped to mount ANAKIM during the winter dry season of 1942-43. By the autumn of 1942, however, it was clear that it would not be possible to do so before the 1943 summer monsoon because the land forces were not ready and the amphibious shipping required was not available.<sup>12</sup> Consequently, British offensive plans over that winter were much curtailed. On the Arakan coast, one division advanced southwards from Chittagong. Its aim was to recapture the airfield on Akyab island in order to reduce the air threat to Calcutta and to make the field available for subsequent allied air operations over Burma. On the Assam front, the first Chindit expedition, a brigade strength raid, was mounted into north Burma from Imphal to harass Japanese lines of communication (L of C) serving their forces in the far north of the country. The Arakan operation failed badly and, following the previous catastrophic defeats in Malaya and Burma, it virtually destroyed British morale, calling into question the ability of the British to fight the Japanese at all in south east Asia. The British reputation was salvaged to a degree, however, by the return of the Chindits during the spring of 1943. Despite achieving little of direct operational value, the Chindit operations were presented as a demonstration that British troops could, if properly trained, led and supported, get the better of the Japanese in the jungle.<sup>13</sup>

Meanwhile, developing the air link to China, as well as re-capturing Rangoon and central Burma in order to re-open the overland link, became the foremost allied strategic intentions in south east Asia. These aims were confirmed formally at the Casablanca conference in January 1943.<sup>14</sup> As a result of that conference, Wavell was directed to mount ANAKIM in November 1943, a year later than he had originally intended, and, meanwhile, to develop the means to mount cross-border offensive operations from Assam into north and central Burma. The broad intention was to combine ANAKIM with an overland offensive by Chinese and British forces from Yunnan and Assam. However, the naval and amphibious resources necessary for ANAKIM were repeatedly withheld for higher priority commitments. In April 1943, in the face of prohibitive resourcing problems, the British Chiefs of Staff (COS) in London decided to postpone ANAKIM indefinitely.<sup>15</sup> Work went ahead,

nonetheless, on building up sufficient forces in Assam to conduct limited overland offensive operations and developing the logistic infrastructure to sustain them there. At the Trident conference in May that year, under American pressure, modified plans were agreed for an offensive to liberate Burma, but with a reduced amphibious element, while the priority placed on the China air lift was confirmed.<sup>16</sup> Over the following summer, however, it became increasingly obvious that even that offensive would not be possible. The necessary amphibious shipping, even for limited participation, was still not available; the build up of supplies and equipment in India was too slow; the capacity of the L of C was nowhere near adequate; and India faced economic crisis due to the demands of her war effort. At the Quadrant conference, in August 1943, the final cancellation of ANAKIM was accepted by the Combined COS. It was decided to limit offensive operations to re-capturing sufficient territory in north Burma alone for a new overland link from India to China, and to shelve, for the time being, aspirations to liberate the rest of Burma.<sup>17</sup> Amphibious operations were again postponed indefinitely, although feasibility studies, planning and preparations were to continue. Following the Quadrant conference, the new allied South East Asia Command (SEAC) was established under Admiral Mountbatten to relieve India Command of the responsibility for conducting operations in the theatre. India was then able to direct its efforts towards building up the strategic base to support the new allied command.<sup>18</sup>

Although Mountbatten had been directed to explore and prepare plans for a range of alternative amphibious operations, the resources were still withheld for higher priority operations elsewhere. Until they could be made available, the new command's priorities remained those of supporting the development of the China airlift and mounting offensive operations in north Burma in order to open a new overland route to China.<sup>19</sup> In addition, SEAC would mount an aggressive air campaign in order to erode Japanese strength and achieve air superiority. In the early spring of 1944, therefore, the American-led CAI, by then re-titled the Northern Combat Area Command (NCAC), started to advance from Ledo, in north east Assam, to seize the ground needed for the new road. Its first objective was Myitkyina, in north Burma. The second Chindit expedition, this time in divisional strength, was flown into Burma to cut the L of C of the Japanese 18<sup>th</sup> Division opposing the Chinese.<sup>20</sup> Lieutenant General Slim's newly formed British 14<sup>th</sup> Army, successor to the Eastern Army of

India, was directed to mount operations in Assam and Arakan to divert the maximum numbers of Japanese away from the NCAC advance.

At the same time, however, the Japanese 15<sup>th</sup> Army started to mount its own offensive to seize the British base at Imphal, in Assam, having first attempted to draw off the 14<sup>th</sup> Army's reserves into a battle on the Arakan coast. At the defence of the Sinzweya 'administrative box', in Arakan, during February 1944, XV Corps, supplied by air and sea, won the first substantial British victory in the war against Japan.<sup>21</sup> The following month, IV Corps, in Assam, becoming increasingly aware of the imminent Japanese attack, withdrew its forward divisions into the Imphal plain to defend the corps' base there. By early April, the Japanese had laid siege to the Imphal plain. The single supply road from the railhead at Dimapur to Imphal was cut at Kohima, where a small British garrison held on to an enclave in the town, surrounded by the Japanese 31<sup>st</sup> Division. For over two months, IV Corps was cut off at Imphal, maintained and reinforced entirely by air, while holding off repeated Japanese attacks. After protracted, hard fighting between mid-April and mid-June 1944, a counter attack by XXXIII Corps from Dimapur re-opened the road through Kohima to Imphal and the Japanese were forced to abandon their offensive.<sup>22</sup>

Following the relief of Imphal and Kohima, the 14<sup>th</sup> Army drove the Japanese back across the Indo-Burmese border to the Chindwin river through the 1944 summer monsoon. During the following dry season, over the winter of 1944-1945, with amphibious shipping finally available, XV Corps cleared the Japanese out of the Arakan coastal area and seized two important airfields on the islands of Akyab and Ramree. Meanwhile, the 14<sup>th</sup> Army re-entered central Burma over the Chindwin, intending to bring the Japanese to battle on the Shwebo plain, between the Chindwin and Irrawaddy rivers. The enemy, however, withdrew across the Irrawaddy to set up a strong defence centred on Mandalay. The 14<sup>th</sup> Army forced a crossing of the river against a numerically superior Japanese defence, making a wide outflanking movement to cut the enemy L of C at Meiktila, between Mandalay and Rangoon. In the combined battles of the Irrawaddy, Mandalay and Meiktila during the first three months of 1945, the 14<sup>th</sup> Army inflicted a second decisive defeat on the Japanese Army in Burma. Having achieved that victory, it was then forced to advance rapidly a further 300 miles southwards to seize and open the port of Rangoon before the onset

of the 1945 summer monsoon, when it would become impossible to sustain the army over the L of C from India. During that final drive, the 14<sup>th</sup> Army was supported and maintained almost entirely by aircraft operating from the airfields captured by XV Corps on the Arakan coast. Rangoon having been re-captured and opened to traffic in May 1945, the last three months of the war were spent mopping up Japanese survivors attempting to escape to the south and east.<sup>23</sup>

### *The historiography of the Burma campaign*

A wealth of material has been written on the subject of the Burma campaign. The published work includes that which covers the campaign as a whole; that which focuses on particular battles or endeavours; biographies; personal recollections; diaries; and official, regimental, corps or formation histories. The campaign also features, of course, in a number of other works with broader parameters. This brief review of the historiography focuses on the most prominent representative selection from the overall campaign histories, biographies, official histories and personal recollections, but, in doing so, it identifies the gap that needs to be filled.

The political and strategic approach to the campaign as a whole was taken most comprehensively by Christopher Thorne in *Allies of a Kind* and Raymond Callahan in *Burma 1942-1945*, both of which were published in 1978.<sup>24</sup> Among other issues at that level, these two authors explored the tensions between the United States and Britain over war aims and priorities in south east Asia. They showed how the Americans, furnishing many of the most essential resources, and hostile to British aspirations to regain their lost far east empire, forced the British to adopt the strategic objective of supporting China ahead of liberating Malaya and Singapore. This issue is fundamental to a clear understanding of how the campaign was designed and conducted at the strategic and operational levels.

Louis Allen's seminal work on the campaign at the operational and tactical level, *Burma: the Longest War*, was published in 1984.<sup>25</sup> As a former Japanese-speaking intelligence officer in the 14<sup>th</sup> Army, Allen was well placed to write an account at those levels, and he had the benefit of Japanese connections, enabling him to set out both sides of the story to a large extent. As well as giving little coverage to strategic



influences and plans, however, he made no mention at all of the 1945 campaign on the Arakan coast, which, although very much a supporting operation, was crucial to the logistic sustainment of the 14<sup>th</sup> Army's final advance to Rangoon. Eighteen years later, in 2002, Julian Thompson wrote the *Imperial War Museum Book of the War in Burma*, which gives an account of the campaign interwoven with hitherto unpublished personal recollections held in the Imperial War Museum.<sup>26</sup> Consequently, the book is focused mainly at the tactical level, but Thompson includes sufficient explanation of the strategic and operational influences to set the tactical detail in clear context. The latest account of the campaign at large, *Burma: the Forgotten War*, was published by Jon Latimer in 2004.<sup>27</sup> Latimer's book is a comprehensive work. It gives a clear, extensively researched and analytical narrative of the campaign at the strategic, operational and tactical levels, explaining the thinking behind the design and conduct of operations without getting involved with personal anecdotes. As such, it is a valuable contribution to the history of the campaign.

Three excellent biographies of Slim, the Commander of the British 14<sup>th</sup> Army, not only tell his story but, in doing so, offer a good deal of analytical history of the campaign at large. In 1969, Geoffrey Evans, who served as a divisional commander under Slim, published *Slim as Military Commander*, which focused primarily on Slim's abilities at the tactical to operational level, with sufficient explanation of the strategy of the campaign to set the story in context.<sup>28</sup> By contrast, Ronald Lewin's *Slim: the Standard Bearer*, published in 1976, dealt more at the operational to strategic level.<sup>29</sup> Latterly, Robert Lyman returned to the operational and tactical levels in his *Slim: Master of War*, published in 2004.<sup>30</sup> Lyman argues, with ample justification, that Slim's military thinking, as well as his style of command, gave a foretaste of the type of manoeuvre warfare and mission command techniques that the British Army was not to grasp fully until about the late 1980s.

Among other biographies of prominent figures associated with Burma, the strategy of the campaign up to mid-1943 is presented in John Connell's *Wavell: Supreme Commander*, which was completed and edited after Connell's death by Michael Roberts, and published in 1969. The strategy of the campaign appears also in Ronald Lewin's slightly less detailed *The Chief*, published in 1980.<sup>31</sup> The latter part of the campaign, from October 1943 onwards, receives attention in Philip Zeigler's

*Mountbatten: the Official Biography*, published in 1985.<sup>32</sup> There is more about India's supporting role after late 1943 in John Connell's *Auchinleck: a Critical Biography*, which was published in 1959.<sup>33</sup> Wavell's diary, *Wavell: the Viceroy's Journal*, edited by Penderel Moon and published in 1973, deals in part with the strategic level of the campaign as seen by Wavell in his role as Viceroy of India from late 1943 onwards.<sup>34</sup> By then, however, he was more concerned with Indian government, economy and politics, and left the campaign very much to Mountbatten, supported by Auchinleck, who succeeded Wavell as C-in-C India. Nevertheless, it contains some useful pointers to India's capacity as the strategic base for operations in the theatre.

Quite recently, three books have been published, which make no attempt to provide a narrative of the campaigns but rather to describe and analyse the development of tactical doctrine, training and command from failure at the start, through growing success, to victory at the end. Daniel Marston's *Phoenix from the Ashes*, published in 2003, takes the imaginative line of following a selection of Indian Army units, describing their training and showing how it affected their performance against the enemy at various stages of the Burma campaign.<sup>35</sup> Tim Moreman's *The Jungle, the Japanese and the Commonwealth Armies at War, 1941-1945*, published two years later, takes a more doctrinal, systemic approach to demonstrate the same story of increasing effectiveness in tactical doctrine and training.<sup>36</sup> In 2004, Brian Bond and Kyoichi Tachikawa edited a compendium of papers delivered at an Anglo-Japanese conference on British and Japanese leadership in the south east Asian war at every level from the grand strategic to the tactical.<sup>37</sup>

Almost all the books described above refer in some measure to the difficulties of logistics in the theatre and some give more than passing reference to air supply and medical problems in particular. On the whole, though, their coverage of logistics is thin and peripheral. It does not give a comprehensive picture of how logistic issues influenced the shaping of the campaign. It would be incorrect to infer, however, that logistic issues in Burma have been ignored, for they do receive greater attention in a number of other works. The British official history, *The War Against Japan*, written by a team led by Major General S. Woodburn Kirby and published in five volumes between 1957 and 1969, includes a good deal of detailed administrative data,

explaining the principal problems and how they were addressed.<sup>38</sup> Of all the accounts of the campaign at large, it comes closest to demonstrating the influence of logistics on the design, conduct and outcome of operations. Nevertheless, that coverage is still set out to support the strategic and operational story, rather than being a contiguous theme in its own right, and it is spread piecemeal over three volumes. Much of it is to be found in appendices and it accounts for only ten per cent of the total content of the three volumes covering the period of the Burma campaign. In addition, a substantial amount of logistic information can be found in other work not specifically written about the Burma campaign. *The Indian War Economy*, a volume of the official history of the Indian armed forces, edited by Bisheshwar Prasad and published in 1962, contains much information useful to an understanding of the development of India as the strategic base.<sup>39</sup> That subject is given coverage also by Compton Mackenzie in *Eastern Epic*, published in 1951, and, more recently, by Ashley Jackson, in *The British Empire and the Second World War*, published in 2006.<sup>40</sup> Two other volumes of the Indian official history, *The Technical Services*, edited by Bisheshwar Prasad and published in 1962, and *The Corps of Indian Engineers*, published in 1974 by S. Verma and V. K. Anand, provide details of the activities of those arms of the Indian Army in all theatres of war, including Burma.<sup>41</sup> Unofficial regimental histories of the Royal Engineers, the Royal Army Service Corps and the Royal Indian Army Service Corps, which cover the activities of those corps worldwide during the Second World War, also contain appropriate reference to the campaigns in south east Asia. They have to be treated with the same caution as any regimental history, however, as that sort of work is not widely known for its objective self criticism. In *The Lifeblood of War*, a broad account of logistics in armed conflict, published in 1991, Julian Thompson includes a chapter, in which he compares the logistics of the Burma campaign with two others: north Africa and Italy.<sup>42</sup> Thomas Kane devotes to Burma a complete chapter of his book *Military Logistics and Strategic Performance*, published two years later, in which he explores the contribution of logistics to strategic success.<sup>43</sup>

What must be one of the most important memoirs of the campaign, Slim's *Defeat Into Victory*, refers repeatedly to the logistic problems that had to be overcome at the operational and tactical level and gives a broad idea of how they were addressed.<sup>44</sup> Slim could not afford the space to go into much detail, however, and he was generally

content, and probably relieved, to record that the problems were solved, giving fulsome and well-deserved recognition to those who did the solving. The details would have taken up a very substantial amount of text, and might have upset the balance of *Defeat Into Victory* as an overall account of the campaign. The book does not dwell at length specifically on how logistics shaped the campaign, although the reader is left in no doubt about the significance of logistic factors in this respect. In its coverage of logistics, the book confines itself almost entirely to the operational and tactical levels of war, referring little to the strategic base in India.

Thus, a good deal of attractive bait on logistic issues has been laid in the work already published on the war in south east Asia, but the account so far has been delivered in a fragmented fashion and it begs to be drawn together. There is an important story to be told in greater detail than hitherto about how the main logistic problems were overcome in Burma and there are equally important conclusions to be drawn about how logistics and strategy inter-acted in the direction and outcome of the campaign. So formidable, indeed, were those logistic problems, and, consequently, so important were their solutions to the shaping of events that the history of the Burma campaign warrants being approached specifically from the logistic point of view.

#### *Aim, objectives and structure*

The aim of this thesis, therefore, is to examine the logistic influences on the design, conduct and outcome of British operations in the Burma campaign between 1942 and 1945 in order to demonstrate the relative importance of the logistic contribution to victory. It is not intended to be a detailed logistic record of the campaign or an account of the logistic corps and services. In support of the aim, it has three broad objectives. First, it establishes the major logistic problems at the strategic, operational and tactical levels of war facing the British Army after the loss of Burma in 1942. Second, it examines the efforts made to overcome these hurdles at each level during the remainder of 1942 and 1943. Third, it assesses the way in which logistics, especially the work done to address the difficulties identified, influenced operations in 1944 and 1945, helping to pave the way to victory. Because of the amount of work needed to develop the logistic infrastructure, it is as much a story of engineering as of resources, movements and maintenance. The scope of the study

must include some brief examination of American logistic matters in south east Asia, for they impinged heavily on those of the British, but the focus is on the latter. Similarly, grand strategic, world-wide logistic issues cannot be completely ignored, for they affected war priorities and vital imports into India, but the main attention of the study is directed to those concerning the theatre, from the strategic base in India forward to the front line. The emphasis is on military affairs but, particularly in dealing with India, the civil economy has to be examined briefly, because it affected directly India's capacity as the strategic base and because it suffered so much in supporting the war. In view of the technical complexity of medical issues and the fact that their part in the Burma campaign commands its own exclusive official history, they are not included in any detail.<sup>45</sup> Because of the importance of air maintenance in the latter stages of the campaign, air logistic matters are referred to occasionally, but the main focus is on army logistics.

The study is divided into three parts, which reflect the objectives. In part one, chapter one explores the logistic contributions to, and implications of, the early defeat in Burma, as well as India's readiness to overcome the challenges she faced in May 1942, following that defeat. From this examination emerge the principal logistic problems at each level of warfare that had to be overcome before the fight could be taken back to the enemy in south east Asia. At the strategic level, India had to be developed into an adequate base; at the operational level, the L of C had to be improved; and at the tactical level, the means had to be found to sustain forces isolated or manoeuvring in the jungle. Part two examines the way these problems were addressed in the protracted period of build up from the start of 1942 to early 1944, during which time the allies stood on the defensive in that theatre. The temporal parameters of part two are deliberately left slightly vague because different measures were set in motion and came to fruition at different times. Within part two, chapter two continues on the subject of India herself, following her development as a strategic base; chapter three covers the development of the operational level L of C from India to the fronts in Assam and Arakan; and chapter four explores the development of methods of tactical maintenance. Part three looks at how these developments influenced the major battles in the latter part of the campaign. Chapter five deals with the defensive battles of 1944 and chapter six with the re-invasion of Burma in 1945. As well as examining the influence of the developments of 1942 and

1943 on the later battles, part three describes also how chronic logistic problems and the development process continued through 1944 and 1945, showing the effect they had on operations. In conclusion, a summary is provided of the contribution of logistics to the design, conduct and outcome of the campaign.

### *Sources*

Research for this thesis started with the British, Indian and United States official histories; campaign histories; accounts of the major battles; and a wide selection of published memoirs, in order to develop a clear understanding of the overall course of events. These not only provided a good base of facts and figures but also pointed to areas which then needed to be followed up or confirmed by primary research. Most of that subsequent research was documentary. The war diaries and a wide selection of the official staff papers concerning logistics, from War Office down to divisional level, were consulted in the National Archive, Kew. Additional material on India's defence policy and role as the strategic base; as well as papers concerning the Army in India, its training, operations, equipment and maintenance; was consulted in the British Library Oriental and India Office Collection. The British Library also holds many of Wavell's personal papers. The Army Tactical Doctrine Retrieval Centre kindly provided a copy of XXXIII Corps' contemporary account of its operations from March 1944 to May 1945, which contained much material on logistics. On top of such official sources, a number of unpublished personal records and memoirs were consulted in the archives of various universities, the Imperial War Museum, National Army Museum, and a number of corps and regimental museums, as well as private collections. Of particular importance, Churchill College, Cambridge, holds Slim's papers; The University of Southampton holds Mountbatten's; and Manchester University holds Auchinleck's. The Liddell Hart Centre for Military Archives at King's College, London, of course, holds a wealth of such material, of which the Lindsell and Lethbridge papers were especially helpful for this study. A number of useful but unpublished original documents were purchased, thereby saving several visits to archives in London. Among them are the following: War Office classified accounts of administrative, transportation and engineering operations during the Second World War; the Supreme Allied Commander's formal report to the Combined COS; a number of contemporary jungle warfare, logistic and engineering training

manuals; and the War Office Notes from Theatres of War, in which lessons learned from operations were disseminated. Many of these documents can also be found in the British Library, the Imperial War Museum and the National Archive. Advice and recollection has been sought directly from a number of veterans of the campaign. Finally, visits have been made to the Indian United Services Institute in Delhi; to Dimapur and Kohima; and to Rangoon and the battlefields of Mandalay, Meiktila and the Irrawaddy crossings. Not all these sources are quoted or referred to in the text, but all have contributed substantially to the author's understanding of the campaign and the particular subject of logistics in south east Asia.

### *Defining logistics*

It is important, at the start, to establish a working definition of the term 'logistics', for it has evolved. For the purposes of his study *Logistics in War*, Martin Van Creveld described logistics as 'the practical art of moving armies and keeping them supplied'.<sup>46</sup> The Oxford English Dictionary offers a similar, if slightly broader definition: 'The organisation of moving, lodging and supplying troops and equipment'.<sup>47</sup> There is more than that in the military understanding of the term, however. Logistics includes the recovery, repair and rearward despatch of damaged people and equipment as well as the forward movement of supplies, so military definitions have used the term 'maintenance' as well as, or instead of, 'supply'. During the war, the term 'logistics' was not used by the British Army, which coined the expression 'administration' instead. The contemporary definition of administration was fairly fulsome:

Military administration consists of the transportation of troops to the places where they are required, their wellbeing, accommodation and maintenance with rations, clothing, equipment, ammunition, weapons and everything necessary for them to fulfil their task; their removal when wounded, their burial when dead.<sup>48</sup>

Interestingly, that definition does not include the recovery and repair of equipment although, of course, that was actually an increasingly important function. The North Atlantic Treaty Organisation, to whose doctrine the British Army subscribes, and the

current Indian Army have refined the definition down to: 'The movement and maintenance of forces'.<sup>49</sup>

Specifically at the strategic level, however, there is more to add. Major General Peter Foxton, a senior British logistics officer, notes that:

Logistics is not just the obvious supplies of war materials that armies have on hand. It is also the ability of a national infrastructure and manufacturing base to support armed forces at war, the availability of national transportation means to ensure that those forces can be deployed and the ability to resupply those forces when they have arrived.<sup>50</sup>

In a similar vein, Brigadier Parmodh Sarin, of the Indian Army, wrote that:

Logistics is the art and science of creating and maintaining a military capability....a nation has to find adequate funds, firstly to equip its forces, second to maintain and sustain them for an indeterminate length of time.<sup>51</sup>

David Moore, a British academic expert in logistic matters, shared this view:

Logistics concerns not only the supply of materiel to an army in times of war, but also the ability of the national infrastructure and manufacturing base to equip, support and supply the armed forces - the national transportation system to move forces - and its ability to resupply those forces once deployed.<sup>52</sup>

What these three observations show is that military logistics must include the resourcing and equipping of armed forces as well as their movement and maintenance in barracks and in the field. So, for the purposes of this work, the term logistics embraces the provision of the resources needed by armed forces to prepare for war and fight, as well as the movement and maintenance of those forces on operations. These are the functions that this study will address in respect of the Burma campaign.

### *The British logistic system*

Before going on to examine the logistic problems, activities and influences involved in the campaign, it is necessary to have a very basic understanding of the administrative doctrine and arrangements in use at the time. In 1941, the British Army overseas supply system was still based on that developed during the First



World War. The system is shown diagrammatically at Appendix One. It assumed that an impenetrable front line would ensure the security of the rear area against ground attack, and that there would be ample rail and road communications between the base and the front. Routine maintenance procedures were based on the principle that formations at the front should be kept amply supplied but not burdened with more material than they needed for immediate operations. Hence, in general, stocks were held as far back as possible and sent forward on a continuous daily basis. Units at the front would normally hold no more than one day's worth of supplies and they were replenished automatically. Petrol, oils, lubricants (POL) and ammunition were likely to be dumped well forward, however, because the rate of their consumption was less predictable. The theatre base was built around a port where supplies were imported from Britain and other imperial sources to be stored in bulk before they were sent forward. Replenishment stocks, in batches of one day's worth, were sent forward by train to an appropriate railhead behind the front, from where they were moved onward to units by road transport. Separate road transport units were used for supplies (ie rations and ordnance stores), ammunition and POL. As well as being separated functionally, transport was divided hierarchically into first line, at unit and brigade level; second line, at divisional level; and third line, at corps level. Behind corps level was an organisation known as the Army L of C Transport Column. Third line and L of C transport was organised into general purpose transport (GPT) companies, normally consisting of about 100 vehicles.<sup>53</sup>

The Army in India, organised for frontier, rather than continental warfare, without continuous fronts and with less secure L of C, ran a slightly modified system. India, itself, of course, was the base, so there was no need for one to be established around a port, as in the British system. Replenishment was unlikely to be attempted daily because of the distances involved, the difficulty of the frontier environment and the likelihood of tactical or natural interruption. For this reason, a series of secure forward field supply depots (FSD) would be established throughout the operational area, each holding several days' stocks. The FSDs were replenished by road, as frequently as circumstances permitted, from secure advanced base depots (ABD). They, in turn, were re-supplied from reserve depots in the Indian interior, normally by rail. The supply, ammunition and POL systems remained separated functionally, although they were normally collocated in the ABDs.<sup>54</sup> The hierarchical organisation

of transport was the same as that in the British system. On the north west frontier, limited use had been made of air supply to FSDs and units in the field. The Indian model was generally more flexible and ironically, for it had been developed for use in under-developed, thinly populated regions, turned out to be better suited to modern, mobile warfare with porous fronts. A modified form of it was adopted by the 8<sup>th</sup> Army in the middle east and, later, by the 21<sup>st</sup> Army Group in Europe. Until very late in 1941, however, the British Burma Army had no logistic system capable of maintaining a force in the field because it was established for internal and border security duties only. Burma was ill-prepared for war, and that was the principal cause of her loss in early 1942. It is to that defeat and India's readiness to face the challenges it thrust upon her that we now turn.

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Notes:

<sup>1</sup> B. H. Liddell Hart, *History of the Second World War* (London, Cassell, 1970), pp. 224-236, 362-369, 513-520, 631-638.

<sup>2</sup> J. Keegan, *The Second World War* (London, Hutchinson, 1989), pp. 212-214, 461-466.

<sup>3</sup> J. Ellis, *Brute Force* (London, Andre Deutsch, 1990), pp. 518-522.

<sup>4</sup> M. Van Creveld, *Supplying War* (Cambridge University, 1977) [hereafter, Van Creveld, *Supplying War*], pp. 1-2.

<sup>5</sup> D. Moore, *Logistics*, in R. Holmes (ed), *The Oxford Companion to Military History* (Oxford University, 2001) [hereafter, Moore, *Logistics*], p. 513.

<sup>6</sup> War Office restricted account, *The Second World War 1939-1945, Army Administrative Planning, 1952* [hereafter, *Army Administrative Planning*], p. 96.

<sup>7</sup> Quoted in T. Pierce, *Proceedings of the US Naval Institute, Volume 122, Number 9*, p. 74.

<sup>8</sup> S. Woodburn Kirby et al., *History of the Second World War: the War Against Japan, Volume II* (London, Her Majesty's Stationery Office [hereafter, HMSO], 1958) [hereafter, Woodburn Kirby, *The War Against Japan, Volume II*], 23-46, 59-104, 145-186, 199-220.

<sup>9</sup> *Ibid.*, pp. 115-130.

<sup>10</sup> *Ibid.*, pp. 236-238.

<sup>11</sup> *Ibid.*, p. 245; C. F. Romanus and R. Sunderland, *US Army in World War II, China-Burma-India Theater: Stillwell's Mission to China* (Washington DC, Department of the Army, 1953) [hereafter, Romanus and Sunderland, *Stillwell's Mission*], pp. 198-201, 321.

<sup>12</sup> Woodburn Kirby, *The War Against Japan, Volume II*, pp. 236-238.

<sup>13</sup> *Ibid.*, pp. 253-268, 309-330, 347-360.

<sup>14</sup> M. Howard, *History of the Second World War: Grand Strategy, Volume IV* (London, HMSO, 1972) [hereafter, Howard, *Grand Strategy, Volume IV*], pp. 629-630.

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- <sup>15</sup> Woodburn Kirby, *The War Against Japan, Volume II*, p. 369.
- <sup>16</sup> *Ibid.*, pp. 381-382; Howard, *Grand Strategy, Volume IV*, p. 664.
- <sup>17</sup> Howard, *Grand Strategy, Volume IV*, pp. 687-688.
- <sup>18</sup> Woodburn Kirby, *The War Against Japan, Volume II*, pp. 392-398.
- <sup>19</sup> *Ibid.*, pp. 421-426.
- <sup>20</sup> C. F. Romanus and R. Sunderland, *US Army in World War II, China-Burma-India Theater: Stillwell's Command Problems* (Washington DC, Department of the Army, 1987) [hereafter, Romanus and Sunderland, *Stillwell's Command*], pp. 119-159; S Woodburn Kirby et al., *History of the Second World War: the War Against Japan, Volume III* (London, HMSO, 1961) [hereafter, Woodburn Kirby, *The War Against Japan, Volume III*], pp. 169-186.
- <sup>21</sup> Woodburn Kirby, *The War Against Japan, Volume III*, pp. 133-160.
- <sup>22</sup> *Ibid.*, pp. 235-248, 297-312, 329-374.
- <sup>23</sup> S. Woodburn Kirby et al., *History of the Second World War: the War Against Japan, Volume IV* (London, HMSO, 1965) [hereafter, Woodburn Kirby, *The War Against Japan, Volume IV*], pp. 135-142, 149-190, 211-224, 253-274, 283-314, 341-400.
- <sup>24</sup> C. Thorne, *Allies of a Kind* (Oxford, Oxford University Press, 1978); R Callahan, *Burma 1942-1945* (London, Davis-Poynter, 1978).
- <sup>25</sup> L. Allen, *Burma: the Longest War* (London, Dent, 1984) [hereafter, Allen, *The Longest War*].
- <sup>26</sup> J. H. A. Thompson, *The Imperial War Museum Book of the War in Burma* (London, Sidgwick and Jackson, 2002).
- <sup>27</sup> J. Latimer, *Burma: the Forgotten War* (London, John Murray, 2004) [hereafter, Latimer, *The Forgotten War*].
- <sup>28</sup> G. Evans, *Slim as Military Commander* (London, Batsford, 1969).
- <sup>29</sup> R. Lewin, *Slim: the Standard Bearer* (London, Leo Cooper, 1976).
- <sup>30</sup> R. Lyman, *Slim: Master of War* (London, Constable, 2004).
- <sup>31</sup> J. Connell, *Wavell: Supreme Commander* (London, Collins, 1969); R Lewin, *The Chief* (London, Hutchinson, 1980).
- <sup>32</sup> P. Zeigler, *Mountbatten: the Official Biography* (London, Collins, 1985).
- <sup>33</sup> J. Connell, *Auchinleck: a Critical Biography* (London, Cassell, 1959).
- <sup>34</sup> P. Moon (ed.), *Wavell: the Viceroy's Journal* (Oxford, Oxford University Press, 1973) [hereafter, Moon, *The Viceroy's Journal*].
- <sup>35</sup> D. Marston, *Phoenix from the Ashes* (Westport CT, Praeger, 2003).
- <sup>36</sup> T. Moreman, *The Jungle, the Japanese and the Commonwealth Armies at War, 1941-1945* (London, Frank Cass, 2005).
- <sup>37</sup> B. Bond and T. Kyaoichi (eds.), *British and Japanese Military Leadership in the Far Eastern War 1941-1945* (London, Frank Cass, 2004).
- <sup>38</sup> S. Woodburn Kirby et al., *History of the Second World War: the War Against Japan, Volume I* (London, HMSO, 1957); Woodburn Kirby et al., *The War Against Japan, Volume II, Volume III, Volume IV*; S. Woodburn Kirby et al., *History of the Second World War: the War Against Japan, Volume V* (London, HMSO, 1969) .

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- <sup>39</sup> Bisheshwar Prasad (ed.), *Official History of the Indian Armed Forces in the Second World War 1939-1945, Indian War Economy* (Combined Inter Services Historical Section, India and Pakistan, 1962), [hereafter, Prasad, *Indian War Economy*].
- <sup>40</sup> Compton Mackenzie, *Eastern Epic* (London, Chatto and Windus, 1951) [hereafter, Mackenzie, *Eastern Epic*], pp. 1-16, 75-81, 173-182, 523-532; A. Jackson, *The British Empire and the Second World War* (London, Hambledon Continuum, 2006) [hereafter, Jackson, *The British Empire*], pp. 351-370.
- <sup>41</sup> Bisheshwar Prasad (ed.), *Official History of the Indian Armed Forces in the Second World War, 1939-1945, The Technical Services* (Combined Inter Services Historical Section, India and Pakistan, 1962) [hereafter, Prasad, *Technical Services*]; S. Verma and V. K. Anand, *The Corps of Indian Engineers, 1939-1947* (New Delhi, Historical Section, Ministry of Defence, Government of India, 1974) [hereafter, Verna and Anand, *The Indian Engineers*].
- <sup>42</sup> Thompson, *The Lifeblood of War* (London, Brassey's, 1991), pp. 75-102.
- <sup>43</sup> T. M. Kane, *Military Logistics and Strategic Performance* (London, Frank Cass, 2001).
- <sup>44</sup> Sir William Slim, *Defeat Into Victory* (London, Cassell, 1956) [hereafter, Slim, *Defeat Into Victory*].
- <sup>45</sup> F. A. E. Crew, *Medical History of the Second World War: Army Medical Services: Campaigns, Volume V, Burma* (London, HMSO, 1966).
- <sup>46</sup> Van Creveld, *Supplying War*, p. 1.
- <sup>47</sup> *The Concise Oxford Dictionary, Ninth Edition* (Oxford, Clarendon, 1995), p. 802.
- <sup>48</sup> Army Administrative Planning, p. 155.
- <sup>49</sup> P. Foxton, *Powering War* (London, Brassey's, 1994) [hereafter, Foxton, *Powering War*], p. 3; P. Sarin, *Military Logistics: the Third Dimension* (New Delhi, Manas, 2000) [hereafter, Sarin, *Military Logistics*], p. 31.
- <sup>50</sup> Foxton, *Powering War*, p. 2.
- <sup>51</sup> Sarin, *Military Logistics*, p. 31.
- <sup>52</sup> Moore, *Logistics*, p. 513.
- <sup>53</sup> War Office Field Service Pocket Book, Pamphlet Number 9, 1939: Supply and Replenishment of Material in the Field; War Office Royal Army Service Corps Training Pamphlet Number 7, 1942, Part 1: Distribution of Supplies in Advance of Railhead; War Office Royal Army Service Corps Training Pamphlet Number 7, 1942, Part 2: Distribution of Petrol and Lubricants in Advance of Railhead; War Office Royal Army Service Corps Training Pamphlet Number 7, 1942, Part 3: Distribution of Blankets, Anti Gas Equipment and Reserve Clothing in Advance Of Railhead; War Office Royal Army Service Corps Training Pamphlet Number 8, 1942, Part 1: Supply Organization in the Line of Communication Area; W. G. Lindsell, *Military Organization and Administration, 26<sup>th</sup> Edition* (Aldershot, Gale and Polden, 1944), pp. 86-118.
- <sup>54</sup> The National Archive, Kew [hereafter, TNA], WO 172/381, Administrative Plan for the Defence of North East India, Apr 42.

# **PART ONE**

## CHAPTER ONE

### THE CHALLENGE FACING INDIA: MAY 1942

Following the fall of Singapore on 15 February 1942, the loss of Burma presented India with economic and strategic crises, which she was ill-equipped to address. It also threw into stark relief the operational and logistical challenges, which had to be overcome before the war could be taken back to the enemy. Some of these emerged from the lessons of defeat in Malaya and Burma and some from India's economic and strategic position in May 1942, when the Japanese arrived on her eastern frontier. This chapter explores the logistic contribution to, and implications of, the loss of Burma, as well as the state of India's preparedness for war against Japan, in which she was to be the front line and strategic base. From this examination emerge the main logistic problems that had to be solved at the strategic, operational and tactical levels before the allies could go back onto the offensive.

#### *The loss of Burma in 1942*

Burma covers an area of some 240,000 square miles (see Map Two). From north to south, that area would reach from southern Denmark to southern Italy, and, at its widest part, from east to west, across France from Brest to the Rhine. Burma's land borders with India, to the west; and China, Laos (French Indo-China in the 1940s) and Thailand, to the east; are mountainous and widely covered, even today, in dense jungle. During the south west monsoon, which blows from May to October each year, the coastal areas and the mountainous periphery of the country are subject to exceptionally heavy rain and stormy conditions, which, in the 1940s, rendered both ground and air movement difficult and dangerous at best, and well nigh impossible for much of the time. The central part of Burma comprises the basins of the Irrawaddy and Sittang rivers. These plains are (and were in the 1940s) extensively cultivated, especially in their southern areas, around Rangoon, mainly for rice production. That part of the country is also subject to very wet conditions during the south west monsoon. However, the area bounded roughly by Meiktila, Yenangyaung, Kalewa and Shwebo, around the confluence of the Irrawaddy and Chindwin rivers, is known as the 'dry zone'. Lying in the rain shadow of the Arakan hills, it is more arid and was then less cultivated than the rest of the central basin. The southern part of the

country is a long, narrow, largely jungle-covered strip, known as the Tenasserim coast, lying between Thailand, to the east, and the Andaman Sea, to the west.

The main L of C in the central part of the country tend to run roughly north-south along the lines of the Irrawaddy, Chindwin and Sittang rivers, which, themselves, carry a good deal of traffic, as they did in the 1940s. The Salween, further east, was used less for transport purposes, as it flows quickly through the mountains of the Shan States and did not pass through particularly productive country. Beside the Irrawaddy and Sittang lay a limited network of reasonably good, two-way, all-weather roads as far north as Shwebo, and a road of similar standard ran from Mandalay, through Lashio to Kunming, in China. Otherwise the road system was poor and of fair-weather standard only, carrying little, if any, motor traffic. A metre gauge railway system, centred on Rangoon, had lines running north west to Prome, on the Irrawaddy; south east as far as Martaban, on the Tenasserim coast; and north to Mandalay. There, the north-bound line divided, one branch going on further north to Myitkyina and another going north east to Lashio, running alongside the Kunming road. The Arakan coast and the Tenasserim coast, south of Martaban, were served by coastal shipping. Cross border communications were not good. The only high-capacity overland link with any neighbour was the road from Mandalay to Kunming. Elsewhere, a few tracks crossed the mountains to Thailand and India, but they were passable only to people and animals on foot in fair weather. Most external trade was carried by sea, the principal port being the capital, Rangoon, which was also the nodal point of the inland L of C and the peacetime logistic base for the Burma garrison. There were several good airfields in the country, the main ones in the northern and central part of the country being at Myitkyina, Mandalay, Magwe and Rangoon. Three other fields, Tavoy, Mergui and Victoria Point, on the Tenasserim coast, formed part of the vital air reinforcement route southward to Singapore.<sup>1</sup>

British defence planning for Burma in the 1920s and early 1930s had been developed under the assumption that the country was not subject to any external threat, and was not, therefore, strategically important. The mountain barriers separating Burma from her neighbours to the east, were assumed to be impassable to an invading army. Moreover, all the countries with which she shared borders were friendly, providing yet further protection from Japan, which was then the only anticipated source of

aggression. The fleet operating out of Singapore, which was the keystone of British defence policy in the far east, would protect Burma from any sea-borne attack. That fleet, however, along with the impenetrability of the mountain barriers and the friendly disposition of Burma's eastward neighbours, turned out to be mythical. From the late 1930s onwards, with the possibility of war in the far east looming, the strategic significance of Burma became apparent, and it was very largely of a logistic nature. Burma provided the British Empire, and especially India, with essential supplies of oil, rice, timber and minerals, which had to be protected. The link she provided in the air reinforcement route to Singapore was becoming ever more important. Plans for the defence and sustainment of Singapore depended increasingly on air power as it became ever clearer that the anticipated time delay before the arrival of the fleet from home waters would have to be extended due to the gathering storm of war in Europe. Following the Japanese occupation of northern French Indo-China in September 1940, an overland threat from the east became rather less incredible, and Burma, with her mountainous borders and great river obstacles provided the outer layer of air and ground defence for the Indian industrial heartland around Calcutta. From that time also, with the port of Haiphong denied to the Chinese, the route from Rangoon to Kunming provided the only overland supply line to China, which had already been at war with Japan for three years. Maintaining that link would become increasingly significant once the Americans entered the war. By the end of 1941, up to 15,000 tons of supplies per month passed through Burma en route to China, and a peak of over 20,000 tons was reached in March 1942 due to a last minute effort just ahead of the Japanese capture of Rangoon.<sup>2</sup>

In all these strategic roles, however, Burma was to prove vulnerable. The three Tenasserim airfields on the Singapore air reinforcement route lay very close to the Thai border. It had been assumed that they would be secure while that country remained friendly to Britain but the fields were to be seized by the Japanese as soon as they invaded Thailand and Malaya in December 1941, beginning the ever-tightening strangle-hold on Singapore. The port of Rangoon; the nearby oil refinery at Syriam, the only one in the country; and the southern part of the supply route to China then lay directly in the path of the unforeseen Japanese invasion route from Thailand. After the fall of Singapore in February 1942, these vital places were vulnerable also to attack from the sea. They were to be lost early in the campaign,



isolating both the withdrawing British and Chinese combined Burma Army and China itself. Finally, once the Japanese had proved that they could cross the mountains on Burma's eastern border and seize the country, they posed a serious ground and air threat to eastern India, which Indian defence arrangements were ill-equipped to counter.

Like Singapore and Malaya, Burma had been severely under-resourced in peacetime to cope with war; indeed she was considerably worse prepared because of her apparent lack of strategic importance until it was too late to correct the resultant shortcomings adequately. To make matters worse, in the run up to war, and even after it had started, responsibilities for Burma's defence fell between the four stools of the War Office in London; India Command; Far East Command in Singapore; and the combined American, British, Dutch and Australian Command (ABDACOM), which was established in the Netherlands East Indies in January 1942. After the administrative and political separation of Burma from India in 1937, operational command of the Burma garrison was retained by the C-in-C India, while the War Office handled its administration. In 1940, operational responsibility was transferred to the C-in-C Far East to reflect the importance of the role Burma played in the air reinforcement plans for Singapore. Administrative control, however, was still held by the War Office, although India Command was made responsible for the actual provision of logistic supplies and services. Operational responsibility for Burma reverted to the C-in-C India on 11 December 1941, when the possibility of Singapore's being isolated became apparent. One month later, however, on 12 January 1942, it was transferred again, this time to the newly formed ABDACOM, in view of Burma's importance to the sustainment of China. The C-in-C India was then given full administrative command. ABDACOM was dissolved on 25 February 1942, after Singapore had fallen and the Japanese invasion of the Netherlands East Indies was virtually complete. At that stage, both operational and administrative responsibility for Burma reverted to the C-in-C India but, by then, southern Burma had already been lost and Rangoon was close to falling. Such turbulence in, and separation of, administrative and operational responsibilities was virtually guaranteed to disrupt Burma's preparation for war. A commander responsible only for the administration of a force and not its operational effectiveness has little incentive to meet its requirements, especially when he has other pressing commitments of

apparently higher priority.<sup>3</sup> Such was the case with regard to Burma. Consequently, the country has been described as ‘almost defenceless’ by the start of the war in south east Asia.<sup>4</sup>

The peacetime garrison of Burma comprised two British infantry battalions, four battalions of the indigenous Burma Rifles and nine battalions of Burma Military Police. The latter was essentially a *gendarmerie*, six battalions of which were converted to border control duties, with the title of Burma Frontier Force, in 1939. These forces, all of whose primary role was border and internal security rather than conventional military operations, were supported by one mountain artillery battery, one field engineer company and engineer works services. Administrative arrangements were designed for static, peacetime operations, with almost all supply, transport and maintenance services being provided directly from civil sources under contract. Arms and equipment were generally in short supply, and were inadequate for anything more intensive than the policing duties of the garrison.<sup>5</sup> By the outbreak of the far eastern war in December 1941, the garrison had been increased to two British and six Indian infantry battalions, fourteen battalions of the Burma Rifles, nine battalions of the Burma Frontier Force, one battalion of auxiliaries, four artillery batteries and two field engineer companies. Most of these units had been grouped into the newly formed 1<sup>st</sup> Burma Division, which comprised four brigades and was deployed mainly in the Shan States for defence against any Japanese incursion from French Indo-China.<sup>6</sup> That division lacked much in the way of administrative staff and services. In early January 1942, the 17<sup>th</sup> Indian Division arrived from India. The division had been preparing for deployment to the middle east when it was split up, two of its brigades going to Malaya and the remainder going to Burma, where it was reinforced by two other brigades, with which it had not trained at all. The 17<sup>th</sup> Division was deployed to the northern end of the Tenasserim coast to counter the new threat from Japanese-occupied Thailand.<sup>7</sup> At that time, the air force in Burma was meant to have been equipped with 280 front line aircraft. It actually comprised one flight of sixteen RAF Buffalos, an obsolete American type, along with a squadron of twenty one modern American P40 fighters flown by Colonel Chennault’s American Volunteer Group, who worked for Chiang Kai Shek, defending the supply route to China.<sup>8</sup> The order of battle of the army in Burma at the time of the Japanese invasion is at Appendix Two.

Despite the late operational reinforcement, however, internal administrative arrangements remained unchanged from their peacetime structure until the Japanese war had started, largely because of the separation of operational and administrative responsibilities. Headquarters, Burma Army, under Lieutenant General Hutton, was forced to combine the functions of a general headquarters (GHQ), a corps headquarters and a L of C command. Consequently, it was unable to master any of them effectively.<sup>9</sup> After visiting Burma in October 1941, the Adjutant General of India reported that the administrative staff and units were inadequate for modern, mobile warfare and his accompanying Director of Ordnance Services anticipated a complete breakdown of administration in the event of hostilities. In order to strengthen the weak administrative staff, the two British battalions were being 'milked' of their most capable officers, with consequent deleterious effect on their operational readiness.<sup>10</sup> There was no army transportation organization to augment the docks, railways and IWT in facilitating military movements.<sup>11</sup> Transport and movements services, which were designed for peacetime purposes, were still under civilian control, and no action had been taken to prepare them for the demands of war. To arrange the transport of freight and personnel, the already over-stretched administrative staff had to deal with numerous civilian agencies, for whom the army was just another customer. A transportation director for the Burma Army was not appointed until the end of January, when the campaign was already seven weeks old.<sup>12</sup> There was no shortage of rail and docks equipment or river craft, but there was no code of discipline to keep civilians, on whom the army depended for essential administrative support, at work in the face of enemy action, and many would desert at critical times, particularly after air raids. Consequent labour problems aggravated existing congestion at Rangoon docks due to the quantity there of lend-lease equipment and supplies destined for China. That, in turn, delayed delivery of supplies for the garrison.<sup>13</sup> In September 1941, Burma had orders still outstanding for 2,604 military vehicles, and, at the outbreak of war, had only seven general purpose transport (GPT) companies, with 100 trucks each, to support the whole garrison.<sup>14</sup> Reinforcements arrived without integral transport, so 620 lend-lease vehicles intended for China were requisitioned by the British and a transport company was taken off docks work to drive them in support of front line formations. Consequently, there were further delays in clearing the docks and 4,000 tons of

equipment were lost there when Rangoon fell.<sup>15</sup> Military workshops facilities were limited to unit first line support only, and the army relied on civilian workshops in Rangoon for all second and third line repair and maintenance work.<sup>16</sup> There were no transport aircraft for tactical supply so, as in Malaya, the Burma garrison was very largely road-bound. The garrison did have four mule companies, which could have given it some degree of tactical off-road mobility, but that does not appear to have been exploited to any extent, and, in any case, they were destined to be lost early on in the campaign.

On 12 December 1941, on assuming operational responsibility for Burma, General Wavell, then the C-in-C India, sent sixty one administrative staff officers to Burma, including Major General Eric Goddard as the Major General, Administration (MGA). The importance of the administrative problems is indicated by the fact that Goddard was second in seniority only to Hutton, the General Officer Commanding (GOC) Burma himself. India also sent additional motor transport, along with seven and a half months' stocks of general supplies and clothing, three months' worth of ammunition and transport spares. Thereafter, stocks of rations, ammunition and POL were adequate but there was a shortage of personnel qualified to supervise the storage and handling of ammunition, and the vulnerability of the only oil refinery at Syriam remained a cause for concern.<sup>17</sup> Indian Army transportation troops, comprising a docks operating group and a railway construction and maintenance group, were sent to replace civilian staff, who were already beginning to desert. They were not in sufficient numbers, however, to make good the losses of civilian labour.<sup>18</sup> In January 1942, with the rail network facing widespread breakdown due to desertions, the army took over much of the running of the railways, bringing some improvements to services until the latter stages of the withdrawal. In April 1942, however, after constant withdrawal and losses, the apparent inevitability of defeat precipitated the final breakdown of the network.<sup>19</sup>

The poor state of Burma's logistic position at the outbreak of war was a principal factor in causing Wavell, in his new role as the new C-in-C ABDACOM, to refuse, at first, an offer from Chiang Kai Shek of two Chinese armies to assist in the defence of the country, in order to keep the supply line to China open. Wavell was criticised later for this rebuttal, but he felt, with justification, that the logistic infrastructure

would have been unable to cope. Each Chinese army was the numerical equivalent of a British division, and the Chinese, who had no logistic organisation of their own, would either have had to live off the land or become a burden on the already over-stretched British system, such as it was. He was motivated also, of course, by the need for Britain to be seen to be defending its own imperial responsibilities. Wavell later changed his mind when it became clear that the British Burma garrison could not hold the Japanese by itself but could, after all, sustain a Chinese force of three armies, at least with rations, basic ordnance supplies and POL.<sup>20</sup>

In January 1942, Hutton, the GOC Burma, foreseeing the increasing threat to Rangoon, ordered the administrative base and three quarters of the stocks at Rangoon to be moved to a new army advanced base to be established in central Burma. The new base was to be sited around Mandalay and Meiktila, with forward ordnance and supply depots further south, at Prome.<sup>21</sup> At the same time, a Burma Army transportation directorate was established to take control of the newly arrived transportation troops and make the army independent of civilian movements control. Command of the army's administrative rear area was delegated to a newly formed L of C Command.<sup>22</sup> Still, however, the headquarters of the Burma Army had to combine the functions of GHQ and corps headquarters. Goddard, the new MGA, managed to complete most of the task of re-deploying the base before Rangoon fell.<sup>23</sup> Within this new structure were stored rations and medical supplies for six months and sufficient ammunition to last until the monsoon, due in May, when, it was anticipated, any Japanese advance would be brought to a halt by the weather. Sufficient refining equipment was removed from the Syriam refineries to the Yenangyaung oilfields, north of Prome, to enable makeshift production of about one million gallons of petrol per month in the event of Rangoon being lost. Although only half the desired target, this was thought to be enough to sustain operations until the monsoon.<sup>24</sup> Due to the speed and resource constraints under which the re-location had to be conducted, there was a considerable amount of mal-placement and loss of control of supplies, but they were, for the time being at least, out of reach of the Japanese and sufficient to sustain operations in the short term.<sup>25</sup> At the same time, India Command began to drive a fair-weather motorable track through to Kalewa, on the west bank of the Chindwin, from Imphal, in Assam.<sup>26</sup> These measures were to enable the allied Burma Army to continue fighting after the loss of Rangoon and, eventually, for the British element, by

then re-formed as the Burma Corps, to withdraw into India. Without them, the corps would almost certainly have been destroyed as soon as Rangoon fell and it was denied supplies and contact with the outside world.

At the time of the Japanese invasion of Malaya in December 1941, the imperative to keep the Singapore air reinforcement route open led to forces being dispersed in defence of the Tenasserim airfields, which, in the event, were either evacuated before the Japanese arrived or their garrisons overwhelmed and defeated almost immediately. Substantial quantities of supplies were lost. This early defeat had a severely detrimental effect on morale at the outset of the campaign. The main invasion of Burma then took place across the Tenasserim border with Thailand, at the Kawkaik pass, south east of Moulmein, on 20 January 1942. The British political desire, for reasons of imperial responsibility and prestige, to defend Burmese territory as far forward as possible, combined with the need to keep the Japanese as far away as possible from Rangoon and the supply routes to China, resulted in the initial British defence being too dispersed and mounted too far forward. Against the advice and wishes of its commander, the 17<sup>th</sup> Indian Division, recently arrived from India, was deployed forward of Moulmein.<sup>27</sup> There it was isolated in front of one of the better natural defensive ground features in that part of the country, the tidal estuary of the Salween river. The division was at the end of tenuous and vulnerable L of C, served by the railway from Rangoon, there being no road link over the Sittang river. A FSD for the division was established at Moulmein, on the south east bank of the Salween. Being across the river from the rail-head at Martaban, the FSD had to be stocked by ferry and was vulnerable to enemy action. Subsequently, many vehicles and two complete mule companies were lost at the initial battle at Kawkaik, on the Thai border, and many of the supplies at Moulmein were abandoned before that town fell a few days later.<sup>28</sup> After evacuating Moulmein, the 17<sup>th</sup> Division was forced to withdraw northwards, repeatedly failing to stop the advance of the Japanese, who outflanked and cut off each defensive position they encountered. On 23 February 1942, the last good line of defence before Rangoon, the Sittang river, was lost, and the 17<sup>th</sup> Division was all but destroyed when the rail bridge over the river was demolished with most of the division still on the eastern bank. Virtually all the division's transport and equipment were captured or destroyed and only 3,500 men were recovered, barely half of them still in possession of their weapons.<sup>29</sup> With that, and

the fall of Singapore eight days earlier, Rangoon, Syriam and the terminus of the supply route to China were open to Japanese attack by land, sea or air. The experienced 7<sup>th</sup> Armoured Brigade, recently arrived from the middle east, was able to cover the withdrawal of the remnants of the 17<sup>th</sup> Division, but, with the Japanese having air superiority, it could not stem their overland advance for long.

On 3 March 1942, following the Sittang bridge disaster, Lieutenant General Harold Alexander took command of the Burma garrison from Hutton, who then became Alexander's Chief of Staff. By that time, the CEF of three armies had finally been accepted and was arriving from China through the Shan States and the upper Sittang valley. Without their own logistic support, the Chinese were to become a liability on the British administrative system and the activities of some, living off the land at the expense of the civil population, alienated many Burmese from the allied cause. The CEF deployed alongside the British Burma garrison to make up a single, allied Burma Army, under Alexander's overall operational command. The CEF held the Sittang valley while the Burma garrison deployed in Rangoon and the Irrawaddy valley. On 19 March, the British garrison was formed into a new Burma Corps, under the command of Lieutenant General Slim. The outline order of battle of the combined Burma Army then is at Appendix Three.

Meanwhile, Wavell's directive to Alexander included the following instructions:

The retention of Rangoon is a matter of vital importance to our position in the Far East and every effort must be made to hold it. If, however, that is not possible, the British force must not be allowed to be cut off and destroyed, but must be withdrawn from the Rangoon area for the defence of upper Burma. This must be held as long as possible in order to safeguard the oilfields at Yenangyaung, keep contact with the Chinese and protect the construction of a road from Assam to Burma.<sup>30</sup>

Thus was stated formally, for the first of many times, the requirement to maintain the link with China. This concern, pressed repeatedly by the Americans, was soon to assume over-riding priority in allied war aims for the campaign in south east Asia at the strategic and operational levels. It is interesting to note as well that all three purposes of defending upper Burma were logistic. This also was a feature that was to re-appear in the future direction of the campaign. The likelihood of Alexander's ever

being able to fulfil that directive, however, has to be questioned, even in the context of the moment. At the time it was given, all that stood between the whole Japanese 15<sup>th</sup> Army and Rangoon was the recently arrived 7<sup>th</sup> Armoured Brigade and the remnants of the 17<sup>th</sup> Division. The Japanese, by then, also had command of the sea and air, so the operational level L of C between India and Rangoon were on the point of being cut and the port was at risk of three-dimensional attack.<sup>31</sup> If Rangoon was abandoned and the Burma Army withdrew north, it could only continue to fight for six months at the most before its supplies ran out. That would not have been long enough to establish a new all-weather route from India into Burma, and the fair-weather track being driven from Imphal to Kalewa would have had nothing like the capacity to sustain the operations of an army at any time of year, let alone through the monsoon. Nevertheless, the directive gave Alexander the authority to withdraw northwards once it was clear that Rangoon was no longer defensible. Thereafter, however, it became increasingly unclear whether the real British objective was to deny northern Burma to the Japanese or to withdraw as much of the Burma Corps as possible to India in sufficiently good order to continue the fight from there.<sup>32</sup>

Rangoon fell on 8 March 1942. The allied Burma Army, although supplied adequately to continue the fight for a while, was, for the time being, cut off from India. British reinforcements and external replenishment would be limited to what little could be flown into Myitkyina airfield, in north Burma, by the very few transport aircraft available to India Command. Meanwhile, the Japanese were then able to reinforce by sea with men and heavy equipment, which they had not been able to bring with them through the jungle on their initial invasion from Thailand. A number of industrial installations and workshops were left intact for the Japanese to use while their essential services were thenceforth denied to the British.<sup>33</sup> Under increasing Japanese pressure and air superiority, the combined British and Chinese Burma Army was forced to withdraw northward along the lines of the Irrawaddy and Sittang valleys.

During the withdrawal, as had been the case in Malaya, the principal logistic problem for the British was not so much a lack of combat supplies in the new makeshift base as their inability to sustain defensive positions along the road and rail L of C. Distribution of supplies was hampered by an increasing lack of transport due to losses



in action. After its re-constitution following the Sittang bridge disaster, the 17<sup>th</sup> Division was reduced to just seventy two trucks - one sixth of its establishment. In the 1<sup>st</sup> Burma Division, the usual procedure of automatic forward delivery of combat supplies was not put into practice, and units had to send transport back to collect them. Not only was this an additional administrative burden they could well have done without, but it ran the risk of the supply system being replaced by marauding bands of scavengers seeking out supplies wherever they could find them.<sup>34</sup> The maintenance organisation improved, however, once the new Burma Corps Headquarters got into its stride.

Nevertheless, troops of the Burma Corps, ill-prepared for high intensity operations in close country, were insufficiently mobile off the roads to be effective against Japanese tactics. The Japanese continually outflanked British defences by infiltration across country to cut the British L of C, forcing the British to break out and withdraw in order to re-establish their supply routes.<sup>35</sup> For some time, a small force of Royal Marines and commandos on the Irrawaddy attempted to prevent the Japanese from using the river as well to outflank British defences. That effort, however, became increasingly ineffective due to attrition, until, by mid-April 1942, the Japanese had won virtually uncontested use of the river to cut British L of C, much as they had done in Malaya by coastal movement. Later that month, an attempt was made to establish strong defended localities at Prome and Allanmayo, just to the north of Prome, stocked for prolonged siege, and able to withstand being isolated. However, the plan was overtaken by the speed with which the Japanese surrounded Prome, forestalling the preparation of any proper defences and precipitating a British withdrawal with substantial loss of stockpiled supplies and equipment held in the FSD there.<sup>36</sup> Later, in defence of the Yenangyaung oilfields further north, the 1<sup>st</sup> Burma Division attempted to hold on while surrounded, awaiting a counter attack by a Chinese division, which came too late. Having exhausted its supplies, the Burma Division was forced to break out and withdraw, losing almost all its transport.

Once the Yenangyaung oilfields were lost on 19 April 1942, it became clear that withdrawal from Burma was inevitable as there was insufficient POL remaining to sustain operations. By that time, too, substantial quantities of other essential supplies had been lost to Japanese air attack or had been abandoned in the haste of British

withdrawals, so the beneficial effects of Hutton's base re-location were being rapidly eroded. In the face of continual losses of transport, bullock carts, mules and ponies were purchased to replace motor vehicles for tactical supply, while the few remaining trucks were concentrated on stocking supply dumps along the withdrawal route from Mandalay to Kalewa. Meanwhile, India Command completed the track from Imphal to Kalewa, where a further 800 tons of supplies were dumped to sustain the British Burma Corps along with one Chinese division withdrawing that way into India.<sup>37</sup> The remainder of the Chinese, meanwhile, largely living off the land, withdrew north eastwards into China. Burma was finally abandoned in early May 1942.

### *The logistic causes of failure in Burma and the lessons learned*

The principal causes of failure in the Burma campaign of 1942 were similar to those in Malaya. Inadequate preparation in virtually all aspects of military effectiveness undermined the security of the country at every level from strategic to tactical. At the strategic level, there had been no plans to defend Burma against external aggression, and consequently her defences were severely under-resourced. Realistic strategic direction was lacking from well before hostilities broke out right up until the decision was taken to withdraw to India. At that level, also, the separation of operational and administrative responsibilities in the run up to war in south east Asia prevented the correct attention being given to Burma's defence plans and resourcing until far too late. At the operational level, early campaign planning was over-influenced by political aspirations to maintain the prestige of British rule by ceding the minimum amount of Burmese territory, as well as the need to maintain the integrity of the Singapore air reinforcement route. Consequently, at the outset, the small garrison was dispersed too far forward, rather than concentrating behind the best natural defences, with good L of C, to protect the vital administrative ground of Rangoon and the supply line to China. Logistic plans for sustaining the army at the operational level were designed for peacetime convenience and economy, and were not modified sufficiently to cope with the pressures of war until it was far too late. Thereafter, the one crucial administrative success of the campaign, the re-location of the logistic base from Rangoon to the Mandalay area, saved the Burma Corps from early destruction.

By the time of the withdrawal from Burma, those errors were effectively water under the bridge. Nothing could be done about them that would alter the future course of the war. At the tactical level, however, there were lessons to be learned from defeat in both Malaya and Burma that could make a fundamental difference to future British military effectiveness in south east Asia. At that level, the British supply system was shown to have been too rigid to cope with the fluid manouvre warfare at which the Japanese excelled in close country. British logistic requirements, in a multi-cultural army were a great deal more sophisticated and complex than those of the Japanese, who, all used to a diet of rice, could live off local resources to a greater extent. This put the Japanese at a distinct advantage in a relatively remote, under-developed environment. British dependence upon roads and mechanised transport for sustainment right up to the forward areas constrained their ability to manoeuvre and counter simple Japanese envelopment tactics. That, in turn, had forced repeated British withdrawals, made all the more difficult by Japanese air supremacy, resulting in the loss of supplies and equipment, which led eventually to critical shortages.<sup>38</sup> It had been identified early on in both Malaya and Burma that static, linear defence would not work in the jungle. Positions laid out in such fashion were easy to infiltrate or outflank in close country, whether they be at company or divisional level. Clearly, the key to defence was to hold the roads and other avenues, along which an attacking army would have to base its advance, but they had to be held in depth by positions, with all-round defence, which could withstand being surrounded and cut off. The defenders could not rely on uninterrupted use of the road for their maintenance. Once isolated, a defensive position had to be able to hold out while mobile reserves counter attacked the encircling enemy forces, destroying them in the process. Even the defensive part of the operation could not be entirely static. The defended position itself was to be a secure base from which strong, mobile columns sallied forth to dominate the surrounding country, disrupting Japanese outflanking movements and interdicting their supply lines. At corps or divisional level, those columns might have to be out on patrol or fighting for long periods.<sup>39</sup>

There was nothing new about the Japanese tactics or the methods of holding and counter attack advocated to defeat them, but successful counter-measures required much additional training for men new to the oppressive environment of the jungle. Equally as important, though, they required the right equipment and a flexible tactical

logistic system, which could sustain substantial forces cut off by the enemy or manoeuvring away from roads for protracted lengths of time. In Malaya and Burma in 1942, without tactical air supply, the only way of sustaining a defensive position for any length of time was to stock it up well in advance. Without the resources and training to mount effective counter attacks, however, and without the confidence and means to hold isolated positions for any length of time, the defenders were inevitably forced to withdraw, usually abandoning their supplies, transport and heavy equipment. The means of successfully sustaining isolated positions would depend upon the development of air, water and animal-borne supply, but troops also needed to be able to move and sustain themselves on the ground much more freely. They needed to be able to live harder, with simpler logistic requirements. The 17<sup>th</sup> Division commissioned an examination by Brigadier Cameron, one of its Brigade Commanders, on the lessons of the retreat from Burma. Apart from numerous training recommendations aimed at achieving this level of self-sufficiency, Cameron's report advocated simplification of equipment and supply, and a substantial reduction in heavy motor transport at the divisional level, to be replaced by mule and jeep companies, which could operate off roads.<sup>40</sup> These ideas would eventually contribute much to victory, but their implementation was to be slow, due largely to resource constraints and the time needed for training.

### *The Effects of the Losses of Malaya and Burma.*

The early losses of Malaya, Singapore and Burma had a profound effect on the allied conduct of the war in south east Asia. The British lost their principal strategic base for the theatre along with important sources of some essential supplies, including oil, tin, rubber, timber, minerals and foodstuffs. Australia and New Zealand were laid open to attack by air and sea, and were subsumed firmly into the American sphere of influence. In establishing and building a new base, additional strain was to be put on the allied merchant shipping fleet, which was already substantially over-committed.<sup>41</sup> China was effectively isolated by land, and the sustainment of Chiang Kai Shek's forces dominated allied strategy in the theatre for the rest of the war. The allocation of American resources, which were to be vital to the conduct of operations in south east Asia, reflected the priority placed by the United States on sustaining China over British aspirations to recover her lost far eastern empire. Maintaining and expanding

the China link became and remained the principal allied strategic war aim in the theatre until the beginning of 1945. Churchill's aspirations to by-pass Burma and re-capture Singapore directly by amphibious invasion were repeatedly frustrated by American pressure, the lack of amphibious resources and, eventually, realization of the need to secure Burma's rice supply in order to sustain the population of Malaya when that country had finally been re-captured.<sup>42</sup> Control over the Bay of Bengal was lost and India's outer eastward defences were breached. She was threatened from a direction almost completely unforeseen in her defence planning hitherto, finding herself right in the front line on land, at sea and in the air. At the same time, she was forced into the position of becoming the strategic base for further operations in south east Asia, a role which her economy was ill-prepared to sustain.<sup>43</sup> The time it took India to come to grips with the unexpected challenges she faced in May 1942 determined very largely the allied programme for taking the war back to the Japanese in that theatre. The next part of this chapter examines India's preparedness to cope with the new threats and responsibilities suddenly thrust upon her, and concludes with a summary of the principal logistic issues which had to be addressed before the allies could contemplate victory. Three related internal issues shaped India's position in May 1942: the state of her economy, the development of her defence policy and armaments industry between the two world wars, and her initial response to the war against Germany.

### *The Indian economy*

There is little doubt that India had considerable economic potential at the start of the Second World War. With a population of some 400 million, she had a huge workforce, which, given adequate education, training and working conditions, could do much for the war effort. She had substantial stocks of strategically important raw materials and the makings of industries needed to sustain the war, even if they were then small, unsophisticated and inefficient. At that time, however, the development of the Indian economy was retarded in relation to the industrialised nations of the west and other comparable eastern countries, particularly Japan. India's was a largely peasant-based agrarian structure, with an average annual per capita income of a barely-credible sixty rupees – about four pounds and ten shillings at the time.<sup>44</sup> The standard of education of most of the workforce was low and there was a widespread

lack of trade skills. In Japan, successive governments since the modernisation period of the nineteenth century had taken an active role in driving the development of industry and commerce, so they were well advanced and suitably prepared to participate in the command-style economic culture necessary for the prosecution of total war. Indian governments, by contrast, had focused on provision of the basic infrastructure, such as the transport system, on which economic activity could grow, as well as emergency measures like famine relief, defence and internal security. It had been left to the commercial sector to develop the economy on those foundations and, for a variety of reasons, growth had been slow. During the First World War the Industrial Commission recommended that the Indian government increase its influence over the country's industrial development in order to cope with the pressures of that war, and the government had responded.<sup>45</sup> In the ensuing peace, however, it reverted to its traditional *laissez faire* attitude to industry and commerce.<sup>46</sup> Consequently, by the outbreak of the Second World War, India was lacking many of the industrial and economic capabilities necessary for the prosecution of a modern war, in which she was to have a front-line strategic role.<sup>47</sup> This charge is worthy of some elaboration if its significance to the conduct of the war is to be demonstrated sufficiently.

India had substantial stocks of raw materials essential to the war effort, but many of these were inadequately exploited. She refined few of her own mineral products herself, being very largely an exporter of raw materials and importer of manufactured goods. For example, she produced sixty per cent of the world's output of manganese ore, but refined only twenty per cent of that share herself. The rest was exported to Britain, France or Japan. She exported 38,000 tons of raw chromite annually, and the 12,000 tons she retained were used in furnace refractories rather than being refined into alloys. She had estimated bauxite reserves of 250 million tons but extracted little and imported all her aluminium.<sup>48</sup> She was potentially self sufficient in most minerals, but had to import a number, of which those causing most concern were sulphur and petroleum products.<sup>49</sup> Her estimated requirement for the latter in 1942 was two and a half million tons, of which she produced only 365,000 tons.<sup>50</sup> She did refine a substantial quantity of her own steel, having the second largest steel works in the British Empire, fed by three million tons of her own iron ore annually, in the late 1930s. However the steel she produced was not of the high quality needed for the

manufacture of munitions and was used mainly for construction, engineering and railway purposes. In 1939, she produced a total of 750,000 tons (a figure that doubled by the end of the war) and had to import 300,000 tons.<sup>51</sup>

India's manufacturing industries were fragile. She was able to produce large quantities of relatively simple items, such as textiles, leather goods, small machine components, construction materials, domestic equipment and the like, all of which were to be in high demand to equip the British imperial armies.<sup>52</sup> Her engineering capacity was unsophisticated, however. It was generally conducted in small jobbing workshops, serving other industries, rather than being a major producer in its own right, using up-to-date production techniques.<sup>53</sup> Working conditions were generally poor.

India had no motor or aircraft manufacturing industries at the outbreak of the German war, but she soon developed workshops to assemble vehicles delivered in kit form and to build bodies on imported chassis and engines, reaching an eventual wartime output of 54,000 per year. This work was extended into the similar assembly of light armoured support vehicles, but not in significant numbers.<sup>54</sup> The Hindustan Aircraft Company was formed in 1940 as an entirely commercial venture without government assistance. By April 1942, it had managed to build just three trainers, one fighter and one glider. By then it had become clear that indigenous aircraft construction was not economically feasible and, on the advice of an American technical mission in 1942, the company turned its attention to aircraft repair, becoming the largest such commercial undertaking in the theatre by the end of the war.<sup>55</sup> Likewise, ship-building of any strategic value was very limited. The construction of ocean-going vessels had ceased in the nineteenth century with the advent of iron-built, steam-driven ships, which were beyond the capabilities of Indian yards at the time. Some assembly of coastal and small craft continued and, in 1918, a total tonnage of 11,808 was completed. By 1937, however, that had declined to 2,418 tons. All boilers and machinery were imported.<sup>56</sup> This lack of ship-building capacity aggravated internal transport problems created by the removal of a quantity of coastal and river shipping to the middle east in 1940, as it could not be replaced locally in anything like sufficient numbers quickly enough. By April 1942, however, India was building some eighty minor war vessels, such as minesweepers, gunboats and harbour defence

launches, as well as a variety of small commercial working and cargo ships, and her yards had a reputation for high quality work. At that time, the Scindia Steam Navigation Company was planning a yard at Vizagapatam, on the east coast, for the construction of ships up to 8,000 tons, but still, at that stage, all the major machinery to be fitted in the hulls had to be imported.<sup>57</sup>

India's armaments industry was geared to meet limited peacetime requirements of frontier and internal security, and was ill-equipped to cope with the demands of modern war. In 1939, such weapons and munitions as she did make for herself were manufactured in eight government-run factories of low efficiency, whose output was limited in scope, quantity and sophistication. Almost all of them were obsolescent and produced in limited numbers.<sup>58</sup> There was no indigenous production of more sophisticated items such as up-to-date artillery; machine guns; or engineering, optical, electronic and radio equipment. In response to the growing threat in Europe, extensive studies had been made into modernising India's armaments industry during 1938, and development measures were in hand, but there had been no perceptible improvement by the start of the Second World War. Some substantial increase in output of existing products had been made, however, by early 1942. There had also been limited growth in the sophistication of products such as artillery ammunition and explosives; and the manufacture and repair of simple optical instruments had begun.<sup>59</sup> Nevertheless, overall, the Indian armaments industry was still weak and almost all up-to-date military equipment had to be imported. This aspect is considered further in relation to the development of Indian defence policy later on in the chapter.

This broad economic pattern, based largely on the export of raw materials and the import of refined or manufactured goods, aggravated the allied wartime shortage of strategic shipping capacity and added immeasurably to subsequent supply and equipment delays endured by the army as well as the economy at large. The situation was made worse by the closure of the Mediterranean in 1940, after which convoys from the United Kingdom could take up to three months to travel round the Cape of Good Hope.

Alongside a weak general economic base, nutrition standards were generally inadequate and much of the population was living at subsistence level. Agricultural



methods were primitive and unscientific. Consequently, yields were low. India was not self-sufficient in food production but, until 1942, the balance of her needs had been met from local trade within south east Asia. Annual rice production was 1,208 pounds per acre in India against 5,592 pounds per acre in Japan. On average, over the five years ending in 1938, she had had to import nearly two million tons of rice annually, mainly from Burma, a source she lost, of course, in March 1942. Her precarious position thereafter was to be evidenced tragically by the Bengal famine of 1943, which claimed something in the region of one and a half million lives.<sup>60</sup> By the start of the war, the population, which had doubled over the previous century, was growing faster than agricultural output. There were areas of agricultural land where the population density reached 800 to 1,000 people per square mile, leaving little space for the crops to feed them.<sup>61</sup> This was to be aggravated later by the influx of troops to areas where there was limited local farming production. The subsequent requirement to supply large quantities of food for the forces without straining local resources was destined to add to the load on an already stretched transport system. This would, in turn, add to the factors limiting the fighting efficiency of some formations at the front. Poor nutrition due to war pressures was also one of a number of factors blamed for a subsequent decline in coal production, which had an adverse effect on industrial output, construction work and the capacity of the railways.<sup>62</sup>

Despite having been traditionally one of the Indian government's main concerns, the country's transport and communications infrastructure was ill-prepared for war, particularly in north east Assam and east Bengal, where the fighting was to take place. Rural roads throughout the country were generally of poor quality, often un-metalled, and likely to become impassable during the monsoon rains. Most of the good roads served the north west frontier, where the majority of military field forces had been deployed to maintain order among the tribes and to counter the external threat from Afghanistan and Persia. There were very few airfields and most of those, like the road system, were sited to sustain military operations on the north west frontier. In September 1939, there were none capable of handling heavy, modern aircraft.<sup>63</sup> The rail network, although of reasonably good quality, was barely adequate for peacetime purposes, let alone those of total war, in which India was to have such pivotal roles as both base and front line. In a country twenty times the size of Great Britain it had only the same track mileage, with one third the number of locomotives and one sixth

the number of freight wagons.<sup>64</sup> The railways were run on a number of different systems, some state and some privately owned, using two principal gauges. Most of the major routes used the broad Indian 5'6" gauge, but some of the major routes and most of the peripheral system, particularly in the north of the country, ran on metre gauge track. In more remote areas, particularly in Assam, still narrower gauges were used, mainly for agricultural purposes, but these, to begin with, were all that were available to the army to sustain its deployment in parts of north east India.<sup>65</sup> The multiple gauge system limited the flexibility with which locomotives and rolling stock could be deployed and used around the country. Consequently, there had to be considerably more stock overall than would have been required on a network of the same total mileage using one standard gauge. Crossing between the gauge systems required complete trans-shipment of passengers and freight, the latter almost entirely by hand. The railways were not designed to carry heavy or unwieldy modern military loads, such as tanks and engineer plant. Bridges and freight handling facilities had to be strengthened or widened and, while this work was being done, delays and diversions were common, slowing down both military and commercial traffic. The efficiency of the network was impaired by poor telegraphic communications, which made it difficult to monitor the movement of consignments and to control traffic on the many single-track sections of line. Operating procedures were cumbersome and designed for use by large numbers of relatively ill-educated staff, working to a ponderous and predictable routine rather than the urgent and ever-changing requirements of war.<sup>66</sup>

At the start of the German war, ten per cent of India's railway equipment was sent to the middle east along with substantial numbers of the more highly trained railway technicians. Thus was removed most of the potential for expansion of rail capacity to meet military and war production requirements as well as much of that needed for normal peacetime requirements.<sup>67</sup> Subsequent requests for replacement equipment from the United Kingdom were refused due to the re-direction of railway production capacity there to munitions work. The British government then vetoed Indian requests to the United States for the supply of equipment on the grounds of their representing unjustifiable dollar expenditure. Even an urgent, personal request from Wavell in May 1942 for 185 broad gauge locomotives was rejected. Despite the pressures on India, she would have to make do with four locomotives due in 1942 and

forty more in 1943.<sup>68</sup> This, of course, was to increase substantially the difficulties for the economy as well as for the deployment and sustainment of forces needed to take the war back to the Japanese on the north east frontier of India.

The crisis on the railways might have been absorbed to some extent by coastal and river shipping, which was already an important element of the freight transport network. However, a large number of coastal and river steamers and barges were also sent to support the forces in Iraq in 1940. On top of the subsequent shortage of shipping capacity, India was ill-served by ports, having only four major and three minor freight-handling ports on a coastline of some 2,640 miles. Port capacity was adequate for peacetime demands only, with no scope for rapid expansion in war.<sup>69</sup> The smaller ports of India were limited in their bulk freight-handling ability by the requirement to load and unload by lighter. Only Bombay and Calcutta had extensive alongside berthing for ocean going ships, and this affected the speed of landing and internal movement of essential imports from Britain and the United States when they eventually started to flow in large quantities.<sup>70</sup> Those limitations aside, after the fall of Singapore, the Japanese naval threat in the Bay of Bengal forced the virtual closure of the eastern ports of India. Only when local naval parity was reclaimed in the latter part of 1942, after the American naval victories in the battles of the Coral Sea and Midway, could they be used safely once more. During that time, yet further pressure was put on the already over-stretched railway system.

In addition to these problems, there was, in 1939, a lack of the central, government level control needed to maximise the capacity of the railways, ports and shipping to meet the increased demands of war. Overall policy direction for the railways emanated from the Indian government Railways Board, but the variety of companies, some commercial and some state owned, running the network, had their own individual characteristics and operating procedures, which were not always complementary. Coastal and river shipping companies ran on an entirely independent commercial basis, in competition with each other and the railways. Most ports were run by autonomous individual port trusts, independent of central government, although Calcutta, Vizagapatam and Chittagong, on the east coast, were eventually taken over by the War Transport Department. They were then run largely by the Army Transportation Service, which was formed from the Indian Corps of

Engineers in 1941 to augment the commercial running of strategically important railways, docks and shipping in facilitating military movements. No one central body was charged with coordinating all these assets until 1942.<sup>71</sup>

Communications and transport to the north east frontier regions of Assam and east Bengal from the Indian interior were particularly difficult, even in peacetime. The principal port serving Assam was Calcutta, but there were no direct road or rail links between the two, both having to cross the Brahmaputra river by ferry. The Bengal and Assam Railway (B & AR) ran on metre gauge track while Calcutta was served by broad gauge lines. The transfer points between the two were west of the Brahmaputra, but the line linking Calcutta with transfer stations on the B & AR was single-track only. Both roads and railways were subject to frequent and prolonged severance due to flood damage during the monsoon season. The Brahmaputra river, although historically a major transport route to north east Assam, was of limited use for military purposes, which required a precise and predictable timetable, due to the fluctuations in its depth, width and course according to the season. In any case, of the shipping sent to the middle east in 1940, much had been taken from the Brahmaputra, leaving only the more decrepit vessels and severely constraining the capacity of the route at the time of the crisis in May 1942.<sup>72</sup> In the fullness of time, however, with capacity reinstated, the river was to prove useful for the movement of loads like fuel and roadstone, which were too bulky, heavy or unwieldy to travel economically by rail or road. The port of Chittagong, the only port of any size east of the Brahmaputra, as well as being the major sea point of entry for east Bengal and the Arakan coastal region, had been largely dismantled after the withdrawal from Burma in order to deny its use to the Japanese should they have advanced that far. The L of C were not capable of fulfilling peacetime requirements as well as the deployment and sustainment of substantial military forces. There was no military logistic infrastructure in the area, and the nearest main military logistic base was at Benares, on the Ganges, as far from the Assam front as London is from Iceland.<sup>73</sup>

As a result of all these factors, India was, by the end of 1941, in a poor economic position to sustain her share of an increasing global war commitment and, in particular, to become the strategic base for operations on her eastern frontier. Against this broad economic background, it is necessary now to step back in time and

examine the development of Indian defence policy and her armaments industry in the years leading up to the Second World War in order to see the full picture of her preparedness for the strategic and logistical roles thrust upon her in May 1942.

*The development of Indian defence policy and armaments production between the wars*

At the outset, it is important to draw a distinction between the Indian Army and the Army in India. The former was the autonomous Indian service, manned by Indian troops and commanded by a mix of Indian and British officers. The latter was a combined operational formation: the garrison of India, which included British as well as Indian Army units. In 1919, the Army in India Committee, known otherwise as the Esher Committee, considered the future role and organisation of the Army in India in the light of the experience of the First World War as well as anticipated requirements in the post war period. It concluded that inter-operability between the British Army and the Army in India would be essential in the foreseeable future. It proposed, therefore, that the Army in India should be organised, equipped and managed on lines as close as possible to those of the British Army, and that it should be considered as an essential element of an overall imperial force.<sup>74</sup> In 1921 Esher's recommendations were submitted to the Indian Legislative Assembly, which, reflecting the growing mood of self-determination among the political classes in the country, rejected the proposed imperial role outside India. Although the principle of inter-operability was accepted, the Assembly insisted that the roles of the Army in India should be limited to internal security and the defence of Indian territory against external aggression, and, for the time being, it won the day.<sup>75</sup> Through this introspection were sown the seeds of divergence between the equipment, establishment and doctrines of the British Army and the Army in India, as well as the operational roles of the latter, which would impact directly on India's readiness to cope with the situation that faced her in May 1942.

In the 1920s, the only external threat to India was perceived to be through the north west frontier, either from Afghanistan or, possibly, from the Soviet Union using Afghan or Persian territory to invade. It was towards that threat that the operational and administrative deployment of the major part of the Army in India was aligned.<sup>76</sup>

The covering force and the field army in the area of the north west frontier were supported by a main base at Lahore, with L of C along the North West Railway and also back to Karachi, which was to be the principal port of entry for reinforcements and imported supplies bound for that region.<sup>77</sup> The threat assumptions, the deployment of forces and the administrative infrastructure to cope with them were formalised in the Defence of India Plan, developed between 1925 and 1929. During this time, however, India's defence budget was reduced in stages by a total of thirty three per cent, so it became increasingly difficult to equip the army adequately, even for its limited roles. Thus was established a defence posture that was under-resourced and facing the wrong way to deal with the unforeseen eventual Japanese threat to India from the east. This was not to change fundamentally before early 1942.<sup>78</sup> Meanwhile, a large proportion of the government munitions factories and other strategically important industries, totalling seventy five per cent of warlike production, as well as some of India's most commercially productive agricultural land, were centred on Calcutta. Well removed from the traditional danger area in the north west, they would, however, become vulnerable to the unexpected Japanese threat, when it emerged on the eastern frontier.<sup>79</sup>

Despite its acceptance of the principle of inter-operability, the Indian Legislative Assembly's rejection of any imperial role contributed to a subsequent failure by the Army in India to keep pace with the modernisation of tactics and logistics embraced by the British Army as the German threat developed in Europe. The most likely ground tactical problems foreseen on the north west frontier during the 1920s and 1930s were tribal insurrection and mountain warfare, in which the infantry would be the dominant arm. Meanwhile, the British Army was trying to prepare itself to fight up-to-date, fast moving, combined arms operations against a modern, sophisticated enemy. The gap thus created was widened when, in 1933, the Indian Military Defence Tribunal, meeting to determine the United Kingdom's relative expenditure on Indian defence, defined possible aggression against India as 'major' or 'minor'.<sup>80</sup> India was to be responsible only for defence against 'minor' aggression with her own resources. Britain would deal with 'major' aggression, using imperial reinforcements. Thus the level and sophistication of contingencies, against which India had to prepare, were limited, and the breadth of her strategic and operational

horizons became increasingly constrained while the doctrinal and capability gulf between the two armies began to widen as war approached.

By 1936, however, the growing potential threat from Germany, Italy and Japan, particularly to Britain's maritime superiority, cast doubts on existing imperial defence assumptions. In that year, the Committee of Imperial Defence began to recognise that Britain's undertaking to deal with any 'major' aggression against India might be rendered untenable by commitments elsewhere, as well as by the possible interruption of the sea L of C preventing the timely reinforcement of India. Consequently, the following year, the basic assumption of the Defence of India Plan, that the only external threat to India was from the north west, began to unravel. To be sure, that threat remained. Although the Afghan government was friendly at that time, it was seen to be open to malign influences from the Soviet Union, Germany and Italy, the latter having supplied it with aircraft superior to any currently deployed in India, presenting a new air defence problem.<sup>81</sup> In addition to that threat, however, India then became directly vulnerable to the possible closure of the Mediterranean and Red Sea, and the British government asked India to be prepared to send forces to the middle east to help secure that link in her L of C with the United Kingdom.<sup>82</sup> Moreover, Japanese aggression in China and her apparent expansionist ambitions throughout the far east raised the spectre of operations in that theatre, which might impact on Indian defence arrangements, given her position on the route between Britain and Singapore. It was anticipated that India would be required to provide troops to defend Singapore and, as it turned out, she provided the clear majority of them, but their operational and tactical employment was not to be the responsibility of India Command. No direct Japanese threat to India was yet perceived, however, because the mountain barriers protecting India's eastern borders and the defence afforded by the fleet due to be based at Singapore, were mistakenly thought to be impenetrable. Thus, while these combined developments extended the geographical area of India's defence concerns, her own defence plans remained focused on the north west frontier.<sup>83</sup>

In March 1938, these perceptions of the wider potential threat to India and the expanded contribution she might have to make to overall imperial defence plans were set out formally by a committee, comprising representation from the War Office, the

Air Ministry and the Indian General Staff, under the chairmanship of Major General Sir Henry Pownall. As well as confirming the extension of India's defence interests and responsibilities, Pownall recognised the capability gap, which had developed between the British Army and the Army in India.<sup>84</sup> The principle of inter-operability established by the Esher Committee had been eroded by the years of introspection in Indian defence policy and its geographically limited military plans. Consequently, Pownall recommended that the Army in India should be modernised in line with the British rearmament programme if it was to be able to co-operate fully with the British Army, facing increasingly complex and sophisticated threats.

Two further committees were then convened, one by the C-in-C, India, and one by the British government, to take forward Pownall's findings and plan the modernisation and expansion of India's defence effort. The first of these, the Indian Modernisation Committee, was convened under the chairmanship of Major General Claude Auchinleck, then the Chief of the General Staff (CGS) in India. Auchinleck delivered his findings in November 1938. He foresaw that the United Kingdom would not be able to meet all India's military supply and equipment requirements to achieve inter-operability, so India would have to develop her own defence industries in order to equip her forces as far as possible. There being no commercial armaments production in India, the government munitions factories would have to be expanded, and the range, quality and volume of their output much improved. Nevertheless, he accepted that substantial quantities of modern weapons, vehicles and other equipment would have to go on being imported as India could not reasonably be expected to develop the capacity to build them in the time thought to be available. She needed, however, the ability to repair and maintain imported vehicles and military equipment. Auchinleck estimated that four and a half to five years were required to implement the programme he recommended.<sup>85</sup> In the event, of course, there was nothing like that amount of time available.

Meanwhile, the British government established its own Expert Committee on the Defence of India under the chairmanship of Admiral of the Fleet Lord Chatfield, latterly the First Sea Lord and then the British Minister for Defence Coordination.<sup>86</sup> The Chatfield Committee visited India for three months from November 1938 and Auchinleck was co-opted as one its members, so it is not surprising to find some



important parallels in the recommendations of the two committees. Chatfield reported his findings in early 1939. He advocated a reorganisation of the regular forces into new groupings for frontier defence and tribal control, internal security, coastal defence, and general reserve.<sup>87</sup> He also recommended that India provide an imperial reserve division.<sup>88</sup> This was the first formal challenge to the introspective defence policy demanded by the Indian Legislative Assembly in 1921. However, While Chatfield re-affirmed that India's defence interests would have to be expanded, he reiterated also the traditional view that the principal threat to India herself lay through the north west frontier, so the basic alignment of the existing Indian defence posture remained much as before.<sup>89</sup> A remote Japanese air and naval threat to eastern India was identified, including the possibility of limited amphibious raids on the east coast.<sup>90</sup> Defence against Japan, however, remained a British responsibility, the key to which was to be the fleet based on Singapore, furthering the lack of Indian preparedness to face the subsequent threat, which developed from the east.<sup>91</sup>

Chatfield followed up on Auchinleck's findings and made detailed recommendations for expanding and modernising the existing munitions factories over a five year programme. These recommendations were not only to equip the Army in India but also to be able to contribute to wider imperial warlike production. The estimated cost was £34.33 million, and the British government agreed subsequently that the United Kingdom should provide the funds.<sup>92</sup> Thereafter, Chatfield recommended, financial responsibility should be shared. India, however, should have full financial control over all the expenditure necessary for the maintenance of the forces for which she was responsible, both for her own defence and for her emerging wider imperial commitments.<sup>93</sup> Sadly, in the event, that did not happen and serious delays in essential equipment procurement continued to occur due to financial authority having to be obtained from London. For example, as late as January 1941, General Headquarters India (GHQ(I)), reported to the War Office that financial authority for India to raise and train the forces required of her by the British government was still not forthcoming.<sup>94</sup> Such delays had a seriously deleterious effect on the readiness for war of units that India was sending abroad and, even more so, on those remaining for her own defence, who often had surrender what equipment they had to units deploying overseas.

The Pownall, Auchinleck and Chatfield Committees set India on a sound course for expansion and modernisation, supposedly resourced adequately by the British government. However, their recommendations would not come to fruition until well after the war had started; indeed they were delayed and complicated by the crises in Europe of 1940, which set the survival of Britain above all other priorities. Thus, at the outset of the war, India was left poorly placed to supply herself or the allied effort at large with the sort of munitions and military equipment needed for modern warfare, and the United Kingdom was not in much of a position to help. India subsequently made immense strides to overcome her shortcomings in this area, but that took time and had a crippling effect on other parts of her domestic economy. Against that background, we now examine India's military response to the outbreak of the Second World War up to the time she confronted the Japanese threat on her eastern border.

*India's military response to the outbreak of war, 1939-1942.*

Although, by 1939, the tide was just beginning to turn in favour of India's defensive preparedness, the outbreak of war in that year exposed her to a new range of actual and potential defence contingencies for which her defence policy was inadequately resourced and mal-directed. Britain, of course, had similar problems, but she, at least, had a clearer idea of where the principal threat to her survival lay at that time. Coping with that immediate threat, however, prevented Britain from giving the requisite attention to the main eastward bastion of India's defence, the fleet based on Singapore, as well as the security of her L of C in the middle east. This, in turn, required India to commit greater forces than planned to the far and middle eastern theatres. Consequently, India, which, until just three years previously, had been responsible only for the defence of her own borders against 'minor' aggression by an unsophisticated enemy, suddenly found herself having to expand much faster than even Pownall, Auchinleck and Chatfield had envisaged. She had, moreover, to deploy her best professional forces overseas to face highly developed armies experienced in up-to-date combined arms warfare, replacing them for her own defence and new commitments with newly raised forces, which had to be trained and equipped from scratch with very limited resources.

In the late summer of 1939, as war in Europe seemed inevitable, India deployed two brigades of the newly formed imperial reserve division to the middle east, where they joined a third, British, brigade to form the 4<sup>th</sup> Indian Division, which was to earn lasting fame in that theatre. They took with them almost the entire stock of up-to-date equipment available in India at that time. In September 1939, one brigade was sent to Burma and one more to the middle east. Early the following year, India undertook to expand the latter by two more brigades to form the 5<sup>th</sup> Indian Division, which was achieved by September 1940. To replace those deployments, 53,000 men were recruited in 1939, and those numbers were constrained only by the limited accommodation and training equipment available. India then agreed to the first of two major programmes for the expansion of her army. The 1940 programme comprised the formation of one armoured and five infantry divisions. Experienced men were taken from existing units to form the cadres around which these formations were built and trained, and much of their equipment had to be supplied by the United Kingdom, which, after the events of May 1940, was not awash with items to spare. Artillery, engineer, signals and maintenance equipment was in particularly short supply and there were, as yet, virtually no tanks available for the armoured division. By September 1940, 120,000 men were in training in India, largely using makeshift accommodation and equipment.

Despite shortages of equipment and accommodation, a second expansion to raise five more infantry divisions began in 1941. During that year, of the previous 1940 expansion programme, two divisional headquarters and three additional brigades went to Malaya, one armoured and three infantry divisions went to Iraq and three more brigades went to Burma.<sup>95</sup> Few, if any, of these formations were fully equipped, trained or fit for war. By the end of 1941, the Indian Army had expanded from 180,000 to 900,000 men, all volunteers, of whom 300,000 were already overseas.<sup>96</sup> Meanwhile, India's own defence posture remained focused on the north west frontier and the middle east, with training, equipment and logistic services all aligned accordingly.<sup>97</sup> In January 1942, two brigades of the 17<sup>th</sup> Division, heading for the middle east, were diverted at sea to Malaya while the headquarters of the division and two replacement brigades, with whom it had not trained at all, went to Burma. The operational formations remaining then in India were four infantry divisions, under-strength, under-equipped and un-trained. One further division was in Ceylon. The

majority of the troops left in India at that time were administrative, non-combatants or in training. Later that year, one more armoured and three further infantry divisions were raised.<sup>98</sup>

Following closely behind the expansion of the Indian Army came a substantial growth in the allied air forces in the country. At the start of 1942, apart from seven fighter squadrons in Ceylon, there were only three fighter and one reconnaissance squadrons for the remainder of eastern and southern India. Wavell informed the COS in London that he needed a total of sixty four squadrons for the defence of Calcutta, Bengal, southern India and Ceylon, as well as for the support of troops on the Burma-Assam front. This was agreed; indeed the COS increased the estimate to sixty six squadrons. By the end of March 1942, ninety seven Hurricane fighters, forty Blenheim and ten Wellington bombers had been sent, or were en route to India, and the estimated RAF force level for the end of April was 268 aircraft.<sup>99</sup> In addition, the first elements of the 10<sup>th</sup> US Army Air Force (USAAF), which was to form part of the total force of sixty six squadrons, began to arrive. The allied air forces in India had neither the command and control organisation nor the operational and maintenance base infrastructure to cope with the number of aircraft needed or, indeed, those actually arriving. The peacetime Air Headquarters, comprising some thirty officers, required rapid expansion and a new Bengal Command was established to control air operations in eastern India. Initially, there were nothing like sufficient airfields in India to support the number of aircraft due to arrive. A huge programme of airfield construction would be needed. There were insufficient trained personnel or suitable sites for aircraft repair and maintenance units, and these, initially, had to be sited where industry could support them rather than where they could best support operational squadrons.<sup>100</sup>

Thus, in the space of three to four years, well within the estimated gestation time of their plans, the level of commitment was far in excess of anything foreseen by Auchinleck or Chatfield, and the logistic programme simply could not keep pace. Procurement of essential equipment and supplies was delayed by lack of foresight and the cumbersome peacetime financial procedures, which were still followed between the Indian and British governments. Military orders were placed with the Indian Supply Department, which screened out those which could be met internally. Those

which could not were then passed through the India Office in London to the War Office, which decided whether they should be allocated to British industry, requested from the United States or placed with another supplier in the British Empire and Commonwealth.<sup>101</sup> All this required protracted procedural work, and the planning and delivery of orders were further complicated and delayed by the time taken for convoys to be loaded and make the passage to India after the closure of the Mediterranean. A supply crisis developed. By November 1941, for example, GHQ(I) reported a deficiency of up to 15,000 vehicles and 78,000 rifles, which could not be made up from Indian resources. The British motor industry was committed to producing 600 trucks a month but failed to deliver them so, with the 'lend-lease' agreement then in force, orders had to be diverted to the United States and Canada. Despite the Auchinleck and Chatfield expansion plans, India was still only making 8,000 rifles per month and was having to make use of 12,000 captured Italian weapons.<sup>102</sup> At that time, of some of the most important heavy weapons allocated to its war establishment, India Command actually possessed only the following percentages:

<b>Item</b>	<b>Holding (% of allocation)</b>
Field gun, 25 pounder	36
Anti-tank gun 2 pounder	23
Bren light machine gun	19
Mortar	11
Anti-tank rifle	4
Anti-aircraft guns, heavy	25
Anti-aircraft guns, light	15
Tanks	27 <sup>103</sup>

126 Valentine tanks had been promised for delivery in 1942 and sufficient American M3 tanks had been ordered for two armoured divisions, but the priority of their issue was unknown and, at the current rate of delivery, it was estimated that the programme would take fifteen months to complete. Most of India's artillery was in Iraq. Only one trained and two partly trained artillery regiments remained in India. The state of signals equipment was described as 'critical'. Some was available from Australia but it could not be procured for lack of British financial authority. By March 1942, in the apparent absence of that authority, stocks of signals equipment were completely



exhausted. The formations deployed overseas in 1941 and 1942 left before they were trained or fit for operations and the equipment remaining in India, even in 1941, was quite inadequate for the training of that year's intake.

The Indian Army's logistic services were also hard put to keep up with this rapid expansion. A large proportion of them were already in Iraq, where plans were being laid for an eventual force of four British and six Indian divisions to defend the oilfields and the southern supply route to the Soviet Union. At the start of 1942, demands were also being made for logistic and medical units to support the increasing force levels in Malaya. The Royal Indian Army Service Corps and Indian Ordnance Corps needed large numbers of men sufficiently educated or skilled to become drivers, mechanics, clerks and storemen, and they had particular problems finding such men in adequate numbers. Consequently, many were sent off to operational units before they were properly trained, and that inevitably created administrative and transport problems at the front. The shortage of suitably qualified administrative personnel led also to the drafting of high quality men from infantry regiments, contributing directly to the tactical difficulties experienced in Malaya and Burma.<sup>104</sup>

The modernisation programme, the increase in administrative movement and the rapid influx of aircraft created particular problems in the supply and handling of POL, which had become a key commodity. Before the war, there had been no dedicated army POL supply organisation in India. Within the army supply system, POL was regarded as a 'miscellaneous' item and the physical handling was left to the oil companies. However, they were already over-burdened meeting peacetime civil needs and the army could not rely on them in operational areas. POL is difficult and dangerous to handle, and requires specialist skills, which had to be learned and adopted by the army from first principles. Hence a specialist POL branch had to be established from scratch within the Royal Indian Army Service Corps and its leading elements were ready just in time to take part in the Malaya campaign, in which, of course, they were lost.<sup>105</sup>

When the Indian Army transportation services were formed in 1941, there was a severe shortage of suitably experienced men to man the rail, docks and shipping units needed. Only 3,000 volunteers were forthcoming from 780,000 railway employees

and almost no-one came forward from the docks. In any case, those industries needed their men to meet the demands already placed upon them. Several supervisory staff from these industries, who had joined the army in 1939, had subsequently had to be released back to their civil employment to handle the increasing load. There was a particular shortage of men suitably qualified or experienced to fill officer appointments. Despite using men from the Burma Railways and the Irrawaddy Flotilla Company, who had fled to India, there was a very substantial training requirement for recruits lacking any technical experience and it was late 1942 before the formation of these units showed any effect on the efficiency of military movements.<sup>106</sup>

The arrival of stores shipments and the requirement for the development of roads, accommodation and airfields precipitated a formidable works programme. Many construction orders were placed in 1941, but there was a shortage of engineer stores, building materials and plant. Due to the long lead time needed for the manufacture and delivery of these items, many projects were not started until well into 1942.<sup>107</sup> Consequently men, equipment and supplies were housed inadequately in the harsh climatic environment, with concomitant effect on their efficiency, serviceability and, in the case of many supply commodities, their useful life, particularly if they had suffered previous prolonged exposure awaiting or during shipment.<sup>108</sup>

On 12 February 1942, with Singapore about to fall and Burma already invaded, GHQ(I) finally issued its first operational plan for the defence of eastern India against the newly emerged Japanese threat. It envisaged the possibility of major amphibious raids of up to two divisional strength on the east coast and a possible invasion of Assam in similar strength if Burma fell. Two newly formed and barely trained divisions were deployed to guard the whole east coast of India and initial administrative preparations were made to send a third such division to Assam. As an interim measure, an infantry brigade, the north west frontier reserve, was moved to Assam to defend the town of Dimapur, where the road from Imphal met the B & AR. The area around Dimapur was being developed as a forward base for the defence of north east India. The 70<sup>th</sup> British Division, recently arrived from the middle east and well experienced, was moved to Ranchi, north west of Calcutta, in reserve.<sup>109</sup> Subsequently, in April 1942, the whole Army in India was reorganised into a more

warlike posture, with the existing administrative Northern, Eastern and Southern Commands transformed into operational armies. The old Central Command was retained as the single remaining administrative command, providing base and training support for the new armies. The Eastern Army, which faced the new overland threat in Assam and east Bengal, then deployed XV Corps, with the 14<sup>th</sup> and 26<sup>th</sup> Indian Divisions, in east Bengal and IV Corps, comprising the 23<sup>rd</sup> Indian and 70<sup>th</sup> British Divisions in reserve.<sup>110</sup> IV Corps Headquarters and the 23<sup>rd</sup> Division were soon deployed to Imphal, leaving the 70<sup>th</sup> Division as Eastern Army reserve. The plan appears to have drawn lessons from the Malaya and Burma campaigns about the need to hold onto isolated defensive positions while reserves counter attacked to destroy enemy encirclement, and it gave appropriate instructions for the stocking of vital positions and the bases from which reserves were to operate. Still, however, there was no means of replenishing defensive positions or mobile troops once they were denied ground L of C.

In March 1942, after the fall of Rangoon, Wavell, back again as C-in-C India after his brief time in ABDACOM, found himself in a position of fundamental disagreement with the COS in London over the new direct threat to India and how her very limited defences should be resourced and deployed. Wavell, conscious of the weakness of his air and ground forces in north east India, and the growing threat to the industrial and agricultural areas around Calcutta, Assam and Bengal urgently needed reinforcements for that front.<sup>111</sup> The COS sympathised with Wavell's shortage of ground and air forces. However, they calculated that, with the Burma Corps still fighting a reasonably orderly withdrawal, and with those army formations available in India, he had sufficient ground forces to hold the ring in Assam. They believed that the imminent 1942 monsoon and the mountain barrier on the Indo-Burmese border would help to keep the Japanese at bay. They were more concerned about the security of the Indian Ocean L of C and, consequently, the defence of Ceylon, which contained the only remaining good naval base in the eastern Indian Ocean at Trincomalee. Moreover, with Malaya in enemy hands, Ceylon was virtually the only secure source of natural rubber left to the allies, and the island had to be held. Seen from the grand strategic perspective, therefore, the defence of Ceylon took priority, and the COS assured Wavell that the Eastern Fleet, based on Ceylon, would prevent any Japanese invasion of the Indian coast.<sup>112</sup> By the end of March 1942, the defences



of Ceylon had been built up to five brigades, along with seven fighter, and two maritime patrol air squadrons.<sup>113</sup> The Japanese naval attacks on Ceylon and the east coast of India in April 1942 gave substance to the COS' view about the maritime threat, but destroyed the credibility of their assurances about the capacity of the Eastern Fleet to defend India. As a result of these attacks, coastal shipping traffic was brought to a halt, putting additional strain on the Indian railways. Most of the government secretariat was withdrawn from Madras, an exodus of labour from eastern ports began, and measures were started to immobilise the ports and coastal railways. The 19<sup>th</sup> Division was deployed to repel an anticipated Japanese invasion in the Madras area.<sup>114</sup> The net effect on the army was to impose a dispersion of its formations to face a multiplicity of possible threats, lengthening already over-stretched internal L of C and leaving the industrial base around Calcutta increasingly vulnerable.

#### *India's position and the logistic challenge in May 1942*

By May 1942, India faced a direct, three-dimensional threat from sea, land and air, against which almost her entire defence posture still faced the wrong way. Her economy was already under growing pressure from the demands of the German war and was ill-prepared to sustain defence against the new threat. She had already committed the best part of her army and substantial quantities of supplies and much important rail and river transport to the middle east, from where threats continued to affect Indian military and economic affairs until the Mediterranean supply route was re-opened in late 1943. She had lost many more troops and much equipment in Malaya and Burma. Philip Mason, in his history of the Indian Army, *A Matter of Honour*, likened the position, in which India then found herself, to that of a central bastion, around which the German and Japanese wars hinged.<sup>115</sup>

Apart from the problems of raising the forces and developing the tactical doctrine needed to defeat the Japanese on the battlefield, the allies then faced three fundamental logistic problems in the theatre, which had to be solved before any successful counter offensive could be contemplated. First, at the strategic level, India's capacity to sustain allied forces of the size and sophistication needed to keep China sustained, while defeating the Japanese at sea, on land and in the air had to be

developed. Clearly, with her current economic problems as well as war production and mobilisation commitments, substantial commitment of effort and reinforcement would be needed before that could be achieved. Meanwhile, she was to be heavily dependent upon imports from the United States and countries of the British Empire and Commonwealth, delaying her progress because of her low position in war priorities, and adding to the stress on allied strategic shipping. Second, at the operational level, the capacity of the L of C from the interior of India to the fronts in Arakan and Assam had to be developed sufficiently to sustain the forces that would be needed, both to fight the Japanese and to maintain the link to China. This would be complicated by the severity of the natural environment and the distance of the front from suitable ports and reserve bases. Third, flexible methods of tactical maintenance had to be developed to enable the army to fight independently of roads, and, thereby, to counter Japanese outflanking tactics, which had, hitherto, defeated all attempts by the British to hold defensive positions or to counter attack the Japanese successfully. All three required substantial commitment of resources, which were then in short supply, as well as much new thinking and practise in doctrine, procedures and training, to overcome them. The effort would also be time consuming. Parts two and three, following, examine developments in each of these areas, their influence on the direction of the campaign and their manifestation in the forthcoming major battles.

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Notes:

<sup>1</sup> Army Administrative Planning, pp. 77-78; War Office restricted account, *The Second World War, 1939-1945, Army Maintenance in the Field, Volume I, 1952* [hereafter, *Army Maintenance*], pp. 307-308; Woodburn Kirby, *The War Against Japan, Volume II*, pp. 1-6.

<sup>2</sup> *Army Maintenance*, pp. 305-306, 311; Romanus and Sunderland, *Stillwell's Mission*, p. 49.

<sup>3</sup> *Army Maintenance*, p. 305; Slim, *Defeat Into Victory*, p. 115.

<sup>4</sup> Woodburn Kirby, *The War Against Japan, Volume II*, pp. 6-7, 21, 101.

<sup>5</sup> *Ibid.*, pp. 8-9.

<sup>6</sup> *Ibid.*, pp. 9-12, 439.

<sup>7</sup> *Ibid.*, p. 27.

<sup>8</sup> *Ibid.*, p. 10; D. Richards and H. St. G. Saunders, *The Royal Air Force, 1939-1945, Volume II* (London, HMSO, 1954), p. 58.

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- <sup>9</sup> Army Maintenance, p. 309.
- <sup>10</sup> *Ibid.*, p. 314.
- <sup>11</sup> *Ibid.*, p. 307.
- <sup>12</sup> War Office restricted account, *The Second World War 1939-1945, Army Transportation*, 1950 [hereafter, *Army Transportation*], p. 199; War Office restricted account, *The Second World War, 1939-1945, Army Supplies and Transport, Volume II*, 1954 [hereafter, *Army Supplies and Transport, Volume II*], pp. 40-41.
- <sup>13</sup> Army Maintenance, p. 310.
- <sup>14</sup> Woodburn Kirby, *The War Against Japan, Volume II*, p. 464.
- <sup>15</sup> Army Supplies and Transport, Volume II, p. 43; A. V. Moharir, *History of the [Indian] Army Service Corps* (New Delhi, Sterling, 1979)[hereafter, Moharir, *The Army Service Corps*], p. 327.
- <sup>16</sup> Army Supplies and Transport, Volume II, p. 44.
- <sup>17</sup> Army Maintenance, p. 315.
- <sup>18</sup> Army Transportation, p. 199; Prasad, *The Technical Services*, p. 181.
- <sup>19</sup> Army Transportation, p. 203; Woodburn Kirby, *The War Against Japan, Volume II*, pp. 464-468.
- <sup>20</sup> Army Maintenance, p. 325; Romanus and Sunderland, *Stillwell's Mission*, pp. 55-56; Mackenzie, *Eastern Epic*, pp. 414-415; Allen, *The Longest War*, p. 58; Latimer, *The Forgotten War*, p. 43.
- <sup>21</sup> Army Maintenance, p. 227.
- <sup>22</sup> Army Transportation, p. 199.
- <sup>23</sup> Woodburn Kirby, *The War Against Japan, Volume II*, p. 467.
- <sup>24</sup> *Ibid.*, p. 469; Army Maintenance, pp. 322-328. The official history quotes a figure of 800,000 gallons per month while the Army Maintenance account quotes 1,300,000 gallons per month. Actual production probably varied by the month.
- <sup>25</sup> A. A. Mains, *A Soldier with Railways* (Chippenham, Picton, 1994) [hereafter, Mains, *A Soldier with Railways*], p. 65.
- <sup>26</sup> Army Maintenance, p. 308.
- <sup>27</sup> Woodburn Kirby, *The War Against Japan, Volume II*, p. 74.
- <sup>28</sup> *Ibid.*, pp. 313, 314, 319.
- <sup>29</sup> *Ibid.*, p. 321
- <sup>30</sup> Woodburn Kirby, *The War Against Japan, Volume II*, p. 86.
- <sup>31</sup> Army Supplies and Transport, Volume II, p. 42.
- <sup>32</sup> Slim, *Defeat Into Victory*, pp. 118-119.
- <sup>33</sup> Army Maintenance, p. 324.
- <sup>34</sup> Army Supplies and Transport, Volume II, p. 44.
- <sup>35</sup> TNA WO 203/5709, Despatch by Lieutenant General T. J. Hutton, Operations in Burma December 1941 to March 1942; War Office pamphlet, Notes from Theatres of War, Number 8, October 1942 [hereafter NTW 8], pp. 5-8.
- <sup>36</sup> Woodburn Kirby, *The War Against Japan, Volume II*, pp. 471-472.
- <sup>37</sup> Army Supplies and Transport, Volume II, pp. 45-47.
- <sup>38</sup> NTW 8, pp. 17-18.

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- <sup>39</sup> TNA WO 203/5711, Despatch by Lieutenant General Alexander, First Burma Campaign, 16 June 1942, pp. 30-32; NTW 5, p. 15; NTW 8, p. 9.
- <sup>40</sup> TNA WO 203/5716, 17<sup>th</sup> Indian Division Report, Lessons from the Burma Campaign, 1942, Jun 42.
- <sup>41</sup> Army Administrative Planning, p. 10.
- <sup>42</sup> *Ibid.*, p. 11.
- <sup>43</sup> Woodburn Kirby, *The War Against Japan, Volume II*, p. 220.
- <sup>44</sup> Liddell Hart Centre for Military Archives [hereafter, LHCMA], Lindsell papers 3/10, GHQ (India) paper 158/C-in-C Sectt, Jan 45, The India Base [hereafter, The India Base], p.3; Moharir, *The Army Service Corps*, p.5; Prasad, *Indian War Economy*, Appendix XXXV, p. 543. The rate of exchange in 1939 was one rupee to one shilling and sixpence [War Office Field Service Pocket Book, Pamphlet 12, 1939, Miscellaneous Data].
- <sup>45</sup> Prasad, *Indian War Economy*, p. 9.
- <sup>46</sup> *Ibid.*, pp. 141-144.
- <sup>47</sup> *Ibid.*, pp. 139-140.
- <sup>48</sup> *Ibid.*, p. 131.
- <sup>49</sup> *Ibid.*, pp. 130-131.
- <sup>50</sup> Woodburn Kirby, *The War Against Japan*, pp. 189-190.
- <sup>51</sup> Prasad, *Indian War Economy*, p. 255.
- <sup>52</sup> *Ibid.*, Appendix I, pp. 409-418.
- <sup>53</sup> *Ibid.*, pp. 34, 139.
- <sup>54</sup> *Ibid.*, pp. 241-242
- <sup>55</sup> *Ibid.*, p. 252.
- <sup>56</sup> *Ibid.*, p. 243.
- <sup>57</sup> *Ibid.*, pp. 245-246.
- <sup>58</sup> Prasad, *Indian War Economy*, pp. 146-147.
- <sup>59</sup> See Appendix Three.
- <sup>60</sup> Prasad, *Indian War Economy*, pp. 3-5.
- <sup>61</sup> The India Base, pp. 3-4.
- <sup>62</sup> Army Administrative Planning, p. 103.
- <sup>63</sup> War Office restricted account, The Second World War 1939-1945, Army Works Services and Engineer Stores, 1953 [hereafter, Army Works], p. 52.
- <sup>64</sup> The India Base, p. 3.
- <sup>65</sup> Mains, *A Soldier With Railways* (Picton, Chippenham, 1994), map following p. xv.
- <sup>66</sup> Army Administrative Planning, p. 99.
- <sup>67</sup> Verma and Anand, *The Indian Engineers*, pp. 252-256.
- <sup>68</sup> Woodburn Kirby, *The War Against Japan, Volume II*, pp. 188-189.
- <sup>69</sup> Army Transportation, p. 180; Army Administrative Planning, p. 97.
- <sup>70</sup> The India Base, pp. 8-9.
- <sup>71</sup> Army Transportation, pp. 178-179.
- <sup>72</sup> Verma and Anand, *The Indian Engineers*, p. 275.

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- <sup>73</sup> Army Transportation, p. 180; Army Works, p. 201.
- <sup>74</sup> Prasad, *Indian War Economy*, pp. 13-14. K. M. L. Saxena, *The Military System of India 1900-1939* (New Delhi, Reliance, 1999) [hereafter, Saxena, *The Military System of India*], 279-281.
- <sup>75</sup> Saxena, *The Military System of India*, p. 442.
- <sup>76</sup> *Ibid.*, pp. 448-449; N. H. Gibbs, *History of the Second World War, Grand Strategy, Volume I* (London HMSO, 1976) [hereafter, Gibbs, *Grand Strategy, Volume I*], pp. 828-829.
- <sup>77</sup> Prasad, *Indian War Economy*, p. 15.
- <sup>78</sup> *Ibid.*, pp. 14-15, 94; Saxena, *The Indian Military System*, p. 449.
- <sup>79</sup> Prasad, *Indian War Economy*, p. 198.
- <sup>80</sup> Saxena, *The Indian Military System*, pp. 449-450.
- <sup>81</sup> *Ibid.*, p. 455.
- <sup>82</sup> *Ibid.*, pp. 453-454.
- <sup>83</sup> Prasad, *Indian War Economy*, pp. 21-22.
- <sup>84</sup> Gibbs, *Grand Strategy, Volume I*, pp. 832-833.
- <sup>85</sup> Prasad, *Indian War Economy*, pp. 22-24.
- <sup>86</sup> The British Library, London, Oriental and India Office Collection [hereafter, BLIOC], L/MIL/17/5/1802, Report of the Expert Committee on the Defence of India 1938-39 [hereafter Chatfield].
- <sup>87</sup> *Ibid.*, pp. 24-26.
- <sup>88</sup> *Ibid.*, p. 19.
- <sup>89</sup> *Ibid.*, p. 9.
- <sup>90</sup> *Ibid.*, p. 49.
- <sup>91</sup> *Ibid.*, pp. 10-11.
- <sup>92</sup> Woodburn Kirby, *The War Against Japan, Volume I*, p. 37.
- <sup>93</sup> Chatfield, p. 20.
- <sup>94</sup> BLIOC L/WS/1/441, CGS(I) liaison letter to CIGS number 1 of 1941, 31 Jan 41.
- <sup>95</sup> Woodburn Kirby, *The War Against Japan, Volume I*, pp.36-40.
- <sup>96</sup> Woodburn Kirby, *The War Against Japan, Volume II*, p. 47.
- <sup>97</sup> BLIOC L/WS/1/441, CGS(I) liaison letters to CIGS numbers 2 and 3 of 1941, 17 Jul and Nov 41 respectively.
- <sup>98</sup> Woodburn Kirby, *The War Against Japan, Volume II*, p. 48.
- <sup>99</sup> *Ibid.*, p. 111.
- <sup>100</sup> *Ibid.*, pp.112-113.
- <sup>101</sup> Moharir, *The Army Service Corps*, pp. 20-22.
- <sup>102</sup> BLIOC L/WS/1/441, Record of the GHQ(I) command conference 24-27 November 1941, GHQ(I) No 128/SD, 17 Dec 41.
- <sup>103</sup> Woodburn Kirby, *The War Against Japan, Volume II*, p. 48.
- <sup>104</sup> Army Supplies and Transport, pp. 1-5.
- <sup>105</sup> Moharir, *The Army Service Corps*, pp. 57-58, 79.
- <sup>106</sup> Army Transportation, p. 183; Verma and Anand, *The Indian Engineers*, pp. 244-245.

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<sup>107</sup> Army Works, pp. 197-198.

<sup>108</sup> Moharir, *The Army Service Corps*, p. 25.

<sup>109</sup> BLIOC L/WS/1/153, Precis of a plan for the defence of north east India; telegram from General Wavell to the Chiefs of Staff, 6353/G, 19 Mar 42.

<sup>110</sup> Woodburn Kirby, *The War Against Japan, Volume II*, pp. 193-194.

<sup>111</sup> BLIOC L/WS/1/1243, Telegram C-in-C India to War Office VV7/5853/G cipher 15/3, 15 Mar 42.

<sup>112</sup> Woodburn Kirby, *The War Against Japan, Volume II*, p. 107.

<sup>113</sup> *Ibid.*, p. 109.

<sup>114</sup> *Ibid.*, pp. 115-127.

<sup>115</sup> P. Mason, *A Matter of Honour – An Account of the Indian Army, its Officers and Men* (London, Purnell, 1974) [hereafter Mason, *A Matter of Honour*], pp.471-476.

## **PART TWO**

## CHAPTER TWO

### THE DEVELOPMENT OF INDIA AS THE STRATEGIC BASE

In the summer of 1942, the COS in London gave the initial direction to develop India as the strategic base for future operations against the Japanese in south east Asia. This was partly due to American pressure to reopen an overland link to China and partly because, at that stage, despite India's obvious weaknesses, there appeared to be no viable alternative. Precisely because of India's problems, the decision was reconsidered repeatedly throughout 1943, with alternative options being sought in Australia and east Africa. The Australian option, in particular, was strongly recommended by the British 220 Military Mission, which toured the Pacific and south east Asian theatres in late 1943, learning from the Americans, Australians and New Zealanders the recipe for their successes against the Japanese at a time when Britain and India were still failing badly.<sup>1</sup> At the time of 220 Military Mission's tour a body of opinion in the British War Cabinet, led by Churchill, was still giving consideration, however unrealistic, to putting the main British counter offensive effort against the Japanese into the Pacific whilst standing on the defensive on the north east India front. However, American pressure to expand the China link, realisation of Australia's limited capacity as a potential base and the need to recapture Burma's rice supply in order to sustain Malaya when that country was eventually recaptured, caused the 'Pacific strategy' to be dropped until the latter stages of the war, when a British fleet joined the Americans there.<sup>2</sup> Thus the decision to establish the strategic base in India to support operations in south east Asia was never changed. In fact, it became ever firmer as India's security and capacity to support operations gradually developed, while the disadvantages of the alternatives, principally their limited potential base capacity and distance from the south east Asian theatre, became ever more apparent. Hitherto, India's responsibilities for contributing to the general war effort and sustainment of the middle east theatre had been met by merely providing the goods, equipment and people required by, and negotiated with, the overseas commands involved.<sup>3</sup> India was severely tested merely achieving that. Developing the base for, and controlling the conduct of, all operations against Japan in south east Asia then became the direct responsibility of the C-in-C India. Despite considerable expansion of the armed forces and some in the ordnance factories, which had already taken place, a huge amount of further development in the military base infrastructure,



the defence-related industries and the supporting economic framework was then required, along with a re-alignment eastwards of the defence posture. During 1942 and 1943, substantial improvements were to be made in most areas, but significant problems remained outstanding, even at the end of the war, and they constrained allied strategic aspirations and plans accordingly.

On 23 June 1942, the War Office sanctioned administrative planning to develop India's capacity to support a total force equivalent to twenty eight divisions, including those troops already assigned to internal security and the defence of the north west frontier, as well as sixty six allied air force squadrons.<sup>4</sup> Overall, that represented approximately a four-fold increase over the force levels in India at the time. Whilst the first priority then was to deploy and sustain troops on the new eastern front in numbers sufficient to prevent any further Japanese advance, India was confronted with a huge works programme to support the overall force levels directed. The airfields, depots, workshops, accommodation, hospitals and amenities needed by the troops had to be built, virtually from scratch. The ports, dockyards, internal transport infrastructure and communications required by both the armed forces and the economic activity of the country had to be improved and expanded to cater for a rapidly increasing load. Additional food supplies would be needed to feed the influx of troops, many with western, Chinese or African tastes, at the same time as men were being taken from the land for the armed forces or labour service and agricultural land was turned over to military or other economic purposes. All this had to be achieved without putting excessive strain on the wider economy and the civil population, many of whom were already existing at subsistence levels.<sup>5</sup>

### *The airfield construction programme*

After initial troop deployments to the eastern frontier, Wavell's first priority was the airfield construction programme, which began in March 1942.<sup>6</sup> At that time, there were just sixteen all-weather airfields in the whole of India, and only one in Assam, at Dinjan, in the Brahmaputra valley. The initial requirement of 200 new fields, set in March 1942, was expanded to 215 in October that year to accommodate the increasing number of aircraft due to be deployed to India and to cater for military movements. The initial specifications for the principal fields required an all-weather

runway 1,600 yards long by 200 yards wide, with an additional seven per cent length for every 1,000 feet of height. Additional runways might be required according to local wind patterns. A concrete runway of those dimensions alone required approximately 4,000 tons of cement and 40,000 tons of crushed stone.<sup>7</sup> In the many places where suitable stone could not be found, runways had to be soled and surfaced with locally made bricks, but those required similar quantities of coal in their manufacture.<sup>8</sup> In addition were the materials required for taxiways, parking, road and rail access, workshops, hangers, accommodation, bulk fuel storage and essential services, all of which, in most cases, had to be transported long distances, increasing substantially the load on the already stretched rail network. Operational requirements in siting the airfields had to be balanced against access to L of C, principally for the supply of POL. In many cases, basic services such as water and electricity supplies had to be provided from scratch due to the remoteness of the sites. On completion, the main base airfields were to be extended in order to accommodate two bitumen surfaced runways, each 3,000 yards long.<sup>9</sup> The cost of the programme was estimated at between £50 million and £73 million, and it was to become the single biggest, as well as the highest priority, works programme in the entire Indian war economy, on which it was to have a profound effect. The project was placed directly under the control of the Engineer in Chief at GHQ(I), Major General Bond, who had plant, engineers and labour available for concurrent work at sixty sites only. The work was shared between the Military Engineer Services and the Public Works Departments of the various states and provinces involved in the programme. By the beginning of 1943, five airfields were complete in all respects, eighty eight had one all-weather runway 1,600 yards in length and sixty fair-weather strips had been completed.<sup>10</sup>

In April 1944, the number of airfields required was increased again to cater for one hundred additional USAAF squadrons for the China airbridge and the strategic heavy bombing of Japan, the latter of which was known as the 'Matterhorn Project'. By that time, the initial airfield construction programme was complete, but additional very long range (VLR) bomber fields for seventy two 'Matterhorn' squadrons were required in west Bengal. To begin with, Auchinleck calculated that all could be ready by August 1945 and the first four were completed remarkably quickly by the end of May 1944. However, the ship carrying much of the plant and material for these fields from the United States was sunk en route. Consequently, a large slice of

Indian engineer effort and resources had to be diverted from development of the reserve bases and other works in support of SEAC and India Command in order to achieve this.<sup>11</sup>

### *The reserve bases*

With the airfield construction programme under way, work began also on the reserve bases, in which were to be assembled and stored the ammunition, rations, POL, ordnance and engineer stores required by the forces forming up in India. One such base depot had long been established and running in Lahore to serve troops on the north west frontier. In early 1942, in response to the emerging threat to eastern India, work had started on the development of a second reserve base supply depot and engineer stores depot at Benares. That, along with a reserve ordnance and ammunition depot at Jamalpur was to sustain forces deploying on the eastern frontier. Both places lay on the Ganges and had access to the metre gauge B & AR, which served Assam and east Bengal, as well as the broad gauge system serving the rest of India, while being well removed from any immediate air or ground threat.<sup>12</sup> Development of these bases suffered repeated delays due to higher priority demands in the airfield construction and transport infrastructure development programmes. Across the whole of India, however, depot accommodation was increased from just over two and a half million square feet in 1939 to thirteen million by January 1943, with eleven million more under construction.<sup>13</sup>

When Operation ANAKIM, Wavell's plan to recapture Burma, was approved at the Casablanca conference in January 1943, the force level for the operation was to be one armoured and ten infantry divisions, one tank brigade and seventy six air squadrons. This force was to be found from the overall allied garrison in India and Ceylon, which would be further expanded to a total of thirty one divisions and one hundred air squadrons, a substantial increase on the COS directive of June 1942.<sup>14</sup> In respect of Operation ANAKIM, the Casablanca directive was actually self-defeating, for it reiterated unequivocally the existing policy, established in March 1941, that operations against Japan in the Pacific and south east Asia were to take second priority to the defeat of Germany.<sup>15</sup> Consequently, the amphibious resources needed to conduct Operation ANAKIM were withheld repeatedly to meet the requirements of

the European war. The denial of external resources, combined with difficulties developing the India base, caused the operation to be delayed again and again until, eventually, it was cancelled altogether in August 1943. Nevertheless, for the best part of that year, the Casablanca directive and ANAKIM planning shaped the development of the India base. The airfield construction programme, then in hand and expanded to 215 fields, was sufficient to serve the planned timescale of Operation ANAKIM. However, the increased force level, as well the continued intention to conduct amphibious operations as part of the overall plan, dictated the scale and location of much further work on the reserve bases.

As a result of the Casablanca directive, development work started in January 1943 on a complete new system of reserve bases to serve the planned expeditionary forces as well as those remaining in India and deployed on the north east frontier (see Map One). The reserve base depot at Lahore, continuing in its existing role of sustaining forces on the north west frontier, was re-titled Number 1 Base. The depots already being developed around Benares and Jamalpur to sustain the Assam and east Bengal L of C were combined into Number 2 Base, which was to serve the overland element of ANAKIM. Two new bases were to be built from scratch to support amphibious operations. Number 3 Base at Panagarh, ninety eight miles west of Calcutta, was to have 570,000 square feet of covered storage accommodation served by eighty five miles of internal railways. It was sited on thirty square miles of agricultural land, and its construction required the re-location of fourteen villages. Number 4 Base at Avadi, with 450,000 square feet of covered storage served by 107 miles of internal railways, was sited twenty miles west of Madras, astride the Madras-Bombay railway. The two new bases were to support operations mounted from Calcutta and Madras respectively. Originally, both were to hold thirty days' stocks, but in March 1943, direction was given to increase that holding to forty five days' worth. Five smaller reserve supply depots were planned to serve the rest of India, two of which were to be combined with a transit area serving the port of Vizagapatam, which was destined to become a military port in April 1944. Construction work on all the new bases began in April 1943.<sup>16</sup> By implication, with a target of November of that year set for mounting operation ANAKIM, the reserve bases and accommodation to support it should have had to be ready by the late summer – a tall order.

When SEAC was established in October 1943 to conduct operations in that theatre, the base requirement to be provided by India was increased yet again. In addition to sustaining her own garrison, she was given one year, to October 1944, to be in a position to support SEAC forces comprising twenty divisions and 186 air squadrons.<sup>17</sup> Despite SEAC's immediate priorities being directed to the expansion of the China link, the new Supreme Allied Commander was also directed to develop plans for a range of alternative expeditionary operations so much work went into preparatory administrative development. The two reserve bases already being completed at Panagarh and Avardi for Operation ANAKIM were re-allocated to support the forces then assigned to SEAC, but that involved substantial expansion of the existing specifications, as the SEAC forces were considerably larger than those originally earmarked for ANAKIM. Moreover, the capacity of the reserve bases was to be doubled to hold ninety days' stocks of most commodities. Consequently, the enlarged bases were expected to be only two thirds complete by the end of 1944. An additional ninety days' worth of supplies were to be held forward in the operational area by SEAC and these all had to be assembled and delivered by India.<sup>18</sup> These scales of stock holding were considerably higher than in the European theatres because of the length and vulnerability of the L of C, both within the theatre and from the United Kingdom and United States, as well as the low industrial productive capacity of the Indian economy.<sup>19</sup>

Initial construction of the reserve bases according to the original specifications was complete by late 1943, but the demand continued to increase. Further development and expansion required to support SEAC went on until the end of the war and was brought to a halt only by Japan's surrender in August 1945. Had the war continued beyond that date, as was widely expected until the dropping of the atom bombs, it was estimated that army stores alone would eventually need fifty million square feet of covered accommodation, of which only twenty one million had been completed by January 1945. This was a huge, ongoing project, which had to compete with the higher priority airfield construction programme for scarce resources, and, like the airfield programme, it impacted heavily on the wider economy. As with so many other projects concerning the build up of the forces required in south east Asia, it took a great deal more time to complete than was anticipated initially at the highest levels of command, thus delaying the desired pace of operations.<sup>20</sup> With a shortage of

suitably qualified supervisors as well as labour, the extent of the works programme overwhelmed the Military Engineering Services and their contractors.<sup>21</sup> To begin with, delays were also experienced in the supply of engineering stores and construction materials. Of these, in early 1943, India produced only about sixty per cent of her requirement internally, and up to eight months' lead time was needed for delivery of the balance of imported materials. This delay was due to the bureaucratic purchasing procedures, which were then still being followed, as well as the time taken for procurement and shipping. Throughout 1942 and 1943, large numbers of the troops arriving or being recruited in India still had to be accommodated in atap huts, even in base areas, as the more substantial buildings had to be reserved for essential stores, workshop and hospital use.<sup>22</sup> By early 1944, however, India was producing some 400,000 tons of building materials per month for her own requirements as well as those of Ceylon and the middle east, and little had to be imported after that.<sup>23</sup> Thereafter, accommodation standards for both personnel and stores began to improve.

#### *The build up of stocks*

Meanwhile, after a slow start at the beginning of the war, large quantities of military supplies and equipment began to arrive from early 1942 onwards, including much that had been destined for Hong Kong and Singapore, but which was diverted to India when those places fell. Until the depots and bases were built, much of this material could not be properly stored for lack of accommodation, and there was substantial loss due to deterioration and pilfering of stores left out in the open.<sup>24</sup> Stocking of Panagarh did not start until December 1943 and of Avardi until April 1944.<sup>25</sup> The huge influx of supplies also created considerable personnel and management problems. The Indian Army in 1942 was quite unfitted to take on such a load so quickly. Like the Royal Indian Army Service Corps, which had already experienced great difficulty in finding men suitable to be trained as drivers, the Indian Army Ordnance Corps, responsible for handling most supplies and running the depots, was soon seriously under-manned with competent clerks and store-keepers. Established to handle some 67,500 tons of stores annually in peacetime, the corps was in charge of approximately 250,000 tons by the beginning of 1943, and its staffing levels and procedures had not kept pace with the workload.<sup>26</sup> Staff found themselves having to assume responsibilities way beyond their capacity. There was a lack of standard

operating procedures for handling such large quantities. A number of commodities such as bulk POL, armoured vehicles, radio equipment, optical instruments, the more sophisticated modern weapons and the ammunition for them, were new to the Indian Army stores inventory. Many required special handling, which was unfamiliar to the existing staff. In the absence of direction from a hopelessly over-loaded ordnance branch at GHQ(I), different bases and depots developed their own working practices. The manning and procedural shortcomings resulted in an increasing tendency to crisis, rather than planned and orderly, management and an imminent breakdown in the stores handling system was feared by the end of 1942.<sup>27</sup> It was narrowly avoided with the assistance of advisers from the United Kingdom. Later, during 1943, the establishment, methods, manning and training of the Indian Army Ordnance Corps were, as far as possible, brought into line with those of the British Royal Army Ordnance Corps. A total alignment of procedures was not possible, however, because of educational difficulties among many soldiers and clerks in the Indian corps as well as differences in the British and Indian government accounting rules, which impacted on army procedures.<sup>28</sup> Nevertheless, the process tapped the experience of the British corps in handling large quantities of up-to-date, sophisticated equipment and ammunition. In May 1943, the repair and maintenance branch of the Indian Army Ordnance Corps was detached to form a new Indian Corps of Electrical and Mechanical Engineers. This change reflected the British organisation adopted twelve months previously, as well as the ever increasing workload and specialization involved in keeping a modern army maintained.<sup>29</sup> All this development and re-training took time, adding to the delay in India's becoming ready to sustain major operations.

Military vehicle deliveries to units in India improved dramatically during 1942, rising from 7,500 in 1939 to 35,000 in 1942 and 115,000 in 1943.<sup>30</sup> Normally, new vehicles would have been transported from their port of entry to their receiving units by rail to save the workload on drivers and workshops as well as wear and tear on the vehicles. Due to the increased rate of importation and the shortage of railway capacity, however, they, along with increasing quantities of stores arriving through Bombay, were driven to eastern India under their own power. This method was wasteful of manpower and significantly increased the level of dilapidation on the vehicles before they even reached their end users, due to the poor quality of roads and

delivery drivers. Nevertheless, the improving rate of delivery had a marked beneficial effect on both units at the front and the capacity of the base and L of C to support them.

The increasing numbers of vehicles and aircraft, and the level of their activity, created concomitant problems in the storage and supply of POL. In January 1943, the armed forces alone estimated monthly requirements for that year of 308,000 tons of aviation and motor fuel as well as 13,400 tons of lubricants. India could produce only 53,500 tons of petrol and 800 tons of oils per month. The balance was imported through Bombay, which had the only oil terminal of sufficient capacity. No bulk POL terminal had been built in eastern India, because, before the war, that region had been served adequately by the oilfields of Assam, which provided the bulk of India's indigenous production. Moreover, following the Japanese sorties of April 1942, the naval threat in the Bay of Bengal discouraged the allies from sending high value tankers into that area. The rapidly increasing supplies needed in eastern India from 1942 onwards, which included most of the country's military requirement, were, therefore, shipped from Bombay by rail, adding to the strain on the railway network. Even by the summer of 1942, supplying fuels to Calcutta by this means had proved so difficult, due to the congestion on the railways and the shortage of tank wagons, that some supplies to civilian users were being cut off. This caused difficulty for civil administration and friction between the civil and military authorities.<sup>31</sup> By May 1943, a six-inch pipeline, with an annual capacity of 400,000 tons of petrol, had been built for the first 275 miles from Bombay over the hills of the western ghats to a staging terminal at Bhusaval holding up to 93,750 tons. By-passing a steep and difficult section of the track, this pipeline took some of the strain off the railway. From Bhusaval onwards, however, supplies to the east were still carried by train. The original intention had been to build up four months' reserve supplies of POL throughout India, but lack of bulk storage capacity caused this figure to be reduced to three months' worth, which was considered for the time being to be an acceptable risk.<sup>32</sup>

The storage and movement of POL stocks for proposed expeditionary operations caused particular problems. In the absence of bulk fuel storage capacity in any of the likely areas of future operations, fuel to sustain any expeditionary forces would have



to be packed in containers, at least until bulk storage could be built, a period estimated at six months. Back in July 1942, the Eastern Army stocked just 5,960 tons of petrol in two-gallon cans for its initial operational deployments.<sup>33</sup> One year later the packed POL requirement for ANAKIM was calculated at 455,360 tons of petrol and 26,785 tons of lubricants. The disposable British 'flimsy' fuel cans in use at that time were found to be insufficiently robust for this purpose and great was the loss of fuel from damaged containers. In any case, India's monthly production of containers was not adequate to hold even the wastage from those amounts.<sup>34</sup> It had, by then, also been discovered that Indian tin plate and the methods of sealing used in the indigenous manufacture of 'flimsies' were of inadequate quality, resulting in substantial leakage when the containers came to be filled. That was not only wasteful but also extremely dangerous, especially in a ship's hold or a rail wagon.<sup>35</sup> The British Army in the middle east had already adopted the stronger, German-designed 'jerrycan'. At that time, however, India had nothing like the capacity to manufacture sufficient 'jerrycans' of the quality needed, and large numbers had to be imported. By late 1943, output of containers was still running well short of demand, and General Auchinleck, by then the C-in-C India, reported that the annual production in India of four-gallon fuel cans alone was only 44,000 against a target of 180,000.<sup>36</sup>

Even by early 1944, production and stocking of POL were still not adequate to sustain planned major expeditionary operations and the increasing force levels, particularly the fuel-thirsty air forces by then in theatre, as well as the expanding war economy. At that time, India produced only five per cent of its own and SEAC's total war requirements for POL, and that included no aviation fuel, due to the poor quality of Indian crude oil. The rate of import of the remaining ninety five per cent was adequate, but storage capacity within the country, particularly in a form suitable for expeditionary operations, remained a serious problem. By that time, four and a quarter million drums and cans of various capacity were required for stocking the POL needed for expeditionary operations. On top of those reserves, there was a routine monthly maintenance requirement for over one million containers of varying capacity, of which 150,000 went to China. India's forecast monthly production capacity of fuel containers, even as far ahead as December 1944, fell short of the maintenance requirement alone by about twenty five per cent. Consequently, suitable sheet steel, container manufacturing plant and completed containers had to go on

being imported in large quantities to sustain current requirements as well as stocking for planned or proposed expeditionary operations.<sup>37</sup> In fact, as things turned out, the estimate of six months, during which expeditionary forces would depend on packed fuel, turned out to be wildly exaggerated. However, that was discovered too late to prevent the apparent shortage contributing to delays in preparations for major operations, which continued throughout 1942 and 1943.<sup>38</sup> All in all, the military base facilities being developed in India from a very weak start point in May 1942, were not in any position to sustain major operations of any sort – offensive or defensive – until early 1944. Even then, there was still a long way to go before the re-capture of Burma could be considered.

### *The wider economy*

On the wider economic front, a number of important developments were made in government-level planning, direction and resourcing. In April and May 1942, an American technical mission, led by Dr Henry Grady, visited India to advise on the further development and modernisation of the Indian war economy, principally with a view to improving its ability to support American operations on the China link. The mission made copious recommendations, including several concerning the expansion of steel, machine tool, munitions, aluminium and chemical production, as well as the development of technical training. However, the Indian government, though receptive to the advice, was unable to implement most of these recommendations in time to affect the outcome of the war.<sup>39</sup> At the organisational level, however, the mission was able to make an impact in successfully pressing the Indian government to take a more active role in controlling the war economy in order to direct industrial effort according to war priorities as opposed to pure profit motive. It was a move, which had already been made in the United States, the epitome, in peacetime, of *laissez faire*, market-led economy, and the results there were being reflected in massive increase in warlike production, so the mission was keen to press the point. In fact, the Indian government had already been moving towards greater centralised control of the economy since the outbreak of war in 1939. The Defence of India Act of that year and its subordinate Defence of India Rules gave the government the right of direct control over essential supplies, works and transport. By 1942, the Indian government effectively had the powers to run a command economy, although it

experienced a shaky start with numerous breakdowns of intended controls. Belief in imperial war aims and striving for its successful conclusion were not issues that captured the imagination of the Indian population at large and there was still much wasteful dispersion of industrial potential. The Grady Mission provided new impetus and the more important government controls began to take effect in the latter part of 1942.<sup>40</sup>

Perhaps the most important of these measures took effect in June that year, when the War Resources Committee of the Viceroy's Executive Council was established to direct and coordinate war production, transport, communications, finance and rationing at the highest level of government. The committee was presided over by the Viceroy personally and its permanent members were the Executive Council Members for Supply, Defence, Finance, Commerce and Communications. The committee had the power to 'focus the attention of the entire Government of India on any problem, major or minor, and force its policy on the Department or Departments concerned'.<sup>41</sup> Prior to the establishment of the War Resources Committee, its functions had been attempted ineffectually by the Defence Department, resulting in confusion and divided responsibilities.<sup>42</sup> Under the new structure, with proper inter-departmental direction and control at the highest level of government, the process became a good deal more effective.

These developments contributed to the increased output of the ordnance factories, which is illustrated at Appendix Four. That, in turn, reflects the developing capacity of a wide range of supporting industries providing the components and raw materials, many of which profited very well out of meeting war demands. Overall the output of military supplies and equipment from Indian ordnance factories increased by over 700 per cent between March 1940 and March 1944.<sup>43</sup> That growth was from a very low start point, however, and it was still inadequate to sustain a modern army the size of that being assembled in the country. Much ordnance material, especially the more sophisticated modern equipment and weapons, still had to be imported. In the production of warlike supplies other than munitions, however, India advanced rapidly. Of the eastern group countries of the British Empire and Commonwealth - discounting Canada, the West Indies and the United Kingdom - India produced sixty one per cent of total output in the year ending March 1942. That share increased to

seventy five per cent over the following year.<sup>44</sup> This growth was not achieved, however, without substantial cost to the wider domestic economy. No amount of organisational development could overcome an imbalance of demand against resources needed from outside India, which resulted from India's low position in overall war priorities. This shortfall could not be addressed satisfactorily until Germany had been defeated. It continually threatened India's economic stability and inhibited the pace of operations in the south east Asian theatre throughout the war.

### *The transport infrastructure*

One of the principal victims of the expansion of military demand, as well as one of its most important constraints, remained the capacity of the transport infrastructure. This delayed not only the deployment of troops and their supplies to their operational areas, but also the supply of materials and finished products to and from factories, the delivery of essential civil supplies and the movement of labour. By July 1942, it was already clear that military requirements were becoming so heavy that essential civil and economic services were threatened. Despite much work to expand capacity by doubling track, extending handling facilities and improving telegraph communications, the railway network in particular remained under immense pressure, due largely to the shortage of rolling stock. In addition to the request for 185 rail locomotives, made personally by Wavell in May 1942, further orders were placed in the United Kingdom, United States and Canada between July 1942 and September 1943 for 595 broad gauge and 605 metre gauge locomotives. By the end of 1943, of all these orders, only thirteen broad gauge and ninety two metre gauge locomotives had been delivered.<sup>45</sup> There is some discrepancy in the records as to how many were delivered in early 1944, but Auchinleck reported at the time that only 144 broad gauge and 341 metre gauge engines had arrived in India by May of that year.<sup>46</sup> Whatever the actual figures, it is clear that a substantial deficiency remained, and ever-increasing industrial and military demands soon absorbed any increased capacity. By mid-1944, the Indian government estimated that, on top of existing orders, a further 220 metre gauge and 800 broad gauge locomotives, 8,000 metre gauge and 40,000 broad gauge wagons, as well as 230,000 tons of coastal shipping would be required to sustain directed operations and the Indian war economy at full production into 1945.<sup>47</sup> Among other consequences for the essential movement of

people and goods, the availability of rail transport for private use was drastically curtailed. Civilian passenger traffic was reduced by forty per cent from its pre-war levels to sustain military traffic and the war economy.<sup>48</sup>

Some of the strain on the railways might have been taken up by coastal shipping. However, by the end of 1943, despite the return of some of the vessels sent to the middle east in 1940 and the removal of any serious Japanese naval threat from the east coast of India, the monthly capacity of coastal shipping was still only 150,000 tons, half of the pre-war figure.<sup>49</sup> Nevertheless, plans were already in hand to develop Indian ports to be able to cope with greater commercial movements as well as supporting any forthcoming expeditionary operations. At Bombay, an additional 4,500 feet of lightering wharfage, along with an ammunition wharf, loading hards for tank landing ships (LST) and small craft piers were to be built.<sup>50</sup> Cochin was to be provided with three 500-foot long, deep-water berths and a POL jetty. Madras was to have new POL and coal discharge berths and a loading hard for LSTs. Vizagapatam, which was to become a completely military port, was to have extended lightering facilities, a POL quay and loading hards for LSTs. Calcutta was to have a total of eight new deep-water berths, additional lighter berths and loading hards for LSTs. Chittagong, which had been partially dismantled in 1942, had all its cranes re-built; existing berths were strengthened and a new deep-water berth was built. Extensive POL handling facilities were added. Little work on these improvements started before 1944, but they were complete by January 1945.<sup>51</sup> Since Calcutta and Chittagong were the ports of entry to the operational L of C in east Bengal and Assam, further details of their improvement and operation are examined in the next chapter.

In the face of these pressures, after a slow start up to 1942, increasingly effective measures were taken during that year and the next to improve government-level coordination of the transport infrastructure and the army's transportation services. During the year, a government War Transport Department was established with a Central Priorities Board, having regional controllers in Lahore, Bombay, Madras and Calcutta. After its inception in 1941, the Army Transportation Directorate expanded rapidly in strength and efficiency during 1942 and 1943. To begin with, there were some difficulties coordinating the work of the Army Transportation Directorate with

that of the government War Transport Department, but a Joint Transportation Committee was established in 1943 and a special section of the Army Transportation Directorate was embedded in the government Railways Board to iron out these problems.<sup>52</sup> Despite early problems with recruitment and training, an extensive list of docks, inland water transport (IWT) and railway operating and maintenance units was formed during 1942 and 1943. At this stage of the war, most of the docks units were retained in India to facilitate military movements at key points and to bolster civil labour where the morale of the latter was unsettled, due to Japanese air raids. IWT and railway units were deployed mainly on the operational L of C and are covered in the next chapter. The work of these units and the improved high-level coordination measures helped to stave off collapse of the transport network, but they could not remove the constant threat of crisis caused by the sheer level of demand and shortage of essential resources.

Problems of transport capacity, combined with diminished production in the mines, resulted in a continued serious shortage of coal throughout the country, which impacted widely on military and industrial activity and created additional hardship for the civilian community. Among the more important consequences, the lack of coal hampered the airfield and base works programmes by impeding brick and cement manufacture. It inhibited also the potential output of steelworks essential to the ordnance factories' production. It contributed substantially to the very transport problems that helped to cause it. During the first half of 1944, industrial and railway stocks of coal fell to a dangerously low level. Overall coal stocks were reduced to seventeen days from a target of between forty five and seventy five days and a number of factories engaged on war production projects suffered temporary closures.<sup>53</sup> Excavation and well-boring companies of the Indian Army Engineers and two pioneer groups, each of some 1,000 men, as well as engineer plant and transport, were taken off their military duties and seconded to the Coal Commissioner to increase output in open-cast mines. They helped to increase production by approximately 60,000 to 70,000 tons per month, but distribution on the over-stretched rail system was still constrained. Consequently, as late as the spring of 1944 India still faced severe problems in many areas of industrial and agricultural production, as well as delays to the base construction programme, which threatened not only military preparations but also the stability of the entire economy.<sup>54</sup>

### *Problems with imports*

Apart from these difficulties within the country, the assembly and preparation of forces, equipment, accommodation and training facilities for ANAKIM, coincident with the continuing importation of materials needed to sustain the economy, required the carefully timed arrival of troops and stores outwith India's control. The delivery of military stores had to be quick enough to ensure that the forces would be equipped and trained by the winter of 1943 to meet the target for mounting the operation. On the other hand, however, it had to be limited to that which was essential, in order to avoid overloading the transport infrastructure and accommodation available. This required the delivery to India from overseas suppliers of 183,000 tons of stores per month between March and August 1943. Within those parameters, the timing of the delivery of certain key items of equipment was critical to ensure that they fitted into the tight equipping and training schedule. It did not happen. Shipping space was inadequate, and delays were imposed by continued operations in the Mediterranean, which forced convoys to use the much longer Cape route. In March and April 1943, a total of only 130,000 tons of imports were allocated, 236,000 tons short of the requirement for those months right at the start. By the end of April that year 18,000 vehicles, 238 earth-moving machines, 800 tanks and 1,770 guns, a total of 101,000 tons, which should have been shipped, were still awaiting embarkation at their home ports. The balance of the shortfall was either still in the manufacturing and procurement stage or on the high seas, and there was no telling when it might arrive. If space was reserved for essential civil supplies, the capacity available for military cargo in the shipping allocated to India would be reduced to 15,000 tons per month. At that rate of delivery, Wavell reported, India would be forced to stand on the defensive indefinitely. She would be unable even to equip the new units being raised under the continuing expansion programme, let alone sustaining offensive and expeditionary operations. Conversely, if military imports were continued at the rate required to mount ANAKIM in November 1943, non-military economic traffic would have to be reduced to a level that risked political discontent, civil disorder and possible economic collapse. Even if all the deficit could be shipped at once, it was, by then, already impossible for the total quantity of stores needed to be imported into India by the end of August 1943, because the Indian ports, transport system and

depots could not handle more than 250,000 tons per month.<sup>55</sup> On top of these problems with shipping and port capacity, the requirement for supply convoys to come round the Cape route added up to three months to the time in which import demands could be met from Britain. Thus it was extremely difficult to make good critical shortages promptly.

### *The Indian economic crisis and the effect on ANAKIM*

The pressures thus caused for economic and social activity aggravated existing political tensions and stresses on the civil community, which, in turn, damaged India's capacity to act as a base for operations. Despite its limited manifestation in overt civil unrest, the Congress Party's 'Quit India' campaign of August and September 1942 had already had a significant impact on military preparations. Fifty seven infantry battalions were deployed on internal security duties for six to eight weeks at a time when they should have been training to fight the Japanese. The airfield construction programme was delayed by four to six weeks. Movement of troops and supplies to the Eastern Army were delayed by three weeks due to sabotage of the railways. Ten per cent of steel and textiles production were lost and there was an unquantified effect on the future output of weapons, military equipment and clothing.<sup>56</sup> Thereafter, the pressures of increasing troop numbers, the focusing of government expenditure on war-related projects, limitations on the availability of consumer goods, poor distribution of foodstuffs and congestion on the railways fuelled inflation, food hoarding and general demoralisation of the civil population. By April 1943, the strain on the Indian economy was beginning to become intolerable. Even if India's economic, political, import shipping and base development problems could have been solved, however, the amphibious forces could not be spared from the Mediterranean or Pacific theatres to mount any significant operations out of India, even of a limited nature on the Arakan coast, before 1944 at the earliest.<sup>57</sup> Consequently, it became clear to the British COS, as well as India Command, that ANAKIM could no longer be mounted in November 1943.<sup>58</sup> For that reason they decided reluctantly to recommend to the Combined COS that the operation be shelved, along with aspirations of recapturing Burma, and that British effort be concentrated instead on defending and developing the Assam L of C in order to give maximum support to the American airlift to China.<sup>59</sup> Churchill was far from



content, still harbouring aspirations for wide ranging amphibious operations leading to the recapture of Singapore but, for the time being, even he was forced to accept the realities of the situation in India.

At the subsequent Trident Conference in May 1943, however, a reduced form of ANAKIM was resurrected as a means of satisfying Chiang Kai Shek's demand for amphibious operations to divert Japanese attention from a Chinese offensive in northern Burma to open an overland link. Despite the reduced scale, India was quite unable to cope with the undertaking. If things were not already delayed enough, a crisis in the whole Indian economy was reached in July that year, the final catalyst for which was a major breach in the rail network leading north west from Calcutta caused by the flooding of the Damodar river at Burdwan. India's principal east-west rail links were severed for four months. Two thirds of the load from Bombay had be diverted back on to the coastal shipping routes, which were, themselves, still suffering reduced capacity. Fifteen to twenty days were added to delivery times at the front, and inadequate stocks reached Eastern Army, which was forced to eat into the small reserves it had managed to accrue in the forward areas.<sup>60</sup>

Food supplies for the civil community as well as the army in Assam and east Bengal became a matter of critical concern. Traditional sources of rice supply in Burma and the far east had been lost in 1942, and demand throughout India increased in line with the workload and higher wages generated in many quarters by the war effort. In response, much agricultural land had already been converted from jute to food production.<sup>61</sup> Bengal, the centre of much operational and base support activity for the Eastern Army and subsequently SEAC, experienced particular difficulties. By August 1943, the distribution of essential civil supplies in the province was in disorder; shortages encouraged hoarding; inflation and profiteering were increasing rapidly. The failure of the grain harvest there in 1943, combined with existing shortages, culminated in the Bengal famine of that year, which some estimates claim to have cost the lives of up to one and a half million people.<sup>62</sup> It is worth dwelling for moment on the enormity of that figure in one of the most important countries of the British Empire, even in war. The famine created an urgent requirement for imports of one million tons of wheat to make up the shortfall for India at large and diverted the attentions of the army from war preparations to humanitarian aid

operations.

In the face of the crisis, Auchinleck, who had relieved Wavell as C-in-C India in June that year, appointed a Long Term Administrative Planning Committee to identify options for meeting his responsibilities to provide adequate base support for SEAC without causing further catastrophic strain on the Indian economy. The committee reported in September 1943. It confirmed Wavell's previous calculations of April that year that India's ports, roads, railways and depots could not cope with the imports and exports generated by the war economy as well as sustaining expeditionary operations. Before they could do so, the additional broad gauge locomotives and wagons already ordered would have to be provided. Planned work on port improvements would have to be completed and additional, smaller ports would have to be developed in order to reduce congestion and support amphibious shipping.

These developments in the transport infrastructure were already in hand, so it was possible to anticipate their being achieved within a year or so. On the weakness of the wider economy, however, the committee's findings were so far reaching that they called into question whether India could sustain the current, let alone proposed, level of military activity. Solution of these problems went well beyond Auchinleck's terms of reference, so he was forced into recommending a fundamental re-examination at government level of India's ability to fulfil the role of base for operations in south east Asia. Wavell, just arrived back in India as the new Viceroy, agreed, and the work was undertaken on an inter-departmental basis by the War Projects Coordination and Administrative Committee of the Indian government. That committee advised that the Indian economy could not sustain present levels of demand for the following two years, let alone the increases likely to result from any proposed major operations, without serious consequences. These had already been demonstrated by the famine in Bengal. They advised a number of emergency measures in two groups to contain the crisis, which Wavell submitted to the British government in October 1943. Shortly before that, in August, the cancellation of ANAKIM had been accepted by the Combined COS, who had finally recognized that India could not cope with supporting that operation as well as the higher priority China link. India's limited capacity was to be focused on supporting the latter.

The first group of emergency measures comprised those intended to control inflation, which was the most immediate threat to the economy. Of these, the first was that imports were needed of sufficient silver to meet the pay and allowances of additional allied forces based in India as well as enough canteen stores to absorb at least fifty per cent of the purchasing power of those troops. Second, limitations were required on the amount of pay that could be drawn in India by United States forces to match that for dominion troops. Third, imports were required of additional foodstuffs and a number of specifically detailed classes of consumer goods for the civil population and these were to be regarded as essential on military grounds.

The second group encompassed those measures to restrict to safe limits any further demands on India for war services and supplies. The volume of war production to which India was already committed was not to be exceeded. New production, or the expansion of existing production for war purposes was only to be undertaken if it could be achieved by June 1944. Thereafter, a drastic reduction was needed in demands for war production from India from 1945 onwards. Where possible, military demands on indigenous production of articles essential to the civil population were to be diverted elsewhere. Maximum use was to be made of productive capacity elsewhere in the British Empire and Commonwealth to meet overall war requirements in order to relieve the strain on the Indian economy. Finally, sufficient internal transport capacity was to be reserved to maintain India's domestic economy at a suitable level.<sup>63</sup>

In the main, the recommendations were accepted by the British government, largely because it could not allow India to fall into such a grave economic position that she would be unable to support the newly formed allied SEAC. Some of the measures, however, were so far-reaching that they took considerable time to be put into effect. The British government was reluctant to provide for the additional food shipments required because of the worldwide shortage of allied merchant shipping. But the danger to the India base of recurrence of the Bengal famine was such that both GHQ(I) and SEAC accepted foregoing ten percent of their war stores imports in order to release the shipping space required for food imports.<sup>64</sup> That, of course, placed further constraints on the timetable, extent and scale of operations. Wavell also maintained an unremitting, and ultimately successful, campaign to persuade the

British government of the need for continued food imports.<sup>65</sup>

Even by April 1944, the pressures on the Indian economy were still such that she could not accept from overseas any further demands for production of war materials except jute, ammunition and tyres, or the goods needed to sustain her own troops serving overseas, which only she could provide.<sup>66</sup> The continuing chronic weakness of imports was aggravated that month, when there occurred a catastrophic explosion aboard the SS *Fort Stikine* in Victoria Dock at Bombay, the principal port of entry to India from the United Kingdom. Along with a quantity of gold, the ship had been carrying 1,250 tons of ammunition and 250 tons of high explosive, which detonated after a fire started in an adjacent load of cotton. Ten other ships, totaling 25,600 tons, were completely destroyed and 15,000 tons of other shipping was badly damaged. One 4,000-ton ship was thrown clear of the water and deposited in the remains of a warehouse on the quayside. 11,000 tons of military stores and 36,000 tons of wheat were lost, the latter contributing substantially to the severe food shortages still being experienced by India in the wake of the Bengal famine. While Bombay was closed for repairs, it was possible to divert vital imports to other ports, but this added to the delays in delivery, due to the more limited handling facilities available. The port was back in full operation by October 1944, but the work of repairing it had diverted a substantial amount of engineer effort from the base and airfield construction programmes.<sup>67</sup> Following this accident, on 15 April 1944, Auchinleck advised the COS in London that no major expeditionary operations could be supported during the following year without interfering with the additional airfield construction programme needed for the China airlift and the Matterhorn strategic bombing plans as well as the construction projects already under way to support the existing directed force levels.<sup>68</sup> For the foreseeable future, offensive operations would be limited to those in north Burma only.

#### *The effect on army supplies and equipment*

Even such constrained operations were placed in jeopardy by the shortage of army equipment, however. Due to the combination of the events described, the delivery of supplies over this period failed to keep pace with demand. By October 1943, there had already accrued an overall British supply deficiency of twenty seven percent and

Slim, on assuming command of the newly formed 14<sup>th</sup> Army, wrote to GHQ(I): ‘The supply situation as regards certain commodities in the Army area is so serious that I consider it will affect active operations’.<sup>69</sup> Receipt of stores from the United Kingdom was still some four months in arrears by December 1943 and internal distribution was further delayed by continuing rail capacity problems. Consequently, in mid-December, GHQ(I) estimated that the full equipment and supply stocking programme for army units already assigned to SEAC for planned operations would not be complete before February or March 1944. This delay was in addition to that of outfitting the reserve bases, which, as we have already seen, was expected to be only two thirds complete by the end of 1944. To make matters worse, wastage of some vital equipment exceeded supply. For example, monthly loss through damage of vehicles was ten per cent while import and production capacity could only replace three per cent.<sup>70</sup> Delivery of 11,000 vehicles per month was required to build up the numbers needed for operations proposed until the end of 1945, and production in Britain, Canada and the United States could not keep pace.<sup>71</sup> Aside from contributing to the constraints on planned operations, all this was to result in shortages of equipment when battle was finally joined. By the beginning of April 1944, after new Japanese offensives had started in Arakan and Assam, critical deficiencies in the 14<sup>th</sup> Army included the following:

Item	Deficiency (No.)
36 Grenade	234,100
3.7" howitzer high explosive ammunition	361,695
5.5" ammunition all natures	56,037
Sub machine guns	11,772
Compasses	4,282
Steel helmets	45,897
15 cwt trucks	2,441
Jeeps	1,349
3-ton trucks	664
Bren gun carriers	398 <sup>72</sup>

#### *The India base – spring 1944*

In summary, by the spring of 1944, the India base was still far from being in a position to sustain expeditionary operations on the scale envisaged in either the then-defunct Operation ANAKIM or subsequent plans and proposals being explored by

SEAC for the recapture of Burma or Malaya. Even aspirations for a limited offensive into north and central Burma to provide space for a new overland route from India to China would be hard to sustain. They depended, in any case, upon the successful outcome of the defensive battles then in progress at Imphal. Nevertheless, India had come a very long way from its position in May 1942. The measures contained in Wavell's appeal to the British government of October 1943 were just beginning to take effect. As a consequence of that appeal and the progress of the European war, India's contribution to eastern group war production was reduced from seventy five per cent of the total, worth £44,506,606, in 1943 to sixty four per cent, worth £21,718,860, in 1944.<sup>73</sup> The economic and logistic capacity thus released could be re-directed towards domestic requirements and the continuing expansion of the strategic base. With the formation of SEAC, the Indian government and GHQ(I) were able to focus more of their efforts on maintenance of the war economy and development of the India base. Increasing American manpower, equipment and supplies were made available to help develop the base facilities and L of C, taking further pressure off the domestic economy and imports from Britain. Although priority in the allocation of resources was still directed firmly towards the European war and the imminent invasion of France, the opening of the Mediterranean route had shortened convoy passage time. Shipments of supplies and equipment were just beginning to improve; and the planning of imports became easier. Under consistent pressure from Wavell, shipping was gradually made available for the food supplies essential to stave off a repeat of the Bengal famine of 1943. Although chronic difficulties in India continued to the end of the war and beyond, the economic and logistic crisis was past its worst by the spring of 1944. India might not yet be able to support major offensive operations but she was successfully maintaining the 14<sup>th</sup> Army, then comprising a total of eleven divisions and a tank brigade; the Chinese NCAC of three divisions; and fifty four allied air squadrons on the eastern frontier.<sup>74</sup> The strength of those deployments was, however, determined equally as much by the capacity of the operational L of C between the Indian interior and the forward areas. It is to that issue that we now turn.

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Notes:

- <sup>1</sup> TNA WO 202/881, 220 Military Mission Report, 25 Mar 44.
- <sup>2</sup> Army Administrative Planning, pp. 32-39, 43.
- <sup>3</sup> Prasad, *Indian War Economy*, p. 94.
- <sup>4</sup> Woodburn Kirby, *The War Against Japan, Volume II*, p. 490.
- <sup>5</sup> Army Maintenance, pp. 344-345.
- <sup>6</sup> Army Works, p. 201; TNA WO 172/381, Eastern Army 'Q' Branch War Diary, 16 Jun 42.
- <sup>7</sup> Army Works, p. 202.
- <sup>8</sup> War Office pamphlet, Military Engineering, Volume V, Roads, Airfields and Mechanical Equipment, Part II: Airfields (Provisional), 1946 [hereafter, War Office Airfields], pp. 156-158.
- <sup>9</sup> Woodburn Kirby, *The War Against Japan, Volume II*, p. 191.
- <sup>10</sup> TNA WO 203/4204, C-in-C India Despatch, Operations in India, July – December 1943 [hereafter Auchinleck Despatch, Jul-Dec 43], p. 37.
- <sup>11</sup> TNA WO 203/4298, C-in-C India telegram to COS, 72929/COS, 15 Apr 44; TNA WO 203/2669A, C-in-C India Despatch, Operations in India, January-June 1944 [hereafter, Auchinleck Despatch, Jan-Jun 44], p. 19.
- <sup>12</sup> Woodburn Kirby, *The War Against Japan, Volume II*, p. 489.
- <sup>13</sup> Prasad, *The Technical Services*, p. 167.
- <sup>14</sup> Woodburn Kirby, *The War Against Japan, Volume II*, pp. 297-299.
- <sup>15</sup> Howard, *Grand Strategy, Volume IV*, Appendix III(D), pp. 621-622, Combined COS report on the Casablanca Conference, the Conduct of the War in 1943.
- <sup>16</sup> Army Transportation, p. 181; Woodburn Kirby, *The War Against Japan, Volume II*, pp. 490-491; Prasad, *The Technical Services*, p. 20; Verma and Anand, *The Indian Engineers*, p. 253.
- <sup>17</sup> TNA WO 203/4298, COS telegram COS(I) 199, 27 Sep 43; Report To The Combined Chiefs of Staff By The Supreme Allied Commander South East Asia, 30 Jun 47 [hereafter, SEAC Report], p. 8.
- <sup>18</sup> The India Base, pp. 14, 25-26; Woodburn Kirby, *The War Against Japan, Volume III*, p. 313.
- <sup>19</sup> The India Base, p. 14; Army Administrative Planning, p. 102.
- <sup>20</sup> The India Base pp. 10-11, 15; Army Administrative Planning, pp. 101-102.
- <sup>21</sup> Verma and Anand, *The Indian Engineers*, pp. 84-100.
- <sup>22</sup> Army Administrative Planning, p. 100.
- <sup>23</sup> Army Works, p. 53; R. P. Pakenham-Walsh, *History of the Corps of Royal Engineers, Volume LX, 1938-1948* (Chatham, Institution of Royal Engineers, 1958) [hereafter Pakenham-Walsh, *Royal Engineers*], p. 309.
- <sup>24</sup> TNA WO 172/381, Eastern Army Q Branch War Diary, 25 Apr 42; Prasad, *The Technical Services*, pp. 19, 60.
- <sup>25</sup> Auchinleck Despatch, Jan-Jun 44, p. 18.
- <sup>26</sup> Prasad, *The Technical Services*, pp. 44-45.
- <sup>27</sup> *Ibid.*, pp. 37-39, 62-63.
- <sup>28</sup> *Ibid.*, p. 42.

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- <sup>29</sup> *Ibid.*, p. 226.
- <sup>30</sup> *Ibid.*, p. 78.
- <sup>31</sup> TNA WO 182/381, Eastern Army 'Q' Branch War Diary, 21 May, 7 Jun, Jul 42.
- <sup>32</sup> Woodburn Kirby, *The War Against Japan, Volume III*, p. 19. The figures have been converted from gallons to tons for the sake of continuity throughout the paper, conversion being at thirty pounds per gallon, taken from War Office Field Service Pocket Book, Pamphlet Number 9, 1939: Supply and Replenishment of Material in the Field, p. 11.
- <sup>33</sup> TNA WO 182/381, Eastern Army 'Q' Branch War Diary, 21 May, 7 Jun, Jul 42.
- <sup>34</sup> Woodburn Kirby, *The War Against Japan, Volume III*, p. 19.
- <sup>35</sup> Army Administrative Planning, p. 23.
- <sup>36</sup> TNA WO 203/4204, C-in-C India Despatch, Operations in India, July to December 1943 [hereafter, Auchinleck Despatch, Jul-Dec 43], p. 37.
- <sup>37</sup> The India Base, pp. 17-18; Moharir, *The Army Service Corps*, pp. 71-73
- <sup>38</sup> Moharir, *The Army Service Corps*, pp. 62-63.
- <sup>39</sup> Prasad, *Indian War Economy*, pp. 196-236.
- <sup>40</sup> *Ibid.*, pp. 87-92.
- <sup>41</sup> *Ibid.*, pp. 81-82.
- <sup>42</sup> *Ibid.*, pp. 79-81.
- <sup>43</sup> *Ibid.*, pp. 76, 435-441.
- <sup>44</sup> *Ibid.*, Appendix IV, p. 429.
- <sup>45</sup> Auchinleck Despatch Jul-Dec 43, p. 33; Woodburn Kirby, *The War Against Japan, Volume III*, p. 20.
- <sup>46</sup> Auchinleck Despatch Jan-Jun 44, p. 18; Woodburn Kirby, *The War Against Japan, Volume III*, p. 315.
- <sup>47</sup> Woodburn Kirby, *The War Against Japan, Volume III*, pp. 315-316.
- <sup>48</sup> The India Base, p. 8.
- <sup>49</sup> Woodburn Kirby, *The War Against Japan, Volume III*, p. 508.
- <sup>50</sup> A loading hard was a sloping concrete ramp, following the incline of a beach or river bank, onto which a LST could lower its own bow ramp in order to load or unload vehicles and stores.
- <sup>51</sup> The India Base, pp. 7, 28; Army Transportation, p 193; Woodburn Kirby, *The War Against Japan, Volume III*, p. 505.
- <sup>52</sup> Army Transportation, p. 179; Verma and Anand, *Indian Engineers*, pp. 243-244, 266.
- <sup>53</sup> Woodburn Kirby, *The War Against Japan, Volume III*, pp. 20-21.
- <sup>54</sup> Auchinleck Despatch Jan-Jun 44, p. 15; Verma and Anand, *The Indian Engineers*, p. 120.
- <sup>55</sup> Woodburn Kirby, *The War Against Japan, Volume II*, pp. 364-366.
- <sup>56</sup> BLIOC, L/WS/1/1247, Viceroy of India telegram to Secretary of State for India, 11 Sep 42.
- <sup>57</sup> Woodburn Kirby, *The War Against Japan, Volume II*, p. 395.
- <sup>58</sup> W. S. Churchill, *The Second World War, Volume IV, The Hinge of Fate* (London, Cassell, 1951), p. 702.
- <sup>59</sup> Woodburn Kirby, *The War Against Japan, Volume II*, p. 369.
- <sup>60</sup> TNA WO 172/1839, Eastern Army 'Q' Branch War Diary, 1, 26 Aug 43; Auchinleck Despatch, Jul-



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Dec 43, p. 33.

<sup>61</sup> The India Base, p. 16.

<sup>62</sup> Army Administrative Planning, p. 103; Woodburn Kirby, *The War Against Japan, Volume II*, p. 392; *The War Against Japan, Volume III*, p. 29.

<sup>63</sup> TNA WO 203/4787, Governor General telegram to Secretary of State for India No 5965, 21 Oct 43.

<sup>64</sup> Woodburn Kirby, *The War Against Japan, Volume III*, pp. 314-315.

<sup>65</sup> Moon, *The Viceroy's Journal*, chapter 5.

<sup>66</sup> Woodburn Kirby, *The War Against Japan, Volume III*, p. 314.

<sup>67</sup> Auchinleck Despatch Jan-Jun 1944, p. 16.

<sup>68</sup> TNA WO 203/4298, C-in-C India telegram to COS, 72929/COS, 15 Apr 44.

<sup>69</sup> Romanus and Sunderland, *Stillwell's Command*, p. 11.

<sup>70</sup> TNA WO 172/1839, Record of a meeting between the MGAs of 11 Army Group, 14<sup>th</sup> Army and GHQ, India, 19 Dec 43.

<sup>71</sup> Auchinleck Despatch Jan-Jun 44, p.12.

<sup>72</sup> TNA WO 203/5061, 14<sup>th</sup> Army Letter 37/1/Q, 22 May 44.

<sup>73</sup> Prasad, *Indian War Economy*, Appendix IV, p. 429.

<sup>74</sup> See Appendix Four. By the spring of 1944, much of XXXIII Corps had joined the 14<sup>th</sup> Army.

## CHAPTER THREE

### DEVELOPMENT OF THE OPERATIONAL LINES OF COMMUNICATION

By capturing Burma, the Japanese achieved the planned limit of their westward exploitation, at least for the time being. Throughout the remainder of 1942 and most of 1943, they were content to consolidate and defend their gains, and it was not until late 1943 that they began to probe further in any strength. The allies were not to know that, however, and, with Burma lost, a further Japanese advance into Assam or east Bengal after the 1942 monsoon appeared to be a distinct possibility. Operational thinking in GHQ(I) and the Eastern Army in early 1942 was focused, therefore, on the urgent deployment and maintenance of forces sufficient to prevent that happening. Once an adequate defensive posture had been achieved, attention could turn to the possibility of building up sufficient strength for offensive operations, but that was to be a long, drawn out process. The most pressing logistic concerns at the operational level during 1942 and 1943 surrounded the capacity of the poor, over-stretched overland L of C between the developing strategic base in India and the two corps operating at the tactical level. The routes following the general line of the Brahmaputra from Calcutta to north east Assam were known as the Assam L of C or the 'northern line'. Those to Chittagong were known as the east Bengal L of C or the 'southern line'. In addition to British operations in Assam, the northern line also had to sustain what rapidly became the principal allied war aim and, for most of the rest of the war, the main point of effort in the theatre: the American-led operations to maintain and expand the link to China. Like the India base, the L of C were incapable of supporting the level of activity envisaged by the Combined COS in the time frames at first desired. It was not until formidable difficulties had been overcome that the China airlift could achieve the rate of delivery promised by the Americans, or any major offensive to open a new overland route could be mounted.

#### *The environment*

The north east frontier area of India posed particular environmental, operational and logistic difficulties for the allies (see Map Two). It was a remote and under developed region, ill-suited to sustaining forces of the size and sophistication needed

to take the fight back to the Japanese or, indeed, even to prevent them continuing their advance into India. Access to the Assam front from the Burmese side was rather easier than from India because it was on or close to the Chindwin river. Roads in the Chindwin valley were poor and the Burmese rail network did not reach to the border area, but the river system of the Irrawaddy and Chindwin was then, and remains to this day, one of the main transport arteries of Burma. Most of the major vessels of the Irrawaddy Flotilla Company had been destroyed by the British during their withdrawal from Burma in 1942 but the Japanese were able to salvage a number of them. They also brought their own river craft and ferries, and pressed smaller local boats into service to help sustain their troops at the front. The Japanese Arakan front was rather more remote from the central Burma transport infrastructure than their Assam front, being separated from the Irrawaddy valley by the mountains of the Arakan Yomas, over which there was only one low-capacity motorable road, from Prome to Taungup, near Ramree. Along the Arakan coast, however, movement in the mangrove creeks, tidal estuaries and rivers was relatively simple with an abundance of local and small military coastal craft available to, or brought in by, the Japanese. In any event, following extensive operational experience in China, the Japanese soldier had learned to live and fight with simpler administrative requirements than his British or Indian counterpart, so the enemy had little difficulty in sustaining substantial forces close up to the border on the Burmese side of either front.

On the Indian side, however, access to the border areas of Assam was extremely difficult along the extended and tenuous northern line, using a combination of low-capacity river, rail and road links, none of which extended all the way from bases in the Indian interior to the front. The complexity of the L of C on the Indian side required considerable time and labour-consuming changing of transport and cross-handling of freight. From the main trunk route following the general line of the Brahmaputra river, subsidiary roads led out into the remote frontier areas around Imphal and Ledo, but neither reached all the way to the border. There was no direct road or rail link between Assam and the rest of India across the Brahmaputra, which was not bridged and had to be crossed by ferry. The so-called Assam trunk road went no further west than Goalpara and all vehicles had to be delivered by rail or river. Distances are formidable. From Calcutta to the advanced base at Dimapur, in

the Brahmaputra basin, is a journey of some 340 miles. From the reserve base depots at Benares to Dimapur is 730 miles. From Dimapur to IV Corps' tactical base at Imphal is a further 134 miles.<sup>1</sup> Apart from Ledo, which was being used by the Americans and Chinese, the Imphal plain, still some sixty miles from the front, was the only area in Assam suitable for the construction of a tactical base for IV Corps. However, it was surrounded by mountains and was accessible to motor transport only along the one-way, all-weather road from Dimapur, which, for the last ninety miles from Kohima, ran parallel to the front on the Chindwin river. At the start of 1942, there was no motorable road between Imphal and the Burmese border. Forward of Dimapur there were few buildings available for personnel, working or stores accommodation. There was no telephone system in Assam and only one telegraph line followed the railway, with a branch leading off through Imphal into Burma.<sup>2</sup>

The British Arakan front, in east Bengal, had the benefit of being accessible to coastal shipping but the only port of any significance held by the British in May 1942 was Chittagong, some 330 miles by sea from Calcutta. Chittagong was a good potential base and point of entry to both the Assam and east Bengal L of C but the town's port facilities had been partially dismantled during the withdrawal from Burma to deny them to the Japanese, and work was needed to restore them once the operational situation stabilised. No motorable roads ran more than thirty miles south of Chittagong, but there were landing places for small craft on the coast at the small ports of Cox's Bazaar and Maungdaw, and at most of the riverside villages. Coastal shipping and small craft were the most important traditional means of transport on the Arakan coast but, in 1942, they were in very short supply for military use and were vulnerable to enemy air action by day. In any case, much of the northern Arakan coast was dangerous for inshore shipping between May and October, during the south west monsoon. Like Assam, the Arakan front lacked any direct road or rail link with the Indian interior across the Brahmaputra, which had to be crossed by ferry. East Bengal was served by the southern line of the metre gauge B & AR, along which it was nearly a 500 mile journey from Chittagong to Calcutta. Throughout Assam and east Bengal, the remoteness, the difficult countryside and the lack of suitable road stone from local sources complicated the already formidable task of improving of the transport infrastructure.

*Allied forces operational deployment and logistic structure – June 1942*

At the time of the Japanese invasion of Burma, there was no military garrison in Assam other than a small *gendarmerie*, the Assam Rifles, established and trained for internal security duties only. By late April 1942, an infantry Brigade and an anti aircraft artillery brigade had been deployed to protect the development work on the advanced base depots around Dimapur. The remainder of IV Corps, however, had to be held back at Ranchi, 180 miles west of Calcutta, mainly for want of the means to move it forward to Assam and sustain it there.<sup>3</sup> In May 1942, a second infantry brigade from the 23<sup>rd</sup> Division arrived at Dimapur. The two infantry brigades then moved forward to Imphal, along with the headquarters of IV Corps, to organize and cover the reception of the withdrawing Burma Corps and refugees. The remainder of the 23<sup>rd</sup> Division moved to Imphal in June, suffering long delays due to the inadequacy of transport.<sup>4</sup> These forces moving forward from India were joined at Imphal during May by the Burma Corps, of which the 17<sup>th</sup> Division was retained there. The 1<sup>st</sup> Burma Division was withdrawn further back to Shillong and reconstituted as the 39<sup>th</sup> Indian Division, a training formation. Until they could be cleared back into the interior of India, Imphal was also hosting 6,000 Chinese troops and some 40,000 refugees, who had made their way out of Burma. By the end of June 1942, the ground forces at Imphal comprised headquarters IV Corps with the 17<sup>th</sup> and 23<sup>rd</sup> Divisions, a level which remained constant until late 1943, due to the limits on the numbers, 40,000 at that stage, which could be sustained at the front. That total comprised 30,000 troops and 10,000 civilian labourers.<sup>5</sup>

The measures recommended, following the retreat from Burma, to reduce British dependence on road transport and un-interrupted replenishment were implemented in IV Corps during the summer of 1942.<sup>6</sup> Nevertheless, neither of the divisions at Imphal at that time was fully equipped, even to the reduced standards. There were negligible stockpiles of ammunition or supplies forward of Dimapur and the troops had to live in makeshift accommodation on reduced rations, all because of the shortage of supplies available in India and the limited capacity of the local infrastructure and L of C to Imphal. Active operations were limited to small scale patrolling in order to maintain contact with the enemy, gather intelligence and

improve tactical competence in the jungle, while activity at Imphal was directed as far as possible to the administrative refurbishment of the 17<sup>th</sup> Division, development of the tactical base and training in the light of experience of the fighting in Burma.

XV Corps, defending the Arakan coast, was also responsible for the defence and internal security of Calcutta. The forward division of XV Corps, the 14<sup>th</sup> Division, had one brigade at Chittagong with the remainder of the division held back around Comilla. The division was only recently formed, having been raised during the 1941 expansion of the Indian Army, and was incompletely trained and equipped for war. The other division of XV Corps, the 26<sup>th</sup> Indian Division, was held back in reserve because it could not, for the time being, be maintained adequately at the front.

Supplies for the forward troops on both fronts were assembled from Indian domestic sources and imports at the reserve base depots around Benares and Jamalpur. From there they were delivered by river, rail or road to the Eastern Army advanced base supply (ABSD), ammunition (AAD) and ordnance (AOD) depots being developed at Dimapur, in the Brahmaputra valley, on the northern line to the Assam front, and at Mymensingh, in east Bengal, on the southern line to the Arakan front (see Map Three). In those two places the depots were physically collocated but still functionally separated. Some time later they gradually became combined into fully multi-functional advanced base depots (ABD). A further ABSD at Gauhati served troops on the Assam L of C. FSDs, rather than being part of the main base area, as they were in the British system, were sited and used for the direct support of forward formations and troops on the extended L of C. FSDs at Imphal and Chittagong served IV and XV Corps respectively and further FSDs in the rear areas served troops on the L of C. They were matched by, and often collocated with, equivalent forward ammunition and ordnance depots. Later, a similar organisation was established for POL, and, like the ABDs, the forward depots at corps level eventually became fully combined. In April 1942, it was intended that the advance base and forward depots serving the two corps would each eventually hold thirty days' stocks of rations, ordnance stores, ammunition and POL, later to be increased to forty five days' worth.<sup>7</sup> However, it was to be almost two years before that was achieved and, for some months, units and formations existed from hand to mouth, with their operational activity constrained accordingly. The administrative instructions of the time do not

indicate the rates of consumption on which these holdings were based.

The area behind the two corps was controlled by the Eastern Army's L of C Command, which operated through a number of subordinate area commands. IV Corps was served by 202 Area and XV Corps by 303 Area. 101 Area served the Eastern Army rear area in Bihar and Orissa, west of Calcutta. The length and complexity of the L of C led to command and control problems. Eastern Army Headquarters were at Ranchi, in Bihar, some 700 miles by road and rail from Imphal or Chittagong, so the L of C Command was hard put to exercise detailed direction and coordination. Lower down the chain of command, the supply companies operating the ABSDs had detachments deployed running FSDs, sometimes hundreds of miles away. This dispersion, coupled with poor communications, led to frequent breakdown in the passage of information, which compounded existing environmental and transport difficulties, resulting in failures of control over delivery and issue of supplies. In May 1942, while Burma Corps and IV Corps occupied Imphal together without a superior command on site, they tended to work against each other in pursuit of elusive supplies at a time when the maximum cooperation was needed due to supply shortages and conflicting priorities.<sup>8</sup>

Both British fronts, Assam and Arakan, presented great logistic difficulties but, of the two, Assam was the more complex to sustain due to the distances, the environment, the force levels and the different means of transport involved on the northern line. As far as Dimapur, the limited transport capacity had to be shared with the American and Chinese forces in north east Assam. On its later advance from Assam into central Burma, the 14<sup>th</sup> Army became the only British formation of that level during the Second World War to have no access to the sea, with all the logistic advantages that confers in by-passing difficult or extended overland L of C. The XV Corps Arakan front, by contrast, was marginally easier to sustain at the operational level because, with the railway going all the way to the corps' FSD at Chittagong, the route was less complicated. Nor it did not have to serve the Americans and Chinese as well. Once the port of Chittagong was working, the overland route could be by-passed using direct sea delivery and, at the end of 1942, the advance base at Mymensingh was moved forward to Chittagong, while the FSD moved south from there to Bawli Bazaar. However, that front suffered particular environmental

complications further forward, at the tactical level, which are examined in the following chapter.

In May 1942, five main logistic developments were required at the operational level in Assam and east Bengal. The highest priority was given to that part of the airfield construction programme scheduled for the two provinces. Following that, the capacity of the Assam and east Bengal L of C had to be improved sufficiently to sustain American, Chinese and British operations. Advanced bases had to be constructed at Dimapur, to support IV Corps, and in the vicinity of Ledo, to support the Americans and Chinese. The port of Chittagong had to be returned to working order. Finally, the road from Dimapur to Imphal had to be improved to maintain IV Corps, and assistance was needed with building the Corps' tactical administrative base there. All these engineering and construction projects had to be undertaken alongside the logistic effort required to sustain current operations, with which they were often mutually incompatible, despite sharing the same ultimate aim.

#### *The airfield construction programme in Assam and east Bengal*

Before the war, the only airfield in Assam was a small strip at Dinjan and there was a field at Chittagong, in east Bengal. The 1942 airfield construction programme for north east frontier region was designed to cater for the then-planned American strategic airlift to Chinese forces in Yunnan of 4,000 tons per month as well as developing offensive, defensive and embryonic tactical air supply operations. Starting in May 1942, the programme comprised the upgrading of Dinjan to take C47 Dakota transport aircraft and medium bombers in all weathers. In addition, thirteen new all-weather airfields were to be built east of the Brahmaputra. In April 1943, a dedicated engineer organisation, the General Reserve Engineer Force (GREF), initially employing some 35,000 civilian labourers, was formed to undertake airfield construction work as well as other high-priority projects in the Assam and east Bengal L of C. GREF worked under the central direction of GHQ(I) to ensure that it was employed only on the highest priority tasks and to avoid having its effort dissipated by the wishes of local commanders.<sup>9</sup> The first fourteen fields were completed by June 1943, as far as possible using local building materials to minimise the transport requirement.<sup>10</sup> Nevertheless, the building programme required very large quantities



of crushed stone to be moved distances of up to sixty miles, sometimes across the Brahmaputra river, to some of the construction sites, tying up scarce transport capacity.<sup>11</sup> At its height, the airfield construction programme required twelve local trains per day, each carrying 600 tons, just to move stone and sand from quarries to the airfield sites.<sup>12</sup> In addition, some 250 tons per day of cement, bitumen and steel planking had to be moved forward up the L of C.<sup>13</sup> The transport requirement for materials, plant and construction personnel, as well as the additional fuel, maintenance and food supplies to sustain them, largely dictated the capacity left available to sustain operations and the China airlift.

The problem was compounded by the American commitment at the Trident Conference, in early 1943, to increase the China airlift from 4,000 to 10,000 tons per month by November of that year. That increase required the upgrading of the existing seven airfields in north east Assam to take the larger C46 Commando aircraft and the construction of three new airfields for the USAAF Air Transport Command (ATC) using special rapid airfield construction materials from the United States. In addition to local materials, the extension of the airfield construction programme required the delivery of 20,000 tons of imported construction stores and 10,000 tons per month of fuel and maintenance supplies for the airfields, in addition to the 10,000 tons of supplies per month to be delivered to the Chinese.<sup>14</sup> The airfields, which created so much of the load, were, of course, able to contribute to the flow of supplies once they were operational. Nevertheless, despite the improvements of 1943, the airlift project overwhelmed the capacity of the Assam L of C for a considerable period. Taken in conjunction with the withholding of the expected amphibious shipping in the Mediterranean and the economic problems in India, it eventually contributed much to the cancellation of Operation ANAKIM in late 1943.

#### *Development of the Assam lines of communication*

From the outset of the war until well into its latter phases, the ground and river L of C to Assam were inadequate for the load that they had to carry to sustain the forces needed at the front and the development of the various bases. Historically, the principal means of communication to Assam had been the Brahmaputra river, which gave access to the road and rail systems at a number of ports along its navigable

length. At the best of times, it was not an easy line to operate. The depth of the river fluctuated by up to forty five feet according to the season, and its course changed frequently, with sandbars constantly shifting and access to jetties and landings having to be adjusted accordingly. The down-river journey from Dibrugargh, the furthest up-stream navigable port, to Goalundu, the nearest down-stream port to Calcutta, took about seven days in good conditions, and the average total turnaround time was about thirty three days, the up-river leg, against the current, taking a good deal longer. Navigation of large vessels at night on the river was virtually impossible because of the shifting course of the channel and the many unlit hazards. On top of all this, the capacity of the river route had been much reduced early in the German war by the removal of twenty seven steamers and forty nine flats to support operations in Mesopotamia. By early 1942, only 27,000 tons of shipping capacity remained available for military use on the Brahmaputra system, and that comprising mainly vessels that were too small or too decrepit to be sent to the middle east.<sup>15</sup> Nevertheless, the river remained the best means of transporting heavy and bulky loads like fuel and road stone, which took up excessive capacity on road and rail transport. With reduced shipping available, river traffic was concentrated mainly in the upper reaches to minimise turnaround times and by-pass bottlenecks in the road and rail systems.

During 1942, a new river port with a daily capacity of 700-1,000 tons was built at Neamati, near Jorhat, to serve Dimapur. By July 1943 the capacity of that port had been increased to 1,200 tons per day. Another new port, able to handle 1,200 tons of freight and 360 tons of fuel and lubricants had been built down-river at Dhubri to ease the embarkation of supplies arriving by rail from the reserve depots at Benares. By then, the river fleet capacity available for military use had been increased to 84,000 tons by the return of shipping and barges from the middle east, and it became economical to use greater lengths of the river route, enabling some strain to be taken off the struggling rail network. In the spring of 1943, an Indian Army IWT operating group was deployed to Gauhati to operate craft on the eastern stretches of the river route.<sup>16</sup> Still, in order to cope with the increasing American airlift to China, Auchinleck, by then C-in-C India, had to consider diverting up to 54,000 tons of river shipping capacity from civil to military use, with consequent very damaging effects on the local economy. During the early part of 1944, however, a further nine paddle

steamers and nine large barges were returned to service from Iraq. Control of all shipping on the Brahmaputra, commercial as well as military, passed to the War Department.<sup>17</sup> Additional tugs were provided. Improvements were made to riverside jetties and freight handling facilities, navigation aids and communications, and night navigation was enabled. Key operating staff were returned from military service and additional masters and engineers were recruited from Britain.<sup>18</sup> By these measures, the threat to vital civil traffic on the river was avoided while essential military traffic continued.

In addition to the river route, Assam was linked to the interior of India by the metre gauge B & AR, which had been built in 1902 to serve the needs of local agriculture.<sup>19</sup> The metre gauge line connected to the Indian main broad gauge system west of the Brahmaputra at Benares, Mokameh, Santahar and Parbatipur. From Parbatipur to Ledo, the furthest extent of the northern line of the system, is some 800 miles by rail. The railway crossed the un-bridged Brahmaputra river by rail ferries at Tistamukh, which served east Bengal and the southern line to Chittagong, and Amingaon, which served the northern line to Assam. From Amingaon, the northern, Assam, branch of the railway then followed the general line of the river, diverting through Lumding and Dimapur, to Ledo. The southern and northern lines were connected by a branch line over the hills between Akhaura and Lumding but that link was of particularly limited capacity due to the many steep inclines. The whole system was of single track only and, in 1942, there were few passing stations or loops to allow two-way traffic. The telegraph and signal systems were rudimentary, so control of traffic travelling in opposite directions was slow and inefficient. The maximum capacity of the B & AR's northern line in May 1942 was 600 tons per day, which was adequate for routine peacetime purposes and little more. During the monsoon, the line was liable to frequent interruption due to flood damage, which reduced the flow of traffic.<sup>20</sup> Consequently, the railway by itself was quite incapable of supporting the increasing military demands as well as continuing civil requirements. Even before the withdrawal of the Burma Corps to Imphal, it took seven weeks to move one brigade of the 23<sup>rd</sup> Division from Ranchi to the front.<sup>21</sup>

During 1942, the capacity of the ferries at Amingaon and Tistamukh was increased, the telegraph and signalling systems were improved and additional passing loops were

built to allow more efficient two-way traffic and increase the daily capacity of the rail route. However, in June 1942, the northern line was breached by flooding near Amingaon, severing the rail link to the ferry on the north bank of the Brahmaputra until after the monsoon. During that time, freight had to be diverted on to the river and road systems or non-rail ferries, with much consequent time and labour-consuming cross handling and slowing down of delivery.<sup>22</sup> The position was further aggravated during August by the 'Quit India' disturbances, during which rail and telegraph communications were a target for sabotage and disruption. At that time, Eastern Army required 900 tons of supplies to be delivered daily at Dimapur in order to sustain IV Corps, base and L of C troops, and build up thirty days' reserve stocks. That rate of delivery would require the arrival at Dimapur of 100 freight wagons daily. The delays imposed by the weather and the disturbances, together with the share of the overall capacity taken by the Americans and construction works, reduced the quantity arriving at Dimapur to 500 tons per day, which was just sufficient for routine maintenance only, and that on reduced rations for the troops.<sup>23</sup> During the late summer of 1942, two newly formed Indian Army railway operating groups were deployed to augment the staff of the B & AR, and GHQ(I) suggested that running of the northern line might be taken over by units of the US Army Military Rail Service.<sup>24</sup> That idea was rejected by Lieutenant General Stillwell, the Commander of US forces in India, on the grounds that the necessary troops were not then available, but the proposal was to be resurrected the following year by the Americans, with profitable results.<sup>25</sup>

During 1943, the northern line was improved sufficiently to carry a sustained daily rate of fourteen trains, each of fifty to sixty wagons, each way. That total was to serve both British and American operations. By the end of the year, twenty nine new stations and fifty six crossing loops were being built to improve two-way traffic on the line. The trans-shipment facilities between the broad and metre gauge systems at Parbatipur and Santahar were improved sufficiently to enable them to handle 160 vehicles and 3,000 tons of stores and bulk fuel daily. The station at Bongaigaon, on the west bank of the Brahmaputra was modified to offload 160 vehicles and 250 tons of vehicle stores daily onto a new access road to the vehicle ferry at Jogighopa, at which point they could be delivered onto the Assam and east Bengal road system. Rail links to the river ports were improved. Plans had been considered to bridge the

Brahmaputra, but the difficulties involved, combined with the increasing efficiency of the ferries caused them to be abandoned.<sup>26</sup>

In early 1944, after the advent of SEAC, a significant improvement began in rail capacity with the introduction of five battalions of US Army railway operating troops to run the whole northern line from Parbatipur to Ledo. Having been rejected by Stillwell in 1942, the idea of using American railway troops was resurrected during the autumn of 1943, and this time the roles were reversed. It was the Americans who had become convinced that they could make substantial improvements to the efficiency and capacity of the railway and the British who were hesitant. Despite GHQ(I)'s having made the suggestion the previous year, Auchinleck, the new C-in-C India, had, at first, been reluctant to accept the Americans' help. To begin with, he insisted that the Indian railways should run under the overall charge of one central authority and believed that the introduction of American troops to run the Assam line would precipitate labour and political problems.<sup>27</sup> However, he was subsequently persuaded, and, by the end of January 1944, arrangements for US military control of the northern line of the B & AR had been agreed.<sup>28</sup> 4,300 troops of the US Military Railway Service Grand Division assumed responsibility for the running of the line on 1 March 1944.<sup>29</sup> On taking over, the Americans discovered widespread inefficiency and dereliction of duty in the operation of the railway, including train crews stopping for the night without authority and blocking the track, station masters running trains at times that suited their own convenience rather than in accordance with the timetable and use of scarce wagons for static storage and accommodation. These matters were put right. The number of locomotives on the system was increased from 290 to 442, and freight wagons from 14,000 to 35,085, mainly by imports from the United States.<sup>30</sup> Train lengths were increased from sixty to 100-125 wagons and speeds were increased. The capacity of the Amingaon ferry was increased to from 125 to 415 wagons per day by the end of April 1944. Communications, supervision and attitudes were improved, and the Americans soon established excellent working relationships with the civilian staff, most of whom kept their jobs and worked on under the new regime.<sup>31</sup> Doubling the line all the way from Parbatipur to Ledo was considered. However, that would have required approximately 200,000 tons of rails, sleepers and fastenings as well as an indeterminate quantity of stone, all of which would have had to be added to the load already being carried by the railway.<sup>32</sup> The

additional strain on the line would have been unsustainable and, in any case, the efficiency measures already undertaken were sufficient to achieve the required improvements in deliveries, so the plan was dropped. As it was, the capacity of the B & AR soon outran that of the broad gauge line from Calcutta feeding it at Parbatipur.<sup>33</sup> Over the course of the subsequent phase of the campaign, the improvements made by these troops on the Assam L of C were to have a profound effect on the ability of the allied forces to sustain major operations on that front, but that was yet to come.

Turning to road transport, in early 1942, the Assam trunk road, which ran along the south east side of the Brahmaputra from Goalpara to Ledo, was metalled for only seventy nine of its total of 500 miles. The maximum load capacity of any bridge on the road network in Assam was four tons.<sup>34</sup> During 1942, the metalling and bitumen surfacing was extended along the whole length of the road. No record has been found of the quantity of material required for that task but a calculation based on the contemporary engineering manual suggests that a figure in the order of one million tons of road stone alone might have been needed.<sup>35</sup> An important additional logistic liability would have been the labour needed to undertake the work, all of whom had to be housed and fed in addition to the local population and the troops on the L of C. The improvement of the road was thus a formidable achievement. By the beginning of 1943, the road was suitable for sustained heavy traffic, the capacity of which was then limited mainly by the numbers of vehicles available and their reliability.<sup>36</sup>

Throughout 1942 and early 1943, military trucks for British forces were in short supply and unsuitable for the load and environmental demands placed upon them. There were, moreover, insufficient workshops and technical staff to keep them operating efficiently, and sending broken down vehicles back to base workshops in the interior of India was expensive in rail and river capacity as well as incurring inordinately long delays before the repaired items were returned. By June 1943, 1,400 British vehicles beyond local repair were dumped at Gauhati and Dimapur, and orders to cannibalise them for parts to keep the remainder running could not be carried out for lack of tools and staff.<sup>37</sup> Crisis was just averted when, in that month, a programme to deliver 2,300 new three-ton trucks and 600 other vehicles to IV Corps, GREF and the L of C troops began at a rate of 120 per day. In November

1943, GHQ(I) placed orders for American five and ten-ton trucks, which were superior to the British lorries used up to then in both lift capacity and rough terrain mobility. Priority for issue of these vehicles went to the Assam front, and by the end of the year, the inflow of new trucks to Assam was running at 170 daily.<sup>38</sup>

Of course, as the numbers of vehicles grew, the problem of supplying sufficient fuel and lubricants for them became an increasing problem, despite India's most productive oilfield being located at Digboi in north east Assam. That field could not supply adequate refined products, which had to be brought in by rail, at first all the way across India from Bombay. That method was barely adequate from the outset, and the expansion of the American airlift to China demanded new measures. In early 1943 a committee was formed under the chairmanship of Sir Thomas Elderton, then the Port Director of Calcutta, to recommend improvements to POL supplies in Assam. Among other things, Elderton recommended that Chittagong become the principal POL port of entry for British forces on both the Assam and Arakan fronts. Bulk storage capacity at the port was to be expanded to 40,000 tons. A pipeline was to be built from Chandranathpur, in east Bengal, to Dimapur, following the alignment of the Akhaura-Lumding railway link, delivering 15,000 tons per month. Bulk storage for 3,000 tons of fuel was to be built at Dimapur. The pipeline terminal at Chandranathpur was to be fed initially by rail from Chittagong. Later developments were to include extensions of the pipeline from Chandranathpur back to Chittagong and from Dimapur forward to Palel, on the Imphal plain. The airfields in east Bengal were to be supplied by branches of the pipeline instead of by rail. American forces in north east Assam were to be supplied initially by barge line on the Brahmaputra, supplemented later by a pipeline from Calcutta along the alignment of the Assam trunk road. It was intended that the British pipeline should be complete as far as Dimapur by October 1943, but transportation difficulties delayed that until February 1944. The extensions to Chittagong and Palel were completed by the end of that year.<sup>39</sup> Total monthly delivery of POL on the Assam and east Bengal L of C more than doubled from less than 107,000 tons in November 1943 to 220,100 tons in May 1944.<sup>40</sup>

By the end of 1943, with the Japanese naval threat to the Bay of Bengal significantly reduced from that of mid-1942, Calcutta was rapidly becoming the main point of

access to the Assam L of C. This was important because it reduced congestion on the railways of the Indian interior and, thereby, speeded up and simplified deliveries originating in the United Kingdom, which had, hitherto, been landed at Bombay and moved forward overland. Calcutta was already the principal port of entry for supplies and personnel from the United States. At that time, traffic through Calcutta had increased to twenty ships per month from almost nothing eighteen months previously.<sup>41</sup> Even then, the port was operating at only seventy five per cent capacity for imports and twenty five per cent for exports, due to labour problems as well as inadequate transit storage and supporting transport infrastructure. Over 90,000 tons of supplies were stockpiled in inadequate facilities, awaiting onward distribution. Supplies to the forward troops, developments on the L of C, and the airfield and base construction programmes were all being held up by the constrained capacity of the port. It was forecast that, unless major improvements were made, the shortfall of imports through Calcutta would still be some 70,000 tons per month by August 1944.<sup>42</sup>

Because of the closure of the eastern ports of India during the period of Japanese naval threat, Calcutta had not been subject to the same level of modernising influences and development, which the war was bringing to other parts of the transport infrastructure. An Indian Army IWT group was deployed to the port in the spring of 1942 for training purposes, but moved on to the Arakan coast in late 1943. At that time an Indian Army railway operating group moved into Calcutta to assist with the railways.<sup>43</sup> Otherwise, the port was still configured and run by civilian staff in a manner sufficient only for peacetime pressures. It needed a radical change of culture, equipment, operating procedure and handling capacity. At the end of December 1943, the American Army assumed responsibility for its own operations at the port and a total of ten US Army docks companies were deployed there.<sup>44</sup> The following month, one British Army docks company moved in to run British docks operations.<sup>45</sup> The difference in scale is a telling indicator of the scale of resources available to the Americans and British in the south east Asia theatre.

In January 1944, Wavell, under pressure from the Americans, who were far from satisfied with the efficiency of the port, accepted that a single, high grade port director, exercising full powers under the Defence of India Regulations, was needed



to bring the port up to the level of efficiency required to sustain the war effort. Reporting directly to the Indian government's War Transport Department instead of the local Port Trust, he would be responsible for the turnaround of shipping, movement and storage of cargo on land and water, and the improvement of related facilities for warlike purposes. The Americans wanted a military officer, but, in the face of resistance from the Calcutta Port Trust and the War Transport Department, they settled for a suitably qualified and competent civilian. Mr F. A. Pope, formerly the Commercial Director of the London, Midland and Scottish Railway, was appointed to the post. He arrived in May 1944.<sup>46</sup> By that time, with military docks finally under army control, the backlog of un-cleared cargo had already been reduced substantially, although there are conflicting figures on exactly how quickly this was achieved. Auchinleck reported a reduction from 88,400 tons in November 1943 to 11,700 tons in May 1944, whilst a GHQ(I) account of the India base development reported a reduction from 96,000 tons in December 1943 to 32,000 tons in June 1944.<sup>47</sup> With cargo constantly being delivered, stored and despatched forward, it is reasonable to ascribe any differences to the precise state of holdings at the time the figures were taken in a generally fluctuating overall position. In any event, the figures indicate a declining trend in the backlog and a concomitant improvement in Calcutta's handling capacity to feed the forward L of C with increasing quantities of imported supplies. During 1944, Pope built on these efforts, directing the construction of six new cargo and POL berths, two new personnel and motor transport jetties, four new berths for loading barges and two new ramps for loading LSTs. Improvements were made to water supply and road and rail access. Covered storage capacity was increased and separate docks were assigned to civilian, British and US military port operations.<sup>48</sup>

All the developments described above led to considerable expansion in the overall capacity of the Assam L of C but, until early 1944, improvement was a great deal slower than planned and was not sufficient to keep pace with the ever-increasing demands placed upon the system. A target of 1,720 tons per day for the maintenance and stocking for both US and British force levels of 1942 was set for the end of that year, but that was not achieved until July 1943. By that time, there were the additional requirements of the extended airfield construction programme and airlift to China, as well as increasing movements of troops, to be catered for. This was all on

top of continuing civil traffic required for the sustainment of the regional economy. Consequently, the target for military traffic by the end of 1943 was increased to 3,400 tons per day, of which 1,940 tons and 160 vehicles daily were for the British forces.<sup>49</sup> This was as much as Auchinleck believed was physically possible with the resources currently at his disposal. Even at that rate, he calculated, there would be a total deficiency against planned stocks in Assam of 128,000 tons by March 1944. His administrative planning staff calculated that the actual requirements of proposed offensive operations through Imphal and Ledo, combined with the increased airlift to China of 10,000 tons per month, demanded a daily lift on the Assam L of C of 4,300 tons, rising to 6,300 tons, divided between the American and British forces. They did not see any chance of this being achievable before October 1944 without a very significant increase in resources, which then showed no sign of being available to India.<sup>50</sup> Only after SEAC took over logistic responsibility east of the Brahmaputra at the end of 1943, with substantial commitment of additional American logistic effort, did the capacity of the Assam L of C begin to improve sufficiently to sustain intensive operations. Nevertheless, in December that year, the new SEAC Director of Movements described the situation in Assam as still 'very bad', reporting, in particular, serious shortfalls in the transshipment of goods from the broad gauge system to the metre gauge, due to lack of labour. On 9 December 1943, for example, only fifty seven out of a target of 1,000 wagons were loaded at Parbatipur. On that day, seventeen 'dead' broad gauge trains were stalled on the line between Calcutta and Parbatipur due to lack of crews.<sup>51</sup> The following month, the new GHQ(I) Principal Administrative Officer (PAO), Major General Lindsell, reported that deliveries were only just keeping pace with consumption, so there was negligible stocking of reserves, which were still described as inadequate in the forward areas.<sup>52</sup> Daily demands consistently exceeded forecasts, but deliveries could not meet them. Under these circumstances, along with the continuing difficulties being experienced in the India base, major conventional offensive operations from Imphal were not possible. The newly formed 14<sup>th</sup> Army was directed in January 1944 to stand on the defensive on the Arakan coast and support the deployment of the Special Force from Assam. Otherwise, operations were to be confined to the west side of the Chindwin unless 'a favourable situation developed'.<sup>53</sup> This was a long way short of the scale of offensive operations originally envisaged to secure northern Burma for the construction of a new road to China.

During the first quarter of 1944, however, increasing resources and the measures described to improve the infrastructure and operation of the Assam L of C began to take effect. Overall control was much improved in April 1944, when a coordinating panel was established under the chairmanship of the Deputy Director of Movements, Calcutta, to maximise the capacity of the Assam L of C and allocate shares to the users. It included representation from the Director General of Railways, Calcutta; the US and British Movements Directorates; and all the transport agencies involved in the operation of the L of C.<sup>54</sup> As a result of all these combined development measures, the capacity of the L of C at last began to show marked growth during 1944. Between January and May 1944, monthly deliveries doubled from 75,531 tons to 153,349 tons while the equivalent target increased from 116,126 tons to 157,573 tons.<sup>55</sup> Thereafter, continuing increases in the rate of delivery still pursued an ever growing demand but the gap between demand and delivery was gradually narrowed. Despite the continuing shortfall throughout most of 1944, the China airlift of 10,000 tons per month was enabled, NCAC opened the new road to China from Ledo as far as Myitkyina, in north Burma, and the 14<sup>th</sup> Army was to defeat the Japanese assaults on Arakan, Imphal and Kohima in a series of decisive defensive battles. Although the aspirations for British offensive operations into Burma remained unfulfilled in late 1944, still due largely to resource and logistic constraints, the allies were at last able to sustain successful operations overland on a substantial scale. Much of this was due, of course, to better training, confidence and skill, but those things could not succeed by themselves without adequate development of the India base and the L of C. Equally important, however, were the development of the advance base at Dimapur and the road forward from there to Imphal.

#### *The advance base depots at Dimapur*

The combined supply, ordnance, ammunition, engineer and POL depots at Dimapur had literally to be hacked out of the jungle in early 1942, before which the town was an unimportant station on the northern line of the B & AR. As it became clear that the Burma Corps would have to withdraw into Assam, plans were drawn up to develop an advanced base at Dimapur eventually capable of sustaining three divisions with supporting troops and labour at Imphal. It was intended that the railhead would

be expanded to handle 2,000 tons per day. In the event, that figure was exceeded by the end of 1944. On completion, the base was to occupy fifty eight square miles of land alongside the road leading out of the town towards Imphal, but that would not be until 1944.<sup>56</sup> At the start, there were innumerable delays in building and stocking the Dimapur base, due largely to the problems we have seen already with the Assam L of C, which contributed to continued supply shortages well into 1944.

In May 1942, as the headquarters of IV Corps and the 23<sup>rd</sup> Division were attempting to move forward to Imphal while the Burma Corps, along with some 40,000 refugees, was arriving from the other direction, Dimapur was in no position to support them adequately. Hence the reception of the exhausted Burma Corps at Imphal was found wanting, creating tensions between the arriving troops and those receiving them.<sup>57</sup> At that time, the embryonic ordnance depot at Dimapur held no more than 300 rifles and twenty mortars. There was very little clothing in store and no ammunition of any nature was stocked forward of Dimapur. Men returning from Burma, who were not fit to remain at Imphal, had to turn their weapons over for use by those who could stay there before being evacuated.<sup>58</sup> At first, it was impossible to build up stocks because urgent issues more than matched receipts arriving at the railhead and poor control and communications resulted in there being no advance warning of the type or quantities of stores being sent forward.<sup>59</sup> Even if the capacity of transport on the L of C could have been increased at that time, the station at Dimapur did not have the capability to handle the quantities of supplies being demanded. During the remainder of 1942, the freight handling facilities were increased to cope with up to 100 wagons per day and, in July that year, Indian Army railway troops took over the running of the station.<sup>60</sup> By September 1942, after the problems of the line breach at Amingaon and the disruption due to the 'Quit India' disturbances of August that year, the supply position at Dimapur, against the initial target of thirty days' stocks, was as follows. Sufficient rations were held to supply the base personnel at Dimapur for eleven days and those on the L of C for nineteen days. Thirty seven days' worth were held for three divisions and corps troops at Imphal. Twenty days' worth of ordnance supplies and eleven days' worth of ammunition were held for all units at the front, at Dimapur and on the L of C.<sup>61</sup> Thus, although the supply position was not as good as planned, it was just adequate to enable IV Corps to survive the shortfall in deliveries caused by the Amingaon breach and the 'Quit India' disturbances.

It was not until November 1942, however, after the monsoon, that sufficient quantities of clothing and equipment came through to enable the whole of IV Corps, who, by then, had been deployed for some four to five months, to be properly equipped.<sup>62</sup> Thereafter, the stocking position at Dimapur gradually improved, but, as with the capacity of the Assam L of C, not to the extent of being able to sustain major operations until the spring of 1944. On the face of it, this might suggest that the administrative staff at Dimapur were more interested in stocking their shelves than sending supplies forward to the troops at Imphal, who needed them. However, there were still serious difficulties on the road forward from Dimapur to Imphal, and those continued to delay deliveries at the front long after the initial crisis at Dimapur had been overcome. It is reasonable to infer that those difficulties contributed also to the apparently excessive holding at Dimapur of rations for IV Corps.

As for POL, there was no bulk storage capacity at Dimapur in the spring of 1942. In December the previous year, with the Japanese war imminent, plans had been drawn up to build bulk tanks for 5,000 tons but, by May, the base still held only 107 tons of petrol in cans, and issued twenty seven tons per day. In view of the crisis on the Assam front, arrangements were made with commercial oil companies to install bulk storage. The total target holding intended for December 1942 was 20,100 tons but, still due to lack of tanks and misuse or loss of portable containers, the actual holding by then was less than a sixth of that: 3,000 tons.<sup>63</sup> This storage capacity at Dimapur remained unchanged and problems with delivering adequate quantities of fuel continued until February 1944, when the pipeline from Chandranathpur to Dimapur was completed.

#### *The line of communication forward of Dimapur to Imphal*

Until October 1943, when a couple of all-weather airfields had been built on the Imphal plain, all movement of supplies and personnel between Dimapur and IV Corps' forward base at Imphal had to be conducted along the one road through Kohima. In May 1942, the road was of all-weather standard, but comprised a single lane with passing places. It was, at that time, and, despite many improvements, remains to this day, mountainous, winding and treacherous. When it was covered in

mud, as was normally the case after any rain, it became extremely slippery and it was difficult for drivers to see the edges of the hard surface. To drift off it invited bogging in or being tipped over down the hillside, the latter often with fatal consequences. Any breakdown or accident was almost certain to cause a major traffic jam.<sup>64</sup> The ninety mile stretch from Kohima to the Imphal plain, which ran parallel to the front, some sixty miles to the east, crossed a series of deep ravines, vulnerable to severance through landslip or enemy action. Just to the west of Kohima, for approximately a mile, the road crossed a steep shale slope, the whole of which slipped - and is still slipping - gradually down the mountainside during the monsoon, leading to repeated breaks, requiring constant repair under the increasing weight of military traffic.

The roads and base infrastructure required on the Imphal plain had to be built virtually from scratch. Hence, apart from the problems on the Assam L of C and the stocking position at Dimapur, which, in turn, limited the level of supplies available for forward delivery, the logistic position at Imphal was constrained by two main problems: first, the availability, organisation and maintenance of transport; and secondly, the engineering work needed to construct and maintain the roads, airfields and base infrastructure required. These two issues were inseparably linked, for the limited amount of transport could not deliver sufficient supplies unless the roads, parks and depots were built and maintained, but the engineers needed a substantial share of that transport and time on the road to enable them to do their work, which, itself, seriously inhibited, and was inhibited by, the movement of traffic. On its formation, the 14<sup>th</sup> Army required 600 tons per day of engineer works stores alone, and this made a serious indentation in the transport capacity left for all other maintenance requirements.<sup>65</sup> The resultant delay in building up the supply position at Imphal was the foremost constraint on force levels that could be sustained there, and hence the operations that could be attempted.

In May 1942, at the time IV Corps first established itself at Imphal, seven GPT companies were available to support 202 L of C Area, IV Corps and engineering works at, and on the route to, Imphal.<sup>66</sup> Few of these companies had the full number of vehicles for which they were established. In June 1942 they reported having only 540 vehicles running, out of a combined establishment of 900.<sup>67</sup> To help make up the

shortfall, 300 civilian trucks were commandeered. To begin with, however, supply of fuel was a constraint on their use. On 18 June 1942, a major landslide occurred on the shale slope west of Kohima, cutting the road to vehicle traffic for a month, during which time all stores had to be carried across the breach by porters and pack animals. Petrol supplies to Imphal were stopped completely and troops were reduced to half rations. Even after a repair had been effected in mid-July, traffic was limited to 300 trucks per day, or about 9,000 per month, and the road required constant repair throughout the rest of the monsoon. Troops only returned to full ration scales in August that year, by which time IV Corps reported its monthly requirement for forward movement into Imphal at 27,000 men (including reinforcements, replacements, labour, and men returning from hospital or leave), 17,000 truck loads and 1,800 mules. Due to the limited transport available and problems on the road, the flow of vehicle traffic was only just over half that which the Corp needed for maintenance, stocking reserves and engineer work. To make best use of the limited number vehicles, men and animals marched from Dimapur to Imphal. However, this created its own problems, for camps had to be built and run at stages along the route to accommodate marching troops, while incidence of malaria increased due to the more prolonged exposure of marching men in disease-prone parts of the route.<sup>68</sup>

With the end of the monsoon in October 1942, the capacity of the road across the Kohima landslide improved as the ground dried out and became more stable. At that time, new manpower for the transport companies was being deployed at the rate of about one company's worth per week. However, numerous accidents due to the inexperience of new drivers, combined with a high rate of malaria - up to seventy five per cent - resulting from delays in malarial areas, reduced their effectiveness.<sup>69</sup> It was reported that drivers so inexperienced that they could not yet change above second gear were being sent forward to drive heavy trucks on the Imphal road. It was soon recognised that the training of drivers to operate in jungle and mountain conditions was equally as important as it was for fighting troops, but it was to be some time in coming because of the pressures of meeting immediate needs. By 1944, however, newly formed transport units were restricted to administrative duties in base areas until they were sufficiently well trained and experienced to cope with conditions at the front, to which they then graduated.<sup>70</sup> At the same time, continuous running on bad road conditions, took a high toll of vehicles, while the supply of new vehicles was

insufficient and repairs were delayed due to lack of maintenance facilities. The base workshop at Jorhat, in the Brahmaputra valley near Dimapur, was not completed in 1942, as had been planned, and there was a severe shortage of facilities and technicians towards the front because India simply could not produce enough of them. The workshops companies at Imphal and Dimapur, each of which should have been able to look after 600 vehicles, were reportedly reduced to one sixth of that capacity. Consequently, by the end of 1942, 202 L of C Area, which was responsible for moving supplies forward to IV Corps, reported that it had only 202 vehicles running out of an establishment of 623. The forward lift to Imphal had been reduced to eighty to ninety vehicles per day against IV Corps' estimated requirement then of nearly 600 required for both maintenance and stocking the intended thirty days' reserves on the plain.<sup>71</sup> Circumstances within IV Corps at Imphal were similar. The workshops of the 23<sup>rd</sup> Division, for example, were 148 technicians short from an establishment of 296 during the summer of 1942.<sup>72</sup> By the end of 1942, IV Corps had a deficiency of 1,600 vehicles against its total establishment and calculated that it actually needed 1,400 more than had been allocated, making a total shortage of 3,000 against the number of vehicles required at and forward of Imphal.<sup>73</sup>

Vehicle movement at Imphal was inhibited also by fuel supply problems due to the delivery and stocking difficulties being experienced at Dimapur, shortage of bulk fuel trucks and incompatibilities between vehicles' fittings and the bulk fuel handling equipment.<sup>74</sup> As a result of all these problems, by the end of 1942, the number of vehicles running forward to, and within, IV Corps was just sufficient for the daily maintenance of the Corps, then comprising just two light divisions. Negligible capacity was left over for stocking the reserves needed to sustain major operations.<sup>75</sup>

In February 1943, a new system of running vehicles on the Imphal road was introduced in an attempt to speed up the delivery of supplies. Instead of waiting for convoys to be formed up by transport companies and then to proceed at the specified speed of fifteen miles per hour, all vehicles and drivers were pooled. Vehicles were loaded as required and dispatched as soon as they were ready, instead of having to wait for others to be formed up into a convoy. They moved individually, at greater speed, drivers being changed at regular staging posts along the way. The transport companies ceased to have any management function other than providing the vehicles



and drivers.<sup>76</sup> Known as the London General Omnibus Company (LGOC) system, this practice, to begin with, improved the turnaround time and delivery rate. By the end of February 1943, the number of trucks working on the Dimapur to Imphal route had been increased to 700 and a realistic revised target for daily movement forward was set at 224 vehicles.<sup>77</sup> During the first week of March, the daily average forward lift was 315 vehicles, a good deal short of IV Corps' stated requirement for maintenance and stocking, but well over the new revised target and much better than the eighty to ninety truck loads per day achieved at the end of 1942.<sup>78</sup> By late March 1943, the number of vehicles on the route had been increased again to 980.<sup>79</sup> However, the lack of maintenance facilities soon eroded this increased capacity. At that time also, the principal weakness of the LGOC system became apparent: pooled drivers had little incentive to look after the pooled vehicles they were driving, and neither did the pooled mechanics who maintained them. One month later, the number of trucks available had fallen again to 852 through accidents and breakdown. On average, during the first half of April, 225 loads per day were sent forward, only just over the IV Corps revised target.<sup>80</sup> By late April, total vehicle availability had fallen back again to about 780 and the number of truck loads forward daily fell below 200. Fifty per cent of vehicles were off the road.<sup>81</sup> At that time, IV Corps revised their calculation of the forward lift required for routine maintenance and stocking of thirty days supplies at Imphal again. A minimum daily average of 380 truck loads was required during May and 480 throughout June, July and August, through the worst of the monsoon.<sup>82</sup> Apart from these increasing difficulties with transport, however, the Dimapur to Imphal road was also reported to be in deteriorating condition due to landslips resulting from the monsoon rain, and this was further slowing down the traffic.<sup>83</sup> The numbers of forward daily loads actually achieved were: 144 in May, 196 in June, 297 in July and 207 in August.<sup>84</sup> The substantial increase in July was due to the delivery of new vehicles, which began that month, but it was soon eroded again by the continued difficulties still being encountered with road conditions, care and maintenance as well as the availability of drivers and labour.<sup>85</sup>

All these problems with transport on the Imphal road were aggravated by the engineer work which had to go on alongside normal traffic to repair the damage due to landslip and normal wear and tear, as well as to widen the road for two-way traffic. This

work not only disrupted traffic but also absorbed a large amount of transport capacity, moving plant, personnel and road-making materials, which was not then available for maintenance of the corps. Contemporary engineer manuals and local engineer calculations suggest that widening the road and surfacing it would have required nearly half a million tons of crushed stone and bitumen, much of which had to be carried forward in addition to supplies for IV Corps.<sup>86</sup> At the end of 1942 the workforce on the Imphal road comprised an engineer works headquarters, one engineer battalion, one auxiliary pioneer battalion, two specialist engineer artisan works companies and three GPT companies, as well as a variety of plant according to the work in hand and its availability.<sup>87</sup> Mechanical engineer plant, however, remained in short supply for the British Army throughout the campaign and road building and maintenance relied mainly upon manual labour. By February 1943, the road had been improved to all-weather, two-way standard as far as Imphal, and the standing work force substantially reduced to two engineer artisan works companies, who were reinforced as required, particularly during the 1943 monsoon, when landslip once again became a major problem.

In August 1943, the LGOC system was modified so that transport companies were reformed to provide for a greater sense of 'ownership' of their vehicles among drivers. While the basic principle of running vehicles continuously with regular changes of drivers continued, it was done within companies and vehicles were taken off the road for maintenance by company mechanics on a strict rotation. This arrangement produced a suitable compromise between pure managerial efficiency and *esprit de corps*, helping to offset some of the environmental and resourcing difficulties then being encountered. Improved standards of training and experience among newly arrived drivers became apparent from mid-1943 onwards and the serviceability rate of vehicles rose to eighty per cent.<sup>88</sup> Following the monsoon, the continued arrival of new vehicles and drier conditions were reflected throughout late 1943 in a substantial increase in the number of loads moved forward: 336 per day in September and 432 in October.<sup>89</sup> Eastern Army still reported 360 drivers and fifteen per cent of its labour force short, but, in the latter part of the year, deliveries on the Imphal road were described as 'satisfactory' to meet the long-delayed stocking programme.<sup>90</sup> IV Corps was able, consequently, to sustain its limited level of operations while preparing its base and logistic infrastructure for an expansion of force levels and combat power

sufficient to take the fight back to the enemy in effective strength during 1944. That may have been too late to meet the Combined COS' aspirations for major offensive operations into Burma, but it was to be sufficient to sustain a decisive defensive victory over the forthcoming Japanese offensive against Imphal and Kohima. In October 1943, a third division and a tank brigade were able to join the two divisions of IV Corps already at Imphal.

### *The east Bengal L of C*

The Arakan front, meanwhile, was fortunate in having the port of Chittagong to serve its L of C, allowing the complex overland route to be by-passed, and rail rolling stock to be re-deployed to serving the northern line and the east Bengal airfields. Responsibility for control and operation of Chittagong was assumed by the 14<sup>th</sup> Army on 1 February 1944, and the port was then entirely militarised<sup>91</sup>. After work to repair the denial measures taken in early 1942, the port was handling 67,500 tons of freight, 20,000 personnel and 3,000 vehicles per month by April 1944, an increase of 127 per cent over the equivalent figures six months previously.<sup>92</sup> By that time, Chittagong was served directly from Vizagapatam, which was similarly militarised in April that year and developed into a mounting port for future expeditionary operations.<sup>93</sup> With Chittagong working, XV Corps was able to sustain two divisions at the front on the Mayu Peninsular, some 100 miles to the south, by October 1943, with a third division held in reserve around the port. From then on, at the operational level, communications to the Arakan front ceased to be a problem.

### *Food supplies in the forward areas*

With the transport difficulties described, provision of fresh food in the forward areas was a serious matter, particularly on the Imphal plain. Things were not quite so difficult on the Arakan front because of the less complicated L of C, but problems existed there as well. Food supplies were a particularly important issue, not only because the troops had to eat whether or not they were fighting, but also because of the complicated dietary needs of the multi-national Eastern - later 14<sup>th</sup> - Army. In order to cater for the wide variety of religious and taste requirements, as well as different tactical circumstances in which troops were likely to find themselves, the

14<sup>th</sup> Army eventually had to offer thirty different ration scales.<sup>94</sup> The Japanese on operations, by contrast, ate rice garnished with whatever vegetables, meat or fish might be available, and it was largely this simple diet that made the Japanese soldier rather easier to administer in the field than his British counterpart. Throughout 1942 and 1943, there was little or no refrigerated storage or transport on either front. At that time, fresh meat could only be obtained from animals kept on the hoof. In Assam, however, local people objected on religious grounds to the slaughter of cattle and would not sell livestock to the army. Attempts were made to transport cattle by rail from the Indian interior for British and Muslim troops, but the practice was not cost effective and animals arrived at Imphal in very poor condition having suffered badly on the way. Hence it was discontinued. Sheep and goats were driven on foot along a track from Silchar to Imphal and, whilst not without its problems, this method was sufficient to provide some fresh meat, though far from enough for a proper diet. IV Corps' nearest source of fresh vegetables in sufficient quantities was Shillong, but the length of the journey in the heat resulted in widespread spoilage. Throughout most of 1942 and 1943, the shortfall was made up by tinned and dehydrated products and soya substitutes, which were barely palatable and bad for morale and health.

In late 1943 a scheme was started by IV Corps to cultivate 400 acres at Imphal for vegetables and fodder. Pig and poultry farms were also established, with breeding stock being imported from Australia and China respectively. Men with farming or market gardening experience were found from units in the corps and GHQ(I) gave formal authority for the formation of six 'Mali' units on the establishment of the new 14<sup>th</sup> Army. The scheme was so successful that it continued throughout the siege of Imphal and, by February 1945, eight Mali units, each comprising over 800 men, had 18,000 acres under cultivation, producing 100% of the fresh vegetables for 170,000 troops and 273,000 civil labourers forward of Dimapur.<sup>95</sup>

Plans were drawn up for the supply of frozen meat for British and African troops, but, because of the lack of refrigerated storage and transport, it was to be September 1944 before deliveries began. Then it was achieved by air from Calcutta, where 5,000 tons of cold storage capacity had been established, which limited the quantity that could be sent forward. Later on a network of cold stores was established on the L of C and refrigerated trucks and rail wagons were provided. Full scales of daily issue were

achieved by the end of 1944.<sup>96</sup> Things were more difficult for Indian troops because of religious requirements in the preparation of meat. Even in mid-1944, the army could only supply forty six tons of Halal and Jhatka meat per month, all of which went to the 14<sup>th</sup> Army, but that was quite inadequate. Indian troops therefore relied heavily on livestock slaughtered in the forward area, which constrained supplies.<sup>97</sup> Various expedients were tried, but Indian troops went short of their full meat ration throughout the war.<sup>98</sup>

### *Summary*

Throughout virtually all this phase of the campaign, there was relentless pressure from the Combined COS and the Chinese for a major offensive into Burma to re-open the overland link to China. However, the lack of amphibious resources combined with limitations on India's capacity as a base and the L of C to the front consistently prevented the British from mounting an attack on the scale needed to achieve that objective. In particular, the limited capacity of the Assam and Imphal L of C constrained the level of forces that could be sustained at and forward of Imphal to the two divisions necessary as a minimum for the defence of the plain, along with levy forces in the hills along the border. Offensively, they could not undertake anything more than patrolling to dominate the west bank of the Chindwin and the Chin hills, with the occasional sortie across the river for intelligence gathering or to support Chindit operations. Improvement of the L of C, constructing the bases at Dimapur and Imphal, and building up sufficient stocks of supplies was a long, difficult and complex process. It was aggravated by the shortage of supplies, equipment and skilled personnel coming forward, the competing demands of American and Chinese forces in north east Assam, and a certain degree of lethargy and political resistance among some of the key civilian organisations supporting the effort. With the resources available during 1942 and 1943, it was probably not possible to have achieved anything much better. Consequently, it was not until the very end of this phase that a third division, along with RAF units and enhancements to corps troops, could be sustained at Imphal. By early 1944, with SEAC having assumed responsibility for logistics east of the Brahmaputra, and the introduction of substantial additional American resources, the logistic position and, hence, operational capability, took a dramatic step forward. Only then, after two years of painstaking preparation,

did the prospect of any significant offensive from Imphal even begin to appear realistic. Whilst all these problems were being dealt with at the operational level, parallel logistic development had been taking place at the tactical level to improve the mobility and flexibility of forces fighting in the jungle.

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Notes:

<sup>1</sup> Woodburn Kirby, *The War Against Japan, Volume II*, pp. 491-494.

<sup>2</sup> National Army Museum [hereafter NAM] 7808-96, History of 202 Line of Communication Area [hereafter 202 L of C Area].

<sup>3</sup> Woodburn Kirby, *The War Against Japan, Volume II*, p. 461.

<sup>4</sup> BLIOC L/WS/1/1243, C-in-C India telegram to CIGS 11697/C, 12 May 42.

<sup>5</sup> Army Supplies and Transport, Volume II, pp. 47-49.

<sup>6</sup> TNA WO 203/5716, 17<sup>th</sup> Division Report on Operations in Burma December 1941 to May 1942 (The Cameron Report).

<sup>7</sup> TNA WO 172/381, Eastern Army Administrative Plan for the Defence of North East India, Apr 42.

<sup>8</sup> Army Supplies and Transport, Volume II, p. 49.

<sup>9</sup> Army Works, p. 203; Verma and Anand, *The Indian Engineers*, pp. 120-121.

<sup>10</sup> Woodburn Kirby, *The War Against Japan, Volume II*, Sketch 17, facing p. 408.

<sup>11</sup> Pakenham-Walsh, *Royal Engineers*, pp. 198-202; Verma and Anand, *The Indian Engineers*, p. 121.

It will be recalled that a 1,600 yard runway alone required up to 40,000 tons of stone.

<sup>12</sup> Verma and Anand, *The Indian Engineers*, p. 123.

<sup>13</sup> Army works, p. 209.

<sup>14</sup> Woodburn Kirby, *The War Against Japan, Volume III*, pp. 24-25.

<sup>15</sup> 202 L of C Area; Woodburn Kirby, *The War Against Japan, Volume II*, pp. 491-493.

<sup>16</sup> Army Transportation, p. 191.

<sup>17</sup> *Ibid.*, p. 179; Verma and Anand, *The Indian Engineers*, p. 258.

<sup>18</sup> Auchinleck Despatch, Jan-Jun 44, p.18.

<sup>19</sup> 202 L of C Area.

<sup>20</sup> Woodburn Kirby, *The War Against Japan, Volume II*, pp. 51, 491-492.

<sup>21</sup> *Ibid.*, p.197.

<sup>22</sup> TNA WO 172/381, Eastern Army Q Branch War Diary 27 Jun, 14 Aug, 23 Aug 42.

<sup>23</sup> *Ibid.*, 8 Jun, 27 Jun, 7 Jul, 8 Aug 42; Woodburn Kirby, *The War Against Japan, Volume II*, p. 495.

<sup>24</sup> Army Transportation, pp. 186-187; Verma and Anand, *The Indian Engineers*, p. 276.

<sup>25</sup> Romanus and Sunderland, *Stillwell's Mission*, p. 203.

<sup>26</sup> Army Transportation, pp. 188-189; Woodburn Kirby, *The War Against Japan, Volume II*, p. 493.

<sup>27</sup> TNA WO 203/5053, C-in-C India telegram to COS, 78833/COS, 19 Oct 43.

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- <sup>28</sup> TNA WO 203/5053, C-in-C India telegram to COS, 82872/COS, 5 Nov 43; TNA WO 172/4145, 11 Army Group Fortnightly Report, 27 January to 9 February 1944.
- <sup>29</sup> Auchinleck Despatch Jan-Jun 44, p. 17; TNA WO 203/4078, PAO/SEAC paper, 27 Jul 44.
- <sup>30</sup> 202 L of C Area.
- <sup>31</sup> Verma and Anand, *The Indian Engineers*, pp. 280-281.
- <sup>32</sup> War Office Notes on Military Railway Engineering, Part II: Engineering, February 1940, Table 17, p. 191.
- <sup>33</sup> Verma and Anand, *The Indian Engineers*, p. 280; Romanus and Sunderland, *Stillwell's Mission*, pp. 267-269.
- <sup>34</sup> 202 L of C Area.
- <sup>35</sup> War Office pamphlet Military Engineering, Volume V, Roads, Airfields and Mechanical Equipment, Part I: Roads, July 1944 [hereafter, War Office Roads], Table 5, p. 371.
- <sup>36</sup> Woodburn Kirby, *The War Against Japan, Volume III*, p. 21.
- <sup>37</sup> TNA WO 172/1839, Eastern Army Q Branch War Diary 17 Jun, 22 Jul 43.
- <sup>38</sup> *Ibid.*, 12 Jul, 28 Nov, 18 Dec 43.
- <sup>39</sup> Army Works, pp. 202-203; Verma and Anand, *The Indian Engineers*, p. 116; Moharir, *The Army Service Corps*, pp. 64-66.
- <sup>40</sup> Auchinleck Despatch Jan-Jun 44, p. 20.
- <sup>41</sup> TNA WO 203/3808, Note by Brigadier General Warden, Commander US Base Section Number 8 to Lieutenant General Wheeler, PAO/SEAC, 8 Jan 44.
- <sup>42</sup> TNA WO 203/3808, Director of Movements SEAC minutes, 10 Dec 44, 11 Dec 44.
- <sup>43</sup> Army Transportation, pp. 186, 191.
- <sup>44</sup> Romanus and Sunderland, *Stillwell's Command*, p. 263.
- <sup>45</sup> Army Transportation, p. 192.
- <sup>46</sup> Auchinleck Despatch Jan-Jun 44, p. 16.
- <sup>47</sup> TNA WO 203/5053, C-in-C India telegram to COS, 81452/COS, 22 May 44; The India Base, p. 7.
- <sup>48</sup> The India Base, p. 28.
- <sup>49</sup> Woodburn Kirby, *The War Against Japan, Volume II*, p. 493.
- <sup>50</sup> *Ibid.*, pp. 393-396; SEAC Report, p. 13.
- <sup>51</sup> TNA WO 203/3808, Director of Movements SEAC minute, 11 Dec 43.
- <sup>52</sup> TNA WO 203/5053, Tour notes, Assam L of C and North Burma Front by Maj Gen Lindsell, PAO GHQ(I), 13 Jan 44.
- <sup>53</sup> TNA WO 172/4145, 11 Army Group Operation Instruction Number 2, 9 Jan 44.
- <sup>54</sup> Auchinleck Despatch, Jan-Jun 44, p. 15; TNA WO 203/5053, C-in-C India telegram to COS, 81452/COS, 22 May 44; Romanus and Sunderland, *Stillwell's Command*, pp. 262-263.
- <sup>55</sup> TNA WO 203/3198, Assam lines of communication monthly reports, Jan 44 to Aug 45.
- <sup>56</sup> 202 L of C Area.
- <sup>57</sup> Slim, *Defeat Into Victory*, pp. 111-112.
- <sup>58</sup> TNA WO 172/381, Eastern Army Q Branch War Diary 8 May, 12 May 42.
- <sup>59</sup> Army Supplies and Transport, Volume II, p. 48.

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- <sup>60</sup> Army Transportation, p. 186; Verma and Anand, *The Indian Engineers*, p. 276.
- <sup>61</sup> TNA WO 172/381, Eastern Army Q Branch War Diary, 8 Sep 42.
- <sup>62</sup> *Ibid.*, 8 Nov 42.
- <sup>63</sup> *Ibid.*, 12 May, 17 Dec 42; TNA WO 172/1839, Eastern Army Q Branch War Diary 13 Feb, 1 Mar 43.
- <sup>64</sup> Army Supplies and Transport, Volume II, p. 48.
- <sup>65</sup> Army works, p. 209.
- <sup>66</sup> Woodburn Kirby, *The War Against Japan, Volume II*, p. 495.
- <sup>67</sup> Army Supplies and Transport, Volume II, p. 50.
- <sup>68</sup> TNA WO 172/381, Eastern Army Q Branch War Diary, 8 Aug 42.
- <sup>69</sup> *Ibid.*, 1 Nov 42.
- <sup>70</sup> Army Supplies and Transport, Volume II, pp. 5-6, 52.
- <sup>71</sup> TNA WO 172/1839, Eastern Army Q Branch War Diary, 19 Jan 43.
- <sup>72</sup> Prasad, *The Technical Services*, p. 187.
- <sup>73</sup> Woodburn Kirby, *The War Against Japan, Volume II*, p. 496.
- <sup>74</sup> TNA WO 172/1839, Eastern Army Q Branch War Diary, 19 Jan 43; TNA WO 172/1878, Commander Engineers IV Corps War Diary, 2 Feb 43.
- <sup>75</sup> TNA WO 172/4839, IV Corps Q Branch War Diary, Jan 43.
- <sup>76</sup> Army Supplies and Transport, Volume II, pp. 52-53.
- <sup>77</sup> TNA WO 172/4839, IV Corps Administrative Instruction No 15, 23 Feb 43.
- <sup>78</sup> TNA WO 172/1839, Eastern Army Q Branch War Diary 7 Mar 43.
- <sup>79</sup> TNA WO 172/4839, IV Corps Q Branch War Diary, 21 Mar 43.
- <sup>80</sup> TNA WO 172/1839, Eastern Army Q Branch War Diary, 20 Apr 43.
- <sup>81</sup> Army Supplies and Transport, Volume II, p. 53.
- <sup>82</sup> TNA WO 172/4839, Signal from IV Corps to Eastern Army Q657, 23 Apr 43.
- <sup>83</sup> TNA WO 172/1878, Commander Engineers IV Corps Progress Report, Jul 43.
- <sup>84</sup> Woodburn Kirby, *The War Against Japan, Volume II*, p. 496.
- <sup>85</sup> TNA WO 172/1839, Eastern Army Q Branch War Diary, 8 Aug 43.
- <sup>86</sup> War Office Roads, Table 5, p. 371; TNA WO 172/4210, Forward Roads in XV Corps, Appreciation by Commander Engineers XV Corps, 15 Jul 44.
- <sup>87</sup> TNA WO 172/411, IV Corps 3043/93/RE, Royal Engineers Location Statement IV Corps, 5 Dec 42.
- <sup>88</sup> Army Supplies and Transport, Volume II, p. 54.
- <sup>89</sup> Woodburn Kirby, *The War Against Japan, Volume II*, p. 496.
- <sup>90</sup> TNA WO 172/1839, Eastern Army Q Branch War Diary, 2 Sep, 10 Sep, 8 Oct 43.
- <sup>91</sup> Auchinleck Despatch Jan-Jun 44, p. 17.
- <sup>92</sup> TNA WO 203/5053, C-in-C India telegram to COS, 81452/COS, 22 May 44; TNA WO 172/4145, SACSEA Fortnightly Report, 10-26 Feb 44; NTW 19, p. 9.
- <sup>93</sup> TNA WO 203/5053, C-in-C India telegram to COS, 81452/COS, 22 May 44.
- <sup>94</sup> TNA WO 203/828, Scales of Rations, 14<sup>th</sup> Army, Sep 44.
- <sup>95</sup> TNA WO 172/6810, ALFSEA telegram 20502/Q2, 7 Feb 45.



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<sup>96</sup> TNA WO 203/2073, ARMINDIA telegram 57368, 12 Feb 44; TNA WO 172/4168, 14<sup>th</sup> Army letter 3820/2/Q Maint, 6 Sep 44.

<sup>97</sup> TNA WO 203/820, DAQMG Maint 14<sup>th</sup> Army minute 25222/02, 21 Jul 44.

<sup>98</sup> Army Supplies and Transport, Volume II, pp. 49, 59, 69.

## CHAPTER FOUR

### THE DEVELOPMENT OF TACTICAL MAINTENANCE

At the tactical level, during 1942 and 1943, logistic attention was focused on developing the means to sustain units and formations fighting in remote or isolated positions in the jungle. The retreats from Malaya and Burma in 1942 had showed the British that they had to be able to dominate the jungle surrounding their defensive positions in some depth if they were to defeat Japanese outflanking tactics. If defences were cut off, they had to be sustained for possibly prolonged periods, while reserves counter attacked to break the encirclement, destroying the enemy in the process. Subsequent operations on the Arakan coast over the winter of 1942-43 confirmed that lesson and demonstrated also that frontal attacks on Japanese fortifications were unlikely to succeed.<sup>1</sup> The Japanese proved to be extremely skilled and tenacious in defence. Their positions were usually sited on reverse slopes, where they were protected from observation and direct fire from the front whilst being able to engage attacking infantry from the side or rear when they had passed out of sight of their own direct covering fire. They were placed to give mutual support so that no single emplacement could be assaulted without the attackers coming under fire from other positions. They were invariably well camouflaged and strongly built, with up to three feet of logs and soil for overhead cover to protect their occupants from artillery or air attack. If over-run, the Japanese would call artillery or mortar fire onto their own positions to kill the attackers in the open, while the defenders were protected by their earthworks. They almost always had quick counter attack plans worked out in advance. Unless they could be overwhelmed from the front by sheer weight of numbers and firepower, which was a rare occurrence, such well defended positions had to be outflanked and attacked from the rear. Alternatively, or in addition, the Japanese L of C had to be severed so that they would have to withdraw or counter attack the road-block, hopefully in disadvantageous circumstances. That, of course, was precisely how the Japanese had overcome British defences in 1942, but the Japanese eventually proved to be just as vulnerable as the British to such methods when the latter finally mastered them. These encircling manoeuvres, however, involved long cross-country marches, sometimes in the order of 100 miles or more,

without motor transport or overland L of C, and the troops had to be sustained both on the march and during the intense fighting that normally followed it.

Building the confidence of the British Army to use these defensive and offensive tactics in close country was the foremost objective of training during 1942 and 1943, and a great deal of parallel work went into developing the means to sustain them in the absence of overland L of C. At the same time, much effort went into building roads and tracks at the tactical level. However much troops might be enabled to fight away from them, there would always be a need for roads for routine maintenance and heavy or bulky supplies. The direction of operations was normally determined by the alignment of the few roads that existed, and the immediate tactical purpose of much the fighting was for control of them. This chapter, therefore, examines the development of the methods used to sustain forces without an overland L of C as well as the building and maintenance of roads in the tactical area.

Soon after the withdrawal from Burma, following the recommendations of the Cameron Report, GHQ(I) re-organised Indian divisions to improve their ability to operate in the jungle without having to rely on roads for tactical maintenance. Two divisions, the 17<sup>th</sup> and 39<sup>th</sup>, both of which had served in Burma (the 39<sup>th</sup> Indian Division having been formed from the remnants of the 1<sup>st</sup> Burma Division after its arrival in India) were designated 'Indian light divisions'. Their scale of heavy weapons and equipment was minimised and they were to rely on mountain pack artillery, which could be broken down and carried by jeep or mule. Their second line transport was to be found from six (later eight) mule companies and four jeep companies only. Any other transport they needed would be supplied from corps third line resources as required. Other divisions serving on the north east frontier were gradually converted to a slightly less Spartan organisation, known as the 'animal and motor transport division', in which motor transport was reduced in favour of mules but not quite to the same extent as in the light divisions.<sup>2</sup> These changes went far towards enabling Indian formations to fight effectively in the jungle but a number of other vital improvements were made, and it is these that this chapter examines. First, though, it is necessary to have some idea of the quantities of supplies that were needed at the front and the problems of the environment in which they had to be delivered.

### *Maintenance requirements*

An average division of three brigades comprised approximately 16,000 men.<sup>3</sup> This figure was by no means fixed because it depended upon the number of ancillary and support units included and these numbers changed quite frequently. For a considerable period, the 17<sup>th</sup> Indian Division comprised only two brigades, during which time, its strength was reduced to some 12,000 men. However, the figure of 16,000 gives a reasonable standard guide. In order to fight, units and formations needed ammunition, rations and POL. These commodities are known as combat supplies and represent the bare essentials for any unit in action. In order to sustain themselves for any length of time at the front, whether or not in battle, units and formations also needed replacements for damaged or worn out clothing, equipment, medical stores, engineer and defence stores, as well as welfare items. Taken together, these groupings comprise the maintenance requirement. The first clear definition of the weight of daily maintenance supplies required by a division on operations in the south east Asia theatre appears to be a report by the operational research division of the 14<sup>th</sup> Army headquarters in December 1944.<sup>4</sup> Prior to that, records of maintenance figures appear to have been recorded in a confusing combination of tons, lorry loads, gallons and days' supply, in which it is hard to discern any standard match between weights or quantities and days' worth of sustainment. Although produced after this particular phase of the campaign was over, the 14<sup>th</sup> Army report offers the clearest available contemporary picture of the tactical maintenance requirement, based on experience from operations of varying intensity in different environments. It is reasonable to assume that it reflects, in part at least, the experience of operations in 1942 and 1943. The figures cannot be exact because they depend upon so many variable factors, such as fighting strengths, formation groupings, terrain difficulty, weather conditions, intensity of action and so on, but, again, they do give a reasonable guide. The full details are at Appendix Five but, in summary, each day, a British division required up to almost 130 tons of maintenance supplies when in contact with the enemy and approximately eighty six tons out of contact. An Indian division needed up to 127 tons in contact and seventy nine tons out of contact. Those figures assume the inclusion of an average grouping of corps troops in addition to the basic division. By comparison, the logistic planning

figure for a British division in the north west European theatre in 1944 was 520 tons per day.<sup>5</sup> Although much of the difference between the theatres would be accounted for by the additional weight of artillery ammunition and fuel used in Europe, it does also give some indication of how much the equipment and transport of infantry divisions in south east Asia were minimized and simplified to cope with the tactical and natural environment. To these figures for maintenance have to be added the quantities needed for stocking reserves, as well as those required by engineering work, the movement of heavy equipment, civil supplies and the needs of the air forces, when trying to establish the overall load having to be moved forward. These, again, are widely variable and go far to explain any apparent discrepancy between the tonnages required by formations at the front and the overall demands on the L of C.

### *The environment*

Tactical maintenance in south east Asia had to be achieved in one of the most difficult natural environments encountered anywhere during the Second World War. The Indo-Burmese border, which roughly marked the front between the opposing armies from mid-1942 to mid-1944, follows a range of jungle-covered mountains, which curve down in a south westerly and then southerly direction from the eastern end of the Himalayas to meet the Bay of Bengal on the Arakan coast (see Map Two). Along the border, the higher peaks reach up to about 8,000 feet. Much of the bedrock is soft and friable and, in many places, the steeper ground is unstable, especially where trees have been felled. Roads and earthworks in the hills are always vulnerable to landslip. The many rivers generally follow deep valleys and ravines; they are fast flowing and flood rapidly in the monsoon rains to become torrents, which are frequently impassable. The Arakan coast is penetrated by numerous tidal creeks, known locally as chaungs, most of which, in 1942, were un-bridged and a serious obstacle to movement until bridges or ferries had been built. The Indian side of the border area is affected particularly by the wet south westerly monsoon, which blows from May to October each year, during which time about ten feet of rain can be expected to fall, causing enormous difficulty for movement and military activity. Bridges often collapsed and roads were washed away, with repairs having to await the end of the rains. The area was prone to several virulent diseases, including malaria and scrub typhus, which were particularly dangerous for troops and labourers having

to live and work in hard conditions without protection.<sup>6</sup> Throughout the border area, in 1942, tracks were few and most of those suitable only for animal or man-packed traffic. Construction and maintenance of roads, airfields, base facilities and accommodation in that environment was a formidable undertaking, consuming time, labour, supplies and transport, often at the expense of the daily maintenance of troops and building up of reserve stocks. Throughout the border area, except in parts of the northern Chin hills, there was a lack of hard stone for the construction of roads and airfields, and the soil on the Arakan coast was described as the most unsuitable for road construction anywhere in Burma.<sup>7</sup> On the Assam front, forward of Imphal, there was no good site for a major base to be established until well into Japanese-held Burma. In Arakan, south of Chittagong, the only satisfactory potential base locations, Akyab and Ramree, were also in Japanese hands. Elsewhere, most of the Arakan countryside comprised either steep, jungle-covered hills or rice padi, which, during the monsoon, flooded too deeply to be of much use. Apart from much improved off-road mobility, overcoming the environment required air maintenance on a scale sufficient to maintain substantial numbers of troops in action, as well as the ability to use the coastal and inland waterways, which formed the only usable surface routes in many parts of the country.

#### *The development of air maintenance*

It is probably fair to say that air maintenance was the most significant development in tactical logistics during the campaign in south east Asia. It enabled many of the natural obstacles to be vaulted and provided the most effective countermeasure to encirclement on the ground. It is important at this stage to clarify two definitions in use at the time. The term 'air supply' was used to define the airborne delivery forward of stores, either by landing or dropping. 'Air maintenance', on the other hand, embraced all aspects of tactical logistic transport: the forward delivery of supplies, equipment and reinforcements, as well as the rearward evacuation of casualties, prisoners of war and damaged equipment.<sup>8</sup> Air maintenance required at least a forward tactical airstrip where an aircraft could land and, if that were available, air supply would normally be developed into air maintenance. During the Malayan and first Burma campaigns of 1942 and the first Arakan campaign over the winter of

1942-43, the use of tactical air maintenance or supply was almost negligible, and that contributed significantly to the British inability to sustain isolated forces in either defence or attack. Following the developments which took place during 1942 and 1943, air maintenance was to become a crucial factor in the major defensive and offensive victories of 1944 and 1945. Before the British had developed the means to maintain a division in action by air, they lost all their major battles with the Japanese. Once they had achieved that capability, the British won them all.

The first problem to be overcome was the initial shortage of suitable tactical transport aircraft. Two types dominated air supply and maintenance operations in south east Asia. The most widely used was the Dakota (C47), which had a payload of just over two and a half tons if its cargo was landed, or two tons if it was parachuted. The reduction in the latter case was due to the weight of parachute equipment, protective packaging and the additional crew needed to despatch the loads from the aircraft.<sup>9</sup> The Dakota had a maximum economic operating radius of 250 miles, beyond which the additional fuel required eroded its payload exponentially.<sup>10</sup> In terms of pure tactical lift capacity, twelve Dakotas were reckoned to be the approximate equivalent of a GPT company of 100 three-ton trucks, but each, of course, had different capabilities and limitations.<sup>11</sup> In fair weather, even at night, the Dakota could operate from a roughly prepared strip in the field, provided it was adequately firm and secure. The Dakota was the principal tactical transport aircraft used by the western allies in all theatres of war. The other main type was the Commando (C46), which had a payload of four and a half tons.<sup>12</sup> This aircraft was not suitable for parachuting or landing on roughly prepared forward strips, and was used primarily by the USAAF ATC on the China air bridge. However, on occasions it was pressed into tactical service where suitable airfields were available. Very approximately, in terms of pure lift capacity, twenty Commandos equated to thirty Dakotas. In addition, various types of medium and light bomber were used early in the Burma campaign in a tactical transport role, but their limited cargo space and payload, as well as pressing operational requirements for bombing, constrained their utility. Bombers were used throughout the campaign, however, to supply bombs and other ammunition to forward airfields.

At the start of 1942, there was only one squadron of twenty five RAF Dakotas serving the whole of India Command.<sup>13</sup> The small number of those aircraft available to the Eastern Army at that time were committed to the administrative evacuation of casualties and refugees from rear airfields in Burma. By March 1943, four Dakotas and three Hudson light bombers were dedicated to the air supply role for the Eastern Army.<sup>14</sup> In June of that year, two Dakota squadrons and one Hudson squadron, each of twenty five aircraft, became available to the British air transport force in India. Only one of those, a squadron of Dakotas, was operational, but the other squadrons were able to relieve it of non-operational, administrative tasks.<sup>15</sup> Soon afterwards, the use of Hudsons in the transport role was discontinued and the squadron operating them converted to Dakotas as more of the latter aircraft became available. Upon the formation of SEAC in the autumn of 1943, the newly formed allied Troop Carrier Command (TCC) comprised 126 Dakotas in two USAAF and four RAF squadrons, the equivalent, in pure lift capacity, of over 1,000 three-ton trucks. Not all the aircraft could be used at the same time, of course, due to maintenance, loading and crew rest requirements. Nonetheless, although it had insufficient transport aircraft to sustain the scale of expeditionary operations originally envisaged on its formation, SEAC had enough to maintain up to two divisions in battle for limited periods over a radius of action up to 250 miles.<sup>16</sup> The Commando aircraft in the theatre were all retained under American national control in the ATC.

The aircraft, of course, had to have all-weather base airfields from which to operate. Those fields had to be within 250 miles of the force to be maintained and close to ports, railways or good roads in order that the flow of supplies for onward delivery as well as the POL and maintenance requirements of the aircraft themselves could be met.<sup>17</sup> Hence the fields used at first were all sited close to Chittagong or one of the branches of the B & AR. They had to be re-located in the later stages of the campaign, when the campaign moved south towards Rangoon.

Apart from aircraft numbers, the other major resource factor limiting the capacity of air supply was the availability of parachutes. It was difficult to anticipate with any accuracy the numbers that would be needed, because that depended upon terrain and enemy action as much as planned operations. Where possible, loads which could sustain the shock of landing were dropped without parachutes, but, despite care in



packing and recovery of loads, that practice resulted in substantial loss of stores and several fatal casualties among the unwary on the ground. One Chin Levy officer recalls celebration as well as damage being caused when a sack of silver coins, dropped without a parachute, exploded like shrapnel among local people helping to gather in the supplies being dropped. Most of them, fortunately, seemed to recover remarkably quickly from any injuries they received when they recognised the source of their affliction.<sup>18</sup> Early estimates of the minimum requirement for parachutes, however, accounted for five per cent of Indian cotton production at a time when her textile industry was already stretched to the limit by other war production demands. The target output of 200,000 per month could not be reached until September 1944.<sup>19</sup> To make up the anticipated shortfall before full production was achieved, the Union Jute Company of Calcutta was invited to manufacture hessian sackcloth parachutes, nicknamed 'parajutes' for dropping more robust supplies.<sup>20</sup> Following successful trials, the 14<sup>th</sup> Army estimated a requirement for 140,000 'parajutes' by the end of April 1944.<sup>21</sup> They worked adequately in dry weather, but not in wet, so their use was discontinued during the 1944 monsoon, after which adequate supplies of conventional parachutes became available.

Air maintenance could be achieved by day or night, and the latter was often enforced by the tactical situation on the ground. Night maintenance and supply flights required, however, particularly well trained and experienced aircrews and ground parties. Any flying was vulnerable to adverse weather conditions, especially in the monsoon. Finally, of course, sustained air maintenance depended upon the ability of the air force to protect the transport aircraft. The allies achieved air parity after the 1942 monsoon and could then establish sufficient local superiority to support specific supply missions. However, the general air superiority needed for long term air maintenance was not won until the arrival in theatre of the Spitfire in late 1943.<sup>22</sup>

The earliest attempts at air supply had, in fact, been made in the latter stages of the withdrawal from Burma in the spring of 1942. However, with the severe shortage at that time of suitable transport aircraft, it was confined to the occasional dropping of emergency rations and relief supplies from four Wellington bombers to refugees and isolated groups of withdrawing troops in the Indo-Burmese border regions.<sup>23</sup> It soon became clear, however, that air supply would become an essential feature of

operations in north east India. At that stage the full air maintenance of units and formations in contact with the enemy was not seriously considered as there were neither sufficient aircraft to make it practicable nor the means for the troops then needing air supply to build tactical airstrips in the forward area. In any case, the Japanese, at that stage, enjoyed complete air supremacy over the front. By June 1942, despite the monsoon conditions, requests for air supply to isolated units had become so numerous that they had to be cleared at Eastern Army headquarters, there being insufficient aircraft to meet demands for air supply and bombing at the same time. The principal recipients then were groups of levy units occupying remote positions in the Chin hills and in north Burma but isolated units of regular forces were also supplied occasionally by air. By late 1942, it was clear that requirements for air supply were growing to the point at which the army needed a specialist organisation to assemble, pack, load and despatch stores by parachute. Consequently, an air despatch training centre was established at Chaklala in north west India, from where rudimentary air maintenance of units on the north west frontier had been mounted for some time. By the end of 1943, five Indian Army air despatch companies had been formed and deployed to airfields in Assam and east Bengal.<sup>24</sup>

Meanwhile, in February 1943, the requirement for air supply increased dramatically with the first Chindit expedition, Operation LONGCLOTH, which lasted until the summer of that year. By that time, still only four Dakotas and three Hudsons were dedicated to the air supply role, although other aircraft were added from time to time when the pressure of requirements demanded. At that stage, although the Japanese still held overall air superiority over Burma, the RAF were able to provide adequate local protection to transport aircraft supplying the Chindits. When the Chindits reached the furthest point of their advance, however, escorting fighters had to refuel at a forward landing strip at Imphal, which complicated operations. At that stage, there were not the facilities at Imphal to base aircraft there. During operation LONGCLOTH, the following planned drops were made to the Chindit force, the 77<sup>th</sup> Indian Infantry Brigade, which marched overland into Burma and operated in widely dispersed columns:

<b>Date</b>	<b>Tons dropped</b>
Around 14 Feb 43	35
24-27 Feb 43	38
Around 25 Mar 43	42
29 Mar-7 Apr 43	33
Around 4 May 43	14 <sup>25</sup>

The quantities dropped are substantially less than would normally be expected for an infantry brigade, judging by the figures given in the 14<sup>th</sup> Army operational research report, but this would be due mainly to there being no requirement for POL, artillery ammunition or defence stores, three of the heaviest supply commodities for a conventional formation. Moreover, the 77<sup>th</sup> Brigade was not, at any time, involved in protracted high intensity combat, and the troops lived on very light scales of rations, supplementing them when possible with food bought locally. The supply dropping programme was controlled by the rear headquarters of the 77<sup>th</sup> Brigade, collocated at the base airfield, Agartala, with the supporting aircraft, the brigade's administrative units, the rear party of each Chindit column and an air supply company. This grouping ensured the correct assembly, packing and despatch of supplies to meet the requirements of the columns, which were submitted by radio and generally met within forty eight hours. A RAF aircrew officer with each Chindit column ensured that the selected dropping zone was suitable from the air force point of view and guided the aircraft while they were dropping supplies.<sup>26</sup> After being dispersed by the Japanese reaction to their activities, survivors of the operation returned in small groups between April and June 1943. Occasional emergency supply drops were made to groups of stragglers when they were able to summon help and if they could be located.

Operation LONGCLOTH was a timely demonstration of the ability of air supply to sustain a substantial force on the move in the jungle, which paved the way for developments over the forthcoming year. Those were, in turn, crucial to the success of decisive future operations. However, it overshadowed and disrupted the equally important air supply of the isolated garrisons of the Chin hills, as well as that of Fort Hertz, in North Burma. Those units not only had to live largely on air-dropped supplies but also to build up reserve stocks for the monsoon, when both flying and overland movement would become increasingly difficult. They, at least, had the advantage of being static, so finding and establishing suitable secure dropping zones

was not quite such a problem as it was for the Chindits or the aircrews supporting them. Moreover there was, by March 1943, a tenuous route into the Chin hills, by which some supplies could be taken forward overland in fair weather. Nevertheless, by the end of that month, with the monsoon only four to six weeks away, 670 tons awaited overdue air delivery to the Chin hills, more than the entire load dropped to the 77<sup>th</sup> Brigade throughout Operation LONGCLOTH.

With the greater numbers of transport aircraft, which became available in June 1943, as well as its increasing combat strength in the air, the RAF coped remarkably well throughout the monsoon of that year. Despite appalling flying conditions, 817 tons were dropped in July 1943 (including last drops to the stragglers of the 77<sup>th</sup> Brigade), 320 tons in August and 317 tons in September.<sup>27</sup> In January 1944, the most extensive air supply operation thus far commenced when the 81<sup>st</sup> West African Division deployed into the Kaladan valley, in Arakan, which was all but inaccessible to overland transport (see Map Four). By that time, the allied 3<sup>rd</sup> Tactical Air Force had won overall air superiority although the Japanese could mount an effective local challenge to it from time to time. On its initial entry into the valley, the 81<sup>st</sup> Division managed to take in 150 jeeps, but the one usable track from Chiringha could not sustain further motor traffic thereafter. A few mule caravans and marching troops passed along the route, and casualties, prisoners of war (POW) and salvaged parachutes were evacuated by that means until forward airstrips could be built. The division remained in the Kaladan valley until the end of May 1944. 1,074 tons of supplies were dropped to it in February, 1,114 tons in March and 1,316 in April. By May, the division had built a number of forward strips and, during that month, 1,047 tons were dropped and thirty four tons were landed.<sup>28</sup> The division comprised only two brigades. It did not engage in sustained, heavy fighting, though it had a number of sharp battles with the Japanese. It had only a light scale of artillery and very few vehicles, and it did receive a small amount of overland supply. Hence the quantities of supplies delivered do not match the requirements of a division in battle as calculated in the 14<sup>th</sup> Army operational research report.

As a result of these operations, standardised dropping zone procedures were agreed between the army and air force. Drawing a compromise between practicalities on the ground and in the air, a clear dropping zone 880 yards long and at least fifty yards

wide was established as the standard for a routine, planned drop. That might seem excessive, but at a parachute dropping speed of 120 miles per hour, those dimensions allowed just fifteen seconds for the despatchers in the aircraft to throw out parachute loads. A complete drop might require the aircraft to make several circuits over the dropping zone, and every circuit increased the risks of enemy interference. It might have been easy enough to find such a clear space in cultivated countryside but in deep jungle, in the mountains or in close contact with the enemy, very much smaller spaces often had to be used and some drops were made straight into the jungle. Then the aircrew and despatchers had to be extremely accurate in their delivery if supplies were not to be lost, often to the enemy. The principle was established that any air-maintained or air-supplied formation should have a dedicated base forwarding party at the airfield, from which supply operations were mounted, in order to ensure the correct assembly, packing and despatch of supplies. For the 81<sup>st</sup> Division, sustained by deliberately planned air supply and, later, full air maintenance, this amounted to nearly 450 men from the division's administrative units in addition to the air supply company. These lessons were soon included in operations instructions to formations relying on air supply.<sup>29</sup> As further experience was gained, remarkable loads were dropped. For example, live pigs and geese were reportedly delivered in this way to the 36<sup>th</sup> British Division in order to provide it with fresh meat rations.<sup>30</sup>

Operation LONGCLOTH demonstrated that an isolated unit or formation required a forward tactical airstrip suitable for a Dakota if it was to operate satisfactorily for any length of time. The main weakness of air supply to the first Chindit expedition was the inability throughout most of the operation to evacuate casualties or deliver reinforcements, and that had a serious consequences for morale as well as effective manpower numbers. On one occasion in early April 1943, however, a Chindit column awaiting re-supply found a clearing where they believed a Dakota could land to evacuate casualties, and they signalled that to the pilot of their supply-dropping aircraft. The pilot made a successful landing - and subsequent take-off - and, with that, tactical air maintenance was born for the British in the south east Asia theatre. Apart from the ability to evacuate casualties and damaged equipment for repair, landing an aircraft at a tactical forward strip, without the additional weight of parachutes and despatchers, allowed for best use to be made of the available payload. It required, however, that the strip be secured adequately to protect the aircraft while

it was on the ground and that sufficient labour be made available to unload and load the aircraft quickly. The Dakota required minimum runway dimensions of 900 yards by thirty yards with all trees cleared to ground level out to fifty yards. Clear approach and take-off lanes, fifty yards wide on a slope no steeper than 1:30, were also required. These specifications virtually dictated that the runway had to be sited on existing flat, reasonably open areas, and it was often clearance of trees from the approach and take-off lanes that required the maximum effort in construction.<sup>31</sup> The first forward strip of this sort was built at Tamu, near the Chindwin front, in late 1943.

These un-metalled tactical strips suffered from dust in dry weather and mud in wet. Dust could slow down the rate at which a strip could be used and might attract enemy attention, so it had to be suppressed as much as possible, but mud was the bigger problem; it could put a strip completely out of action. To make a tactical strip suitable for all-weather use required either large quantities of stone, which it was rarely practical to quarry, transport and lay in the forward area, or an expedient surface material. Of the latter, the most widely used eventually at the tactical level was bitumen-soaked hessian sackcloth, known officially as prefabricated bituminous surfacing (PBS). Laid directly onto stable, compacted soil with the correct moisture content and good drainage, PBS provided a waterproof surface, which would prevent the runway softening into mud in wet weather and would reduce dust clouds in the dry. Provided the material was put down in dry conditions and maintained adequately, a PBS-surfaced runway could sustain up to 100 landings per day by Dakota or Commando aircraft, even during the monsoon.<sup>32</sup> A 1,600 yard runway, which, it will be recalled, required up to 40,000 tons of stone, needed just 550 tons of PBS, which could, if necessary, be flown to the site.<sup>33</sup> Whenever possible, however, the material was usually delivered by road because of the cost in aircraft sorties required by flying it in.

The first planned use of tactical air maintenance was by the 81<sup>st</sup> West African Division in the latter stages of its deployment in the Kaladan valley and the 3<sup>rd</sup> Indian Division, the Special Force, during the concurrent second Chindit expedition in early 1944.<sup>34</sup> Once they had captured suitable ground, the African divisional engineers built five strips by hand, assisted by local labour.<sup>35</sup> The Special Force was rather better off, being supported by American forward airfield engineers equipped

with small, air-portable bulldozers and other plant, which were delivered by glider in advance of the aircraft. Fair-weather strips were then developed, deep in enemy-held territory, around which substantial forward operating bases, or 'strongholds' were established. At one such stronghold, fighters were based for a short time to protect it against Japanese air attack. Neither the 81<sup>st</sup> Division nor Special Force found it necessary, nor had they the wherewithal, to upgrade any of their forward strips to all-weather standard. Forward tactical strips were only surfaced later in the campaign, when the situation demanded and sufficient PBS equipment became available. However, the Special Force solved the problem of evacuating casualties during the monsoon by establishing a forward flying boat strip on a lake.

During 1943, two fair-weather strips at Imphal - Palel and Imphal Main - were upgraded to all-weather standard to support and assist in the maintenance of IV Corps. Eventually, both had 2,000 yard, stone-surfaced runways, suitable for transport aircraft, as well as fighters and light bombers, and, thereafter, aircraft could be based on the plain. The construction of these two airfields required an engineer force made up of four auxiliary pioneer labour battalions, each comprising 1,000 men; one engineer artisan works company; one electrical and mechanical engineer company; and one and a half GPT companies, as well as a variety of the very limited quantities of engineer plant available to the British in south east Asia at that time.<sup>36</sup> These became substantial airfields, on the borderline between the tactical and operational levels of warfare, the timely completion of which was to prove crucial to the sustainment of IV Corps during the forthcoming siege of Imphal. Compared, however, with the effort that had to go into the construction and maintenance of roads in that theatre, they demonstrated that tactical airfields could be built quickly and maintained with relative ease. Both these fields were completed within two months. This lesson was not to be missed later in the campaign, when air maintenance took on a central role in the sustainment of the army, both in defence and, even more especially in the advance, when requirements at the front overwhelmed the capacity of the road L of C.

### *The development of water-borne supply*

Of almost comparable importance, but less conspicuous, was the development of IWT in the forward areas. This became crucial to operations, first on the Arakan coast and, in the latter phases of the campaign, on the Chindwin and Irrawaddy rivers as well. Considerable use of the Irrawaddy Flotilla had been made during the retreat through Burma in 1942. Soon after the withdrawal, although far from the sea or any major rivers, Imphal became the scene of early experiments with the local construction of improvised assault boats and supporting craft for the eventual re-crossing of the Chindwin and Irrawaddy. During 1942, in the absence of purpose built river-crossing equipment, the engineers of IV Corps and the 23<sup>rd</sup> Division designed a simple craft, known as the PN boat, which could be built entirely from local materials. The PN boat had a payload of two short tons (4,000 lb) and could be rowed empty by one man or powered by outboard motor. Two could be carried in a thirty-cwt truck. 500 PN boats were completed by the end of 1943 and 120 were transferred to the Arakan front, where many more were built. The 23<sup>rd</sup> Division engineers also designed and built tugs powered by inboard truck engines and a gunboat version, armed with an anti-tank gun, all of which could be transported overland, if necessary in pieces. At the same time, Eastern Army engineers developed a timber-built dumb barge, essentially a large PN boat, known as the EA boat, intended also to be constructed from local materials in the forward area. The EA boat could serve by itself as a lighter, with a ten-ton payload, or as one component of a thirty-ton ferry raft.<sup>37</sup> These craft were also destined to reappear in large numbers later in the campaign. In addition to these 'home-made' craft, a wide variety of factory-built vessels, capable of being delivered overland or by air in kit-form sections for assembly at the front, was developed in India, the United Kingdom and the United States. However, they did not begin to arrive in south east Asia until late 1943. They included assault boats, self-propelled lighters, pontoons, ferries, barges and tugs. Wherever possible, of course, use was also made of existing local craft and crews.

Coastal and river transport was, from the outset, especially important to operations on the Arakan front, particularly in view of the paucity and difficulty of overland communications, largely created by the rivers themselves (see Map Four). Initially,



however, use of the inland waterways at that front favoured the Japanese, who were facing north, because the rivers tended to converge from that direction towards the Japanese forward base at Akyab. That allowed their river traffic to fan out naturally from Akyab to forward fighting positions, which were sited mainly to cover the approaches along the coast or in the river valleys. The Japanese were able to commandeer or bring in all the boats they needed to capitalise on this natural advantage. Any British advance from the north was faced with the problem of crossing the intermediate ridges before any use could be made of the Kalapanzin or Kaladan rivers for movement. Only the Naf river was easily accessible from the north. Moreover, the British forces could only use those boats they found, carried in or built on site until they could secure the river mouths, allowing them to gain access from the sea. Thus, for British troops, to start with, at least, most rivers tended to be part of a series of natural obstacles, which had to be overcome before they could be developed into means of transport. That changed as the campaign developed southwards in its later phases.

In peacetime, the majority of commercial traffic from Chittagong to the Arakan region had been carried by coastal shipping. That was vulnerable to the prevailing weather in the monsoon period, and there were, in 1942, very few craft available for military, or even civilian, use after the denial measures undertaken in May that year. Daytime coastal traffic was also particularly vulnerable to Japanese air and naval interdiction during 1942, before the allies had achieved parity on and over the Bay of Bengal. At the end of that year, however, an Indian Army IWT group, comprising three operating companies, a port operating company and workshops, was deployed on the Arakan front. For coastal operations between Chittagong and the two small ports of Cox's Bazaar and Maungdaw, the group was equipped with a variety of old requisitioned river steamers, launches and barges, which were barely seaworthy. In December 1942, during the abortive first Arakan offensive, two convoys made up of these craft succeeded in reaching Maungdaw in reasonable weather, but it was clear that a regular service that far was beyond the capacity of most of the vessels then available. Consequently, Cox's Bazaar, which was well protected by small islands and reefs offshore, became the principal forward port until more seaworthy craft were found. Two companies of the group operated local river sampans on the Naf and Kalapanzin rivers to provide a link between troops at the front and the head of the

road then being built southwards from Chittagong. All these operations came to a halt during the 1943 monsoon. However, small port facilities and workshops, which had been built at Cox's Bazaar and Tumbru Ghat, at the head of the Naf river, were kept open in readiness for renewed operations during the following dry season.

Following the 1943 monsoon, the IWT force on the Arakan front was doubled in size to two groups, each of three operating companies. One of these groups worked the coastal route from Chittagong to Cox's Bazaar and the other the river routes from the roadhead near Bawli Bazaar to troops at the front on the Naf and Kalapanzin rivers.<sup>38</sup> At that stage, in addition to requisitioned and home-made craft, a variety of purpose-built harbour and river craft, including tugs, self-propelled lighters with landing ramps and kit-form barges, which could be transported overland, had become available. By January 1944, a fleet of coastal steamers, tugs, barges and local craft, crewed by both army engineers and civilians, carried some 900 tons per day forward from Chittagong. The small ports at Cox's Bazaar and Tumbru Ghat, were improved with stores sheds, workshops, landing ramps and jetties.<sup>39</sup> The former of these two was then served by a variety of requisitioned and specialised harbour craft, also capable of handling up to 900 tons per day. IWT and local craft on the Naf river had a capacity of 800 tons per day of general freight plus 1,000 tons bulk lift for the road stone then being imported from India. In addition, the few naval minor landing craft available were able to assist with logistic lift when they were not involved in local patrol and raiding operations. A mix of local sampans and 280 of the PN boats, developed by the engineers at Imphal, provided a total lift capacity of 530 tons on the Kalapanzin river. Outboard motors and fuel to power these craft, however, had to be carried over the Mayu hills by mule, there being no access for motor vehicles.<sup>40</sup> Further east still, on the Kaladan river, much of the 81<sup>st</sup> West African Division's local transport was provided by home-made rafts and engineer folding boats with outboard motors flown into tactical airstrips near the river by Dakota.<sup>41</sup> Provided they could be replenished adequately at their base termini, these river routes were more than sufficient to sustain XV Corps' formations on the Arakan front. The main problem was that of delivering supplies to the base termini along difficult overland L of C and then onward overland delivery from the forward beachheads to unit locations.

## *Roads*

For all the development that took place between 1942 and 1944 in air and water-borne maintenance, those logistic services could only provide part of the answer to the problems that had to be solved in order to sustain the army in the jungle. A water-borne L of C might be able to maintain a large force indefinitely, but only if it could reach that force. Beyond the beachhead, overland movement was still needed. As far as air maintenance was concerned, at no time during this stage of the campaign was it ever envisaged that a major formation could be maintained by air alone indefinitely. Air maintenance was seen as a means by which an isolated force might be enabled to fight on, or to sustain troops deployed temporarily away from any roads. Overland transport remained the foremost artery of routine army maintenance at the tactical level, and a substantial road building and improvement programme in the forward areas was essential, just to sustain a defensive posture. If, as was intended, the army was eventually to invade Burma, it was anticipated that a high-capacity, all-weather road would be needed to sustain it whatever other means might be used as well. In 1942, there was only a fair-weather track forward of Imphal.

Fair-weather roads were only ever a temporary expedient. They would quickly become impassable in rain, so any significant, long term activity requiring overland maintenance had to be supported by an all-weather road as soon as possible. Constructing all-weather roads in the environment of the north east frontier was a formidable undertaking and a good deal more arduous than building airfields. At no time during the campaign did the British contemplate building from scratch an all-weather road that could equal the 250-mile economic operating radius of the Dakota. Setting out a road alignment was complicated by innumerable terrain obstacles and lack of visibility due to thick vegetation. In many places, roads literally had to be hacked out of the trees and rock. In jungle, trees had to be cleared out to thirty five feet either side of the road centre to enable sunshine to dry the surface after rain. All organic soil had to be dug out from the width of the road and removed because it was unstable and could not support the weight of traffic. In hilly country, the road often had to cut out of the hillside on slopes of up to seventy degrees, much of the work having to be done by hand, even when plant was available because of the angle of the ground. Trees felled on the uphill side had to be moved away to prevent their

slipping down and blocking the road, since fallen trees mixed with the rock in a landslip made it much more difficult to clear. The best ground for road building in the hills tended to be on the ridge tops, avoiding the innumerable gullies, rivers and swamps on low ground. However, that meant building long, switch-back ascents and descents, vulnerable to landslip, to cross the main rivers. Road alignments had to be planned, if possible, to avoid the side of ridges on which the dip of the rock strata followed the slope of the ground, for it was there that serious landslip was most likely, but that might mean long, tortuous diversions from the most direct line.<sup>42</sup> For all these reasons, planning the alignment and construction of roads required great care and co-ordination between the operations, logistic and engineer staffs because effort could not be wasted on roads that were not essential. Moreover, once constructed, the layout of the road network would probably have a defining influence on the pace and direction of operations.<sup>43</sup>

Where it was not founded on a naturally hard surface, a properly constructed one-way, all-weather road, twelve feet wide, required nearly a ton of crushed stone and chippings to surface every yard of its length. More than twice that weight was required if the surface was to be sealed with bitumen.<sup>44</sup> Even where suitable hard rock could be found, the work of excavating, crushing, transporting, spreading and compacting the stone was immense. Rock might be found locally from cutting the alignment of the road itself, but, where that was not the case, it had to be transported from quarries or shingle beds that might be far distant. Where it could not be provided at all, bricks or expedient surfacing, such as timber or bamboo 'corduroy' or woven split bamboo matting laid on the soil had to suffice.<sup>45</sup> These methods were slow to prepare and required constant maintenance if they were to survive heavy use. The many rivers on both fronts had to be bridged at a height clear of the monsoon flood level or ferries constructed which could withstand the currents. In the hills, the smallest gully would turn into a torrent in the monsoon, so a substantial culvert had to be placed wherever the road crossed a re-entrant, and deep drainage ditches dug along its length to prevent rainwater washing it away.<sup>46</sup> This work was a major logistic undertaking in its own right, especially since the lack of mechanical plant was made good by large numbers of labourers, who had to be fed and accommodated. It generated a large amount of its own supporting traffic, and, where existing roads were

being widened or improved, that had to go on alongside existing use of the road to sustain the troops already at the front.

Aside from improving and maintaining the Dimapur to Imphal road and constructing the accommodation and depots required at Imphal, the priority tactical road building tasks laid down for the engineers in IV Corps in the latter part of 1942 were as follows (see Map Three). The existing one-way, all-weather road from Imphal to Palel was to be widened to two-way, all-weather standard by 1 March 1943. That standard was then to be extended to Tamu, but there appears to be no record of any target date being set at that stage. A one-way, fair-weather road from Imphal to Tiddim was to be completed by 1 January 1943. That road was to be improved to one-way, all-weather standard by 1 March 1943.<sup>47</sup> Most of this work was to be carried by Eastern Army, IV Corps and divisional engineers, even after GREF took over responsibility for roads, airfields and pipelines throughout the rest of Assam. However, GREF assumed responsibility for work on the Imphal to Tamu road in 1943.

Of all the engineer tasks assigned at that time, the construction of the roads to Tiddim and Tamu were the most formidable. They were also to have the most profound effect on tactical developments within IV Corps, for it was largely those roads that permitted the corps to establish and maintain contact with the Japanese well forward on the Chindwin and Chin hills fronts. In September 1942, the Commander Engineers of IV Corps estimated that the construction of these roads would require two engineer works unit headquarters; four engineer field companies; two forestry companies; one and a half electrical and mechanical engineer units; sixteen auxiliary pioneer battalions, each of 1,000 men; and an unspecified quantity of local labour.<sup>48</sup> It was never possible to provide all these resources and, by February 1943, it was clear that the engineers would not be able to meet all the demands placed upon them with the reduced assets allocated.<sup>49</sup> Much of the deficiency can be accounted for by shortages of men and equipment in India as well as the difficulties with transport and movements being encountered at that time all the way up the Assam L of C. In any event, it resulted in severe delays being imposed on the road building programme forward of Imphal.

Initially, priority was given to the Tiddim road because it was further from the Chindwin front and should, therefore, be better protected than the Tamu road from Japanese interference. It would also serve to sustain the isolated Chin hills garrisons. Of the two, however, it was the more difficult undertaking, running for 156 miles from Imphal, with the furthest 100 of those being through forested mountains, where no previous road-making work had been attempted. By October 1942, the workforce on the Tiddim road comprised a works engineer unit headquarters, one engineer field company and three auxiliary pioneer battalions.<sup>50</sup> Although substantially greater in manpower than the commitment to the Tamu road at the same time, this was still well short of the requirement in terms of plant, transport, specialist engineers and labour.

By the beginning of January 1943, the target date for completion of a one-way, fair-weather road all the way to Tiddim, the limit for jeep traffic alone was only sixty five miles from Imphal. The workhead, where the track was actually being cut out of the trees, was two miles further on.<sup>51</sup> Nearly 100 miles remained to be built. During that month, the workforce was increased to an engineer works unit headquarters, a complete engineer battalion and two additional engineer field companies, one forestry company and four auxiliary pioneer battalions. Large numbers of infantry from units of the 17<sup>th</sup> Division were also co-opted as labour, and a local work force started cutting the track northwards from Tiddim to meet the road extending south from Imphal.<sup>52</sup> With this additional effort, a fair-weather jeep track had been cut to within three miles of Tiddim by the end of February 1943, only two months behind schedule. At that time, however, the difficulties involved in building and maintaining an all-weather road through Tiddim had become apparent, and the priority for engineer work was switched to the Tamu road. By then, fourteen GPT companies were working on the Tiddim route, including two dedicated to the engineers.<sup>53</sup> The number of GPT companies needed was larger than that on the Tamu road because of the greater distance involved and because the poor condition of the southern end of the track demanded increased numbers of smaller 4x4 vehicles. Moreover, the need to ferry everything across the un-bridged Manipur river, 126 miles south of Imphal, required a substantial number of vehicles to be kept forward of the river in order to minimise the load on the ferry. The river was not bridged until late October 1943, after the monsoon, during which the ferry was washed away and the forces forward of the river sustained largely from supplies stockpiled in advance, along with occasional air

supply. By the end of November 1943, the new bridge was improved to take three-ton trucks, which could then drive to within thirty miles of Tiddim.<sup>54</sup> Beyond that, stores were ferried forward by jeep or fifteen-cwt 4x4 trucks. Forthcoming enemy action during the Japanese attack on Imphal forestalled any improvement of the Tiddim road beyond one-way, fair-weather standard, and that was to have a defining influence later on the British pursuit of the defeated Japanese 15<sup>th</sup> Army following the battle of Imphal.

Construction of the Tamu road had been started by the Assam Tea Planters' Association in early 1942 to provide an escape route into the Imphal plain for the Burma Corps and refugees withdrawing from Burma. After that withdrawal was completed, the road was of one-way, fair-weather standard only. From Palel, on the south east edge of the Imphal plain, where the all-weather road terminated, it was a further fifty six miles to Tamu, and the route climbed 2,000 feet over a high mountain pass at Shenam before dropping gradually down to Tamu, at the head of the Kabaw valley. In July 1942, the IV Corps engineers had estimated that, given two and a half auxiliary pioneer battalions and one GPT company in addition to the engineers, it would take a minimum of sixty days, but, more realistically, ninety days to complete the road as required.<sup>55</sup> By October that year all that had been committed was an engineer works unit headquarters, one engineer field company and one auxiliary pioneer battalion.<sup>56</sup> By December 1942, the engineer field company had been reduced to a detachment, and, although the force had been augmented by one GPT company, it was still well short of the resources required.<sup>57</sup> At that stage, the target date for completion of the road to two-way, all-weather standard was set at 15 May 1943, the expected start of the monsoon.<sup>58</sup> In March 1943, priority for engineer effort switched from the Tiddim road to the Tamu road, but it was not in time to make much difference to progress. By the time the May deadline arrived, the target date for completion had been slipped to 1 November 1943, after the monsoon, and the workforce was still deficient of 3,000 men, 250 trucks and one electrical and mechanical engineer company, along with most of the mechanical plant needed for completion of the task.<sup>59</sup> In July 1943, even with GREF resources committed, the Commander Engineers in IV Corps reported that, by 1 November that year, the Tamu road could be completed to two-way, all-weather standard only as far as Shenam, a mere seven miles from Palel, and to one-way, all-weather standard for the remaining

forty nine miles.<sup>60</sup> Although late and short of the stated requirement, this was, in the event, sufficient to meet the needs of the forward division on that road in relatively static, low-intensity defensive operations until the start of the Japanese attack on Imphal in March 1944.

On the Arakan front, in May 1942, the southern line of the B & AR terminated some thirty miles south of Chittagong, and the all-weather road about ten miles south of that. From that roadhead to the front on the Mayu peninsular, near Akyab, 130 miles to the south, was just a fair-weather cart track (see Map Four). A fair-weather road ran along the coast from the small port of Maungdaw, at the mouth of the Naf river, to Foul Point, at the southern extremity of the Mayu peninsular. The only all-weather road on the Arakan coast, not already held by the Japanese, ran east-west across the Mayu peninsular from Maungdaw to Buthidaung, on the Kalapanzin river (also known as the Mayu river in its lower reaches). After the 1942 monsoon, work began on the construction of a road from Chittagong to Maungdaw in order to support the operations that winter. Due to the number of chaungs to be bridged and the difficulties encountered, it took until the end of the year just to make a fair-weather track for 4x4 vehicles up to fifteen-cwt over the first 100 miles to Alethangyaw, just south of Maungdaw. Parts of the route at the southern end actually ran along the hard sand below the high water mark on the beach, and were thus usable for a few hours either side of low tide only. After the first Arakan offensive during the winter of 1942-1943, the track south of Bawli Bazaar fell into disrepair. However, by the end of 1943, a one-way, all-weather road had been completed from Chittagong to Tumburu Ghat, but, south of there, it remained fair-weather standard only.<sup>61</sup> For most of its length, the road ran on low-lying padi fields or marshland, so the engineers were spared much of the task of cutting the alignment out of the trees and hillsides. However, the underlying soil was soft and there was no suitable rock for soling or surfacing, so, in order to improve the track to all-weather standard, stone was imported from India or bricks were baked locally. Building and maintaining the twelve-foot wide road used some twenty million bricks per month, which, in turn, required 60,000 tons per month of coal to be imported from India, where it was already dangerously scarce – hence the use of army engineers to assist with coal production in India. It is reported that every soldier moving forward, whatever his rank, from general to private, was required to carry a basket of bricks to the



roadhead.<sup>62</sup> Much of the improved road had to be constructed on a causeway six feet high and thirty feet wide, built by hand, to raise it above the level of the monsoon floods.<sup>63</sup> Innumerable tidal creeks had to be bridged and there was very little suitable timber available locally, so, again, either timber or purpose-built engineer bridging had to be imported. By the end of 1943, however, a one-way, all-weather road had been completed as far as Bawli Bazaar, south of which there was only a derelict fair-weather track. Only pack tracks suitable for animal transport ran to the east over the Mayu peninsular.

### *Animal transport*

An examination of the development of tactical supply in the Burma campaign could not be complete without brief word on animal transport, which has been much taken for granted, but which was heavily instrumental in enabling units and smaller formations to break free of dependence upon roads at the front. Of all pack animals, the most important was the mule. The army transport (AT) mule could carry a payload of 160 pounds wherever a man on foot could go without having to use his hands, and it could swim unloaded. The larger mountain artillery or ordnance mule could carry a payload of over 300 pounds. A mature working mule, between six and twenty years old, has great endurance, can cope with variable climatic conditions and is not fastidious about its food, so it was well suited to operations in such a harsh environment. Mules had been used extensively by the Army in India up to the time of the First World War to support operations in mountainous areas of the north west frontier. The development of mechanisation and embryonic air transport between the wars, however, had led to reductions in the numbers of mules on the army's establishment, along with much of its animal training, maintenance and veterinary capacity. By the beginning of the Second World War, the Army in India still had some thirty operational AT companies, many of which were sent to Britain and the middle east, in which theatres they remained for most of the war. There were none in Malaya and only four companies in Burma in 1942, two of which were lost in the opening days of the campaign. Like the rest of the Indian Army, animal transport units had to be expanded rapidly to meet the Japanese threat.

The establishment of a divisional second line AT company comprised 352 working mules, with thirty three spare animals, and 301 men. The theoretical payload of an AT company was, therefore, 56,320 pounds or approximately twenty five tons, and of a mountain artillery company, 105,600 pounds or forty seven tons. Of the Indian divisions eventually assigned to the Eastern or, later, 14<sup>th</sup> Armies, the following allocations of second line mule companies, with payloads in tons, were made:

<b>Division</b>	<b>AT coys/ payload (tons)</b>	<b>Mtn arty coys/ payload (tons)</b>	<b>Total payload (tons)</b>
5	4/100	1/47	147
7	4/100	1/47	147
14	6/150	1/47	197
17	8/200	3/141	341
19	3/75	1/47	122
20	4/100	1/47	147
23	4/100	1/47	147
25	3/75	1/47	122
26	4/100	1/47	147

In addition, infantry battalions in Indian divisions each had fifty two mules, carrying a total of three and a half tons, on their first line scale.<sup>64</sup> African divisions had army porters on their establishment, so made less use of mules. British divisions, initially intended for mobile reserve or amphibious roles, remained more heavily mechanised than Indian divisions until committed to operations in 1944. Experience then caused them to adopt animal transport as well.<sup>65</sup>

At first sight, the figures above might suggest that divisions had sufficient mule lift capacity to lift a complete day's supplies even at intensive rates (104.5-126.5 tons per day). However, it could take a number of days for the animals to make the round trip from the road, air or riverhead to the troops who needed the supplies. If it took two days, the rate of delivery would be halved, and so on. Thus troops who were wholly dependent upon animal transport for their maintenance would normally have to stockpile stores at the front in quiet periods in order to cater for rapid consumption during battle, and, with such limited capacity, that could take a long time. Very often, the whole of a division's animal transport capacity would have to be concentrated on the support of the subordinate formations or units needing it most. Nor do the figures take into account animal maintenance and casualties. Mules, like

vehicles, required regular maintenance and re-fuelling but, unlike motor vehicles, they went on burning fuel, even when idle. The daily ration scale for an AT mule weighed twenty pounds and was, itself, a major contributor to the re-supply requirement. Moreover, unlike a motor vehicle, a mule has 'character'. It is normally a cheerful, intelligent and willing beast, but it requires understanding and becomes irksome if it does not get it. It does not respond well to neglect, abuse or mis-handling.<sup>66</sup> Daily grooming, without which a mule would soon become a casualty, took at least one hour per animal per day and more after particularly hard work, and one mule leader might have four mules to look after on operations. Good mule leading required men of the right temperament with extensive training, without whom, their charges would soon become casualties. Drivers made available when formations shed motor vehicles in favour of animal transport did not necessarily make good mule leaders, and suitable men became ever harder to find as the war went on. Mules were vulnerable to a number of debilitating or fatal diseases, which were prevalent in the north east frontier region, particularly surra, a blood parasite. Problems arose also with poor quality harness and saddlery as a result of wartime demands on the Indian leather industry. Inferior equipment, made of canvas and other substitute materials, caused casualties from saddle galls.<sup>67</sup> In defensive positions protective trenches were needed for mules as much as for men. In order to accommodate the animals, the trenches had to be big and deep and, if a unit was relying on animal transport, there was unlikely to be any engineer plant available for digging them, so it normally had to be done by hand, adding to the workload on the mule leaders. Without protection, mules were likely to suffer heavy casualties from artillery fire. On the move, a mule caravan would be vulnerable to enemy action, strung out along a track in single file, often with only its own mule leaders for defence. Wastage of mules from disease, misuse and the effects of battle was heavy, and the supply of replacement animals was limited. India could not provide sufficient numbers, so most mules were imported from Argentina and South Africa. They arrived in an unbroken state after a stressful sea passage, and required between one and three months to train sufficiently for operational use.<sup>68</sup> Consequently, both AT and mountain artillery companies were normally short of animals and leaders, and those they had soon became over-worked, adding further to the casualty rate.

Experiments with alternative forms of animal transport did not generally prove satisfactory. Ponies and donkeys were insufficiently robust. Bullock carts were used during the retreat from Burma and by the 81<sup>st</sup> West African Division in the Kaladan valley, but they were slow moving and required one driver each. The animals required up to sixteen hours per day for grazing and rumination, so their work rate was very slow. Strict measures had to be adopted to ensure that they were not eaten when rations ran short. An elephant company was used occasionally for transport, but it proved to be more profitably employed on engineering work and vehicle recovery in wet conditions.<sup>69</sup> Despite all the problems they suffered, and the almost constant deficiency against their establishment strength, the mule companies, taken into use in increasing numbers from May 1942 onwards, gave the British Army a degree of tactical mobility which it had lacked with disastrous consequences during the Malaya, first Burma and first Arakan campaigns. Aircraft, boats and trucks might take men to the area of battle and sustain them there but, ultimately, it was largely the mule which enabled men on foot to get away from the roads, airfields and beaches with sufficient supplies to engage the Japanese successfully in the jungle.

#### *Tactical administrative bases.*

Throughout 1942 and 1943, divisions were deployed in remote, isolated positions, widely separated from each other and from their supporting corps bases, but relatively static. Given the tenuous condition of the developing operational and tactical L of C, reliance could not be placed on regular delivery of the division's daily maintenance requirement from corps-level FSDs, so divisions as well as corps were forced to stockpile stores well forward in the tactical area. For the same reason, divisional logistic units were likely to be located further forward than would normally be expected, due to the difficulty of access between them and the forward troops they were supporting. Because of the porous nature of the front, limited access and space, and the cover afforded by the close country, logistic units in the forward areas tended to be concentrated for defence against the threat of ground infiltration and attack, rather than being dispersed for protection from air attack, which was normally the practice in the middle east or Europe. Consequently, the concept of the tactical administrative base, containing the division's immediate logistic support facilities in one defended forward area was developed. The administrative base included supply,

ordnance, ammunition, salvage and POL dumps; workshops; a POW cage; field ambulance and the main headquarters of the division. This arrangement may have been necessary for logistic purposes, and it suited static, defensive operations, but it presented divisions with the problem of moving the base and its dumps if operations became mobile.<sup>70</sup> In order to minimise the quantities of vehicles and stores having to be managed and protected at the front, corps withdrew as much transport as possible to provide it centrally as required, leaving divisions with the bare minimum, but that aggravated the mobility problem if it arose.<sup>71</sup> Those divisional logistic units not needed for the immediate daily support of operations, such as vehicle parks and rest camps, were kept in a holding area, at least one day's motor transport journey in rear, from where they could sustain the division without additional measures being needed for their defence.<sup>72</sup> The arrangement had its advantages but it was destined to be a cause of some inertia in tactical decision making and the loss of substantial quantities of valuable stores when the Japanese invaded India and some well-stocked forward administrative bases had to be abandoned.

#### *The effect on operations during 1942 and 1943*

As a result of these logistic developments, along with better training and a steady increase in force levels, the Eastern Army, and later the 14<sup>th</sup> Army, was able gradually to improve its position on the Assam and Arakan fronts during 1942 and 1943. Starting with virtually nothing in May 1942, IV Corps finally had thirty days' supplies stockpiled at Imphal by the beginning of 1944, and could sustain two divisions in contact with the enemy, along with a third division and a tank brigade in reserve. At that time, the forward divisions were directed to maintain six days' stocks in their administrative bases.

Throughout the 1942 monsoon, the southern approaches to Imphal, through the Chin hills, were covered only by the Chin Hills Battalion of the Burma Frontier Force and the recently raised Chin Levies, who, at that stage, could provide little more than information on Japanese movements (see Map Three). Detachments of regular troops visited to gain operational experience and ground familiarisation, but there was little in the form of defence and it was fortunate that the Japanese did not probe in any great strength.<sup>73</sup> During the 1942 monsoon, forces in the Chin hills were sustained

largely by local resources backed by the occasional air-drop of supplies as very little could be brought in overland by mule.

During the winter of 1942-43, the 17<sup>th</sup> Indian Division, already reorganised as a light division with mules and jeeps only for transport, deployed on the Tiddim road to defend the workforce and assist in building work. As the 1943 monsoon approached, increasing Japanese activity in the foothills south east of Tiddim required that the Chin hills garrison be reinforced, and the 48<sup>th</sup> Brigade of the 17<sup>th</sup> Division deployed to the town.<sup>74</sup> One brigade was the maximum strength that could be sustained at Tiddim in addition to the levies at that stage. The Chin hills garrison was again virtually cut off for much of the 1943 monsoon due to the state of the fair-weather road and the Manipur river crossing, neither of which could sustain heavy supply traffic during the rains. The larger-than-planned garrison of over 4,500 men relied heavily, therefore, upon air supply and reserves stocked south of the river crossing before the rains had started.<sup>75</sup> It was only the increased numbers of transport aircraft then available, and determined flying, that enabled the 48<sup>th</sup> Brigade to stay in place. In August 1943, the operational capability of the garrison became further threatened by the need to supply the civil population, who were suffering severe shortages as a result of the monsoon, the loss their normal source of supplies from the Japanese held plains, and the presence of relatively large numbers of troops. Jeep transport, which was stretched enough to sustain the troops, was having to be diverted to supply twenty five tons of rice and salt per day, about one third of the weight of the division's own requirements, to the local population.<sup>76</sup>

In November 1943, once the ground had dried out sufficiently, light vehicles could once again reach Tiddim with relative ease and the whole of the 17<sup>th</sup> Division deployed forward to the area of the town in response to a renewed Japanese advance into the foothills from the area of Kalemyo. The division was able to contain any further advance for the time being, but was not able to recapture lost ground, so it adopted a defensive posture.<sup>77</sup> By the end of 1943, four days' supplies of rations, ammunition and ordnance stores, as well as six days' worth of fodder for mules, had been stocked forward at the division's administrative base at Tiddim, along with one day's worth of POL. The stocks of animal fodder compared to motor fuel are indicative of the relative importance of mules and motor vehicles in the forward area.

A further 1,400 tons of stores and 60,000 gallons of fuel were stocked at a layback dump at milestone 109 from Imphal, just north of the new Manipur river bridge.<sup>78</sup> Road replenishment was augmented fairly regularly by air supply, but it was not possible to build a Dakota strip anywhere in the Chin hills. The 17<sup>th</sup> Division was thus just able to sustain itself adequately, but it was at the end of a long, tenuous and vulnerable tactical L of C from Imphal, which was to become a liability when the Japanese attacked in March 1944.

Sustaining a division on the Tamu road was slightly less arduous than keeping one at Tiddim because there was less Japanese activity, the fair-weather road was already in place, and it was only a third of the distance from Imphal. In June 1942, while the 17<sup>th</sup> Division recuperated after its withdrawal from Burma, the 23<sup>rd</sup> Division covered the eastern and south eastern approaches to Imphal. In the monsoon conditions, it could do little more than prepare defences and patrol, occasionally as far forward as the Chindwin, sustained by mule, jeep and the occasional air-drop. Over the winter of 1942-1943, the division moved its administrative base forward to Tamu and dominated a substantial stretch of the west bank of the Chindwin, patrolling across it quite frequently. It was able to support the crossing of the river by the outgoing first Chindit expedition, Operation LONGCLOTH, in February 1943, and to receive those, who managed to return, between April and June that year. During this time, the division began to establish a well-stocked administrative base at Moreh, near Tamu, which eventually occupied the last four miles of the road being built from Imphal. The 20<sup>th</sup> Division relieved the 23<sup>rd</sup> in October 1943 and, by the beginning of February 1944, just before the Japanese invasion of India, had built up an operating stock of 2,400 tons of supplies and ammunition, as well as 64,370 gallons of fuel.<sup>79</sup> These quantities represented approximately fifteen days' supply, against IV Corps' directive of six days' stocks to be held forward by divisions. It resulted in substantial loss of stores when the 20<sup>th</sup> Division was compelled to withdraw to the Imphal plain before the Japanese invasion of early 1944. Upon relief by the 20<sup>th</sup> Division, the 23<sup>rd</sup> withdrew to the Imphal plain to form the IV Corps reserve with the 254<sup>th</sup> Tank Brigade.

On the Arakan front, the motley collection of coastal shipping and IWT available in late 1942, along with the road built southwards from Chittagong, enabled the 14<sup>th</sup>

Division to advance to the Mayu peninsular at the end of that year in preparation for the planned attack on Akyab (see Map Four). At the front, the division was sustained by road, river and mule traffic. Its attempts to secure Foul Point, prior to assaulting Akyab island, failed, however, because of the strength of the Japanese defences and the ineffective tactics of frontal assault upon them. When the Japanese counter-attacked, they characteristically outflanked the 14<sup>th</sup> Division and cut its road L of C. The IWT resources available might have enabled the division to stay put and fight on. However, it was not adequately trained for that; it was becoming worn out and the reserves were not in place to mount a counter attack on the Japanese quickly enough. Consequently, despite substantial reinforcement, the British were forced into retreat back to Bawli Bazaar, which they managed to hold during the subsequent monsoon. The Japanese, thereafter, controlled the port of Maungdaw and the one all-weather road across the Mayu peninsular until they were ejected the following year. The newly built fair-weather road south of Bawli Bazaar, in what was essentially no-man's land, fell into disrepair and became impassable during the monsoon.

During that first Arakan offensive, the advanced base depots for the Arakan front moved forward from Mymensingh to Chittagong in order to make best use of the facilities there. The FSD moved forward from Chittagong to Ukhia, just south of Cox's Bazaar, where it remained until mid-1944. By November 1943, with improvements to IWT and the road from Chittagong gradually increasing the capacity of the tactical L of C, it became possible to maintain two divisions at the front with a third in reserve at Chittagong. The 5<sup>th</sup> Indian Division occupied the Naf river valley. Due to the state of the road and bridges south of Bawli Bazaar, the division was maintained mainly by IWT. The 7<sup>th</sup> Division moved into the Kalapanzin valley to the east. Completely isolated from any motor transport, the division was maintained by mule over the Goppe pass, followed by local craft on the Kalapanzin river, requiring a good deal of forward dumping of supplies to guard against failure of the replenishment process.<sup>80</sup> One of its brigades on the east side of the river was supplied by air. At that time, the state of the AT mules taken over from the previous formation gave much cause for concern, as they had been at the front for nearly a year without relief. Only 400 out of an establishment of over 1500 were fit for work and the morale of the mule leaders was very low.<sup>81</sup> Nevertheless, they continued to fulfil a vital function in the maintenance of the division. However, the 7<sup>th</sup> Division's



logistic position remained extremely difficult until the end of December 1943, by which time a pack track over the Ngakyedauk pass, further south, had been improved sufficiently to take fifteen-cwt 4x4 vehicles and tanks as far as the division's new administrative base at Sinzweya.<sup>82</sup> In January 1944, the 5<sup>th</sup> Division captured Maungdaw, where the port facilities were repaired sufficiently to maintain the division by sea, using the improved coastal shipping, which was, by then, available.<sup>83</sup> Thus, by the start of 1944, XV Corps was able to face the Japanese on the Mayu peninsular with twice the strength of the previous year's failed offensive, as well as a strong reserve within striking distance on a reasonably good road. It was, by then, backed by a wide range of options for tactical maintenance. In addition, from January 1944, the left flank of the corps was protected by the 81<sup>st</sup> West African Division in the Kaladan valley, further to the east, being maintained entirely by air. The 81<sup>st</sup> Division also posed a significant flanking threat to Akyab, which the Japanese could not afford to ignore. The corps was in a good position for the next for the next phase of the campaign, which proved to be the turning point of British military fortunes in the theatre, and to which we now turn.

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Notes:

<sup>1</sup> NTW 5, p. 15; The British Library, London, Science 2, Supplement to the London Gazette, 11 Mar 48, General Alexander's appendix to Field Marshal Wavell's Despatch, Operations in Burma, December 1941 to May 1942, 14 Jul 42; TNA WO 172/1838, Appreciation by Commander XV Corps, 26 Apr 43.

<sup>2</sup> Woodburn Kirby, *The War Against Japan, Volume II*, pp. 242-243.

<sup>3</sup> Army Administrative Planning, p. 182.

<sup>4</sup> TNA WO 203/106, 14<sup>th</sup> Army Operational Research Report No 24, Maintenance of Field Formations, Dec 44.

<sup>5</sup> Army Administrative Planning, p. 182.

<sup>6</sup> *Ibid.*, pp. 77-78.

<sup>7</sup> War Office restricted account *The Second World War, 1939-1945 Army Military Engineering (Field)*, 1952 [hereafter, *Army Engineering*], p.91; Pakenham-Walsh, *Royal Engineers*, pp. 157-158, 187; Verma and Anand, *The Indian Engineers*, p. 177.

<sup>8</sup> *Army Supplies and Transport, Volume II*, p. 92.

<sup>9</sup> Woodburn Kirby, *The War Against Japan, Volume III*, p. 523.

<sup>10</sup> SEAC Report, p. 107. The 'operating radius' or 'radius of action' of an aircraft is the maximum distance it can fly from, and return to, its base without landing en route. Consequently, it is about half

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the aircraft's maximum range.

<sup>11</sup> War Office restricted account *The Second World War, 1939-1945*, Army Supplies and Transport, 1954, Volume I, p. 92.

<sup>12</sup> Woodburn Kirby, *The War Against Japan, Volume III*, p. 523.

<sup>13</sup> Woodburn Kirby, *The War Against Japan, Volume II*, p. 479.

<sup>14</sup> TNA WO 172/1839, Eastern Army Q Branch War Diary, 16 Mar 43.

<sup>15</sup> Woodburn Kirby, *The War Against Japan, Volume II*, pp. 518-519.

<sup>16</sup> TNA WO 203/4699, Report by SEAC planning staff, Closing the Gap Between Air Transport Requirements and Resources; Woodburn Kirby, *The War Against Japan, Volume III*, pp. 468-469, 514. (Troop Carrier Command was part of the Allied Eastern Air Command.)

<sup>17</sup> NTW 19, p. 6.

<sup>18</sup> Harold Braund, *Distinctly I Remember* (Victoria, Wren, 1972), p. 201.

<sup>19</sup> SEAC Report, p. 14; Auchinleck Despatch Jan-Jun 44, p. 13.

<sup>20</sup> TNA WO 203/2335, MGA 14<sup>th</sup> Army minute 3809/79/Q Air, 27 Nov 43.

<sup>21</sup> TNA WO 172/6863, 14<sup>th</sup> Army G Plans Branch War Diary, 23 Feb 44.

<sup>22</sup> NTW 19, p. 6.

<sup>23</sup> TNA WO 172/381, Eastern Army Q Branch War Diary, 22 May 42.

<sup>24</sup> Moharir, *The Army Service Corps*, p. 47.

<sup>25</sup> TNA WO 172/1839, Eastern Army Q Branch War Diary, Feb to May 43.

<sup>26</sup> Woodburn Kirby, *The War Against Japan, Volume II*, pp. 499-502.

<sup>27</sup> TNA WO 172/1839, Eastern Army Q Branch War Diary, Mar to Sep 43.

<sup>28</sup> TNA WO 172/4208, XV Corps Administrative Order No 6, Maintenance of 81<sup>st</sup> West African Division, 18 Jan 44; TNA WO 172/4215, XV Corps letter No 20774/98/Q, Air Supply, 19 May 44; Woodburn Kirby, *The War Against Japan, Volume III*, pp. 512-513.

<sup>29</sup> For example see TNA WO 172/4208, XV Corps Administrative Order No 6, Maintenance of 81<sup>st</sup> West African Division, 18 Jan 44; TNA WO 172/4215, XV Corps Administrative Order No 22, Instructions for Supply by Air, 17 Feb 44.

<sup>30</sup> 202 L of C Area.

<sup>31</sup> War Office, *Airfields*, p. 14; various discussions between the author and Walter Faulds, late of the Bombay Sappers and Miners, a former forward airfield engineer in IV Corps.

<sup>32</sup> Royal Engineers Training Memorandum No 17, *Warfare in the Far East, 1945* [hereafter RETM 17], p. 110.

<sup>33</sup> *Army Works*, p. 202.

<sup>34</sup> NTW 19, p. 6.

<sup>35</sup> *Army Engineering*, p. 98.

<sup>36</sup> TNA WO 172/1878 IV Corps Commander Engineers Appreciation on the Construction of Imphal and Palel Aerodromes, 12 Apr 43.

<sup>37</sup> TNA WO 172/411, IV Corps/3455/6/RE, 23 Jan 43; Anon., *History of the Royal Bombay Sappers and Miners* (Royal Bombay Sappers and Miners Association, 1999) [hereafter, *Bombay Sappers*], pp. 295, 320.

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- <sup>38</sup> Army Transportation, pp. 191, 211-212.
- <sup>39</sup> NTW 19, p. 10.
- <sup>40</sup> TNA WO 172/4208, XV Corps Administrative Order No 4, Maintenance of XV Corps Excluding 81<sup>st</sup> West African Division, 3 Jan 44; NTW 19, p.114.
- <sup>41</sup> Army Engineering, p. 98.
- <sup>42</sup> RETM 17, pp. 82-84.
- <sup>43</sup> NTW 19, p. 107.
- <sup>44</sup> War Office Roads, p. 371. The figures in the manual are confirmed by TNA WO 172/4210, Forward roads in XV Corps, appreciation by Commander Engineers XV Corps, 15 July 1944.
- <sup>45</sup> RETM 17, pp. 92-96.
- <sup>46</sup> *Ibid.*, pp. 96-100.
- <sup>47</sup> TNA WO 172/411, IV Corps/3071/18/RE, 28 Sep 42.
- <sup>48</sup> TNA WO 172/411, IV Corps/3054/4/RE, Appreciation of Major Engineer Tasks in IV Corps, 16 Sep 42.
- <sup>49</sup> TNA WO 172/1878, IV Corps Commander Engineers War Diary, 9, 10 Feb 43.
- <sup>50</sup> TNA WO 172/411, IV Corps letter IV Corps/3043/69/RE, 11 Oct 42.
- <sup>51</sup> TNA WO 172/1878, IV Corps Commander Engineers War Diary, 2 Jan 43.
- <sup>52</sup> I. Lyall Grant, *Burma: the Turning Point* (Chichester, Zampi, 1993), p. 37.
- <sup>53</sup> TNA WO 172/4192, IV Corps Administrative Instruction No 34, the Chin Hills Line, 13 Feb 44.
- <sup>54</sup> TNA WO 172/1878, IV Corps Commander Engineers War Diary, 25 Feb 43.
- <sup>55</sup> TNA WO 172/411, IV Corps/3027/5/RE, Estimate of the Palel - Tamu road, 3 Jul 42.
- <sup>56</sup> TNA WO 172/411, IV Corps/3043/69/RE, 11 Oct 42.
- <sup>57</sup> TNA WO 172/411, IV Corps/3043/93/RE, Royal Engineers Location Statement IV Corps, 5 Dec 42.
- <sup>58</sup> TNA WO 172/1878, IV Corps Commander Engineers Appreciation of Roads Imphal to Fort White and Palel to Kalemmyo, 10 Feb 43.
- <sup>59</sup> TNA WO 172/1878, IV Corps Engineer Appreciation of the Construction of a Two-Way Road to Tamu by 1 November 1943, 15 May 43.
- <sup>60</sup> TNA WO 172/1878, Commander Engineers IV Corps Progress Report, Jul 43.
- <sup>61</sup> NTW 19, p. 10.
- <sup>62</sup> Army Administrative Planning, p. 79.
- <sup>63</sup> Pakenham-Walsh, *Royal Engineers*, p.207; Verma and Anand, *The Indian Engineers*, p. 106.
- <sup>64</sup> This information was obtained from discussions with, and some memoirs of, Philip Malins, late of the Royal Indian Army Service Corps, who wrote *The Indian Army Animal Transport Mule*, in Brian Nicholls, *The Military Mule in the British and Indian Army, An Anthology* (unpublished) [hereafter, Nicholls, *The Military Mule*]. Philip Malins had been an instructor at the Indian Army Animal Transport School, Jullundur, before commanding a mule company in the 20<sup>th</sup> Indian Division in late 1944. The establishment of a mule company is confirmed in TNA WO 172/4230, XXXIII Corps Administrative Appreciation, 15 May 44.
- <sup>65</sup> The 70<sup>th</sup> British Division became the core of the Special Force, being re-titled 3<sup>rd</sup> Indian Division, and was established with animal transport before deploying on the second Chindit expedition. The 2<sup>nd</sup>

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British Division adopted animal transport after its experience at Kohima, when it had to use porters for overland moves. The 36<sup>th</sup> British Division adopted animal transport before being assigned to NCAC to replace the Special Force in mid-1944.

<sup>66</sup> War Office manual, Animal Management, 1933, pp. 279-280.

<sup>67</sup> Moharir, *The Army Service Corps*, p.89.

<sup>68</sup> Nicholls, *The Military Mule*.

<sup>69</sup> NTW 19, p. 113.

<sup>70</sup> Royal Army Service Corps Training Pamphlet No 7, Part 1: Distribution of Supplies in Advance of Railhead, 1942, 4 Aug 42, p.1.

<sup>71</sup> NTW 19, p. 112; Army Supplies and Transport, Volume II, pp. 60-61.

<sup>72</sup> NTW 19, pp. 108-10; War Office Military Training Pamphlet No 52: Warfare in the Far East, 1944, Dec 44, p. 28; Army Supplies and Transport, Volume II, pp. 61-62.

<sup>73</sup> Bisheshwar Prasad (ed.), *Official History of the Indian Armed Forces in the Second World War 1939-45, Reconquest of Burma, Volume I* (Historical Section (India & Pakistan), 1958) [hereafter, Prasad, *Reconquest of Burma, Volume I*], p. 62.

<sup>74</sup> Woodburn Kirby, *The War Against Japan, Volume II*, p. 405.

<sup>75</sup> TNA WO 172/4839, IV Corps Administrative Instruction No 19, 26 Mar 43.

<sup>76</sup> TNA WO 172/4839, IV Corps letter 1815/25/Q, 8 Sep 43.

<sup>77</sup> Woodburn Kirby, *The War Against Japan, Volume III*, pp. 41-42.

<sup>78</sup> TNA WO 172/4192, IV Corps Q Branch War Diary, 3 Jan 44.

<sup>79</sup> TNA WO 172/4192, IV Corps Q Branch War Diary, 3 Jan 44; IV Corps Administrative Instruction No 33, the Kabaw Line, 22 Feb 44.

<sup>80</sup> TNA WO 172/ 4208, XV Corps Administrative Order No 4, 3 Jan 44.

<sup>81</sup> TNA WO 172/1897, Tour Notes by DDS&T XV Corps, 30 Oct to 5 Nov 43; TNA WO 172/1891, DA & QMG XV Corps notes on visit to 7<sup>th</sup> Indian Division, No 20631/42/Q, 6 Nov 43.

<sup>82</sup> Woodburn Kirby, *The War Against Japan, Volume III*, p. 123.

<sup>83</sup> NTW 19, p. 20.

## **PART THREE**

**CHAPTER FIVE**  
**THE LOGISTIC INFLUENCE –**  
**DEFENSIVE VICTORY 1944**

For twenty months following the loss of Burma in May 1942, despite constant pressure and aspirations for a counter offensive, the British in south east Asia had been forced almost completely onto the defensive while they made the necessary operational and logistic preparations to take the war back to the enemy. They simply did not have the resources, the logistic means or the tactical skill to engage the enemy successfully in any strength until the beginning of 1944. The first Arakan offensive over the winter of 1942-43 had been attempted before India or its Eastern Army were ready for battle, with concomitant results. If it achieved anything, it was to convince the British once and for all that the infantry were the dominant arm in the jungle and had to be properly manned, trained and equipped for their demanding role.

Fortunately, at the same time, Operation LONGCLOTH proved that British troops, properly trained and supplied by air as well as animal transport, could actually operate effectively in the jungle, independently of ground L of C. During that period, therefore, valuable lessons were learned, experience was gained and the overall capability of British forces was gradually much improved. The combined tactical and logistic lessons, both positive and negative, from these two operations, as well as increasingly successful patrol contacts with the enemy, were to have a profound influence on the outcome of battles and the shape of the campaign from then on.

By the spring of 1944, although much remained to be done, measures to address the principal economic and logistic shortcomings in India and south east Asia were beginning to bear fruit. India, at immense cost to her domestic economy and people, was successfully providing a base for operations in south east Asia and American support for China, as well as her continuing, though reducing, contribution to the wider war effort. Although there were, in the newly formed 14<sup>th</sup> Army, the successor to the Eastern Army, a number of important equipment and supply deficiencies, India was able to provide, through imports or her own industrial and agricultural output, most of the really essential requirements of troops at the front. Measures to address residual shortfalls were in hand and the 14<sup>th</sup> Army became expert at improvisation to make good the deficiencies. Over 200 airfields were in full use. The reserve bases

for expeditionary operations were virtually complete to the original specifications and were being expanded to meet SEAC's increasing demands. Allied ground and air combat forces, sufficient either to engage the Japanese Army in Burma, or to form the core of an expeditionary force for an overseas operation, had been assembled in India and were available to SEAC.<sup>1</sup> Mounting both types of operation simultaneously, however, would require further reinforcement, which was gradually continuing. The air transport capacity, although still inadequate for any substantial expeditionary operations in addition to ongoing commitments on the north east frontier of India, was more than four times that which had been available one year previously. On its formation in late 1943, SEAC had been allocated an amphibious force but, in the event, that was soon withheld for continuing operations in Europe. The capacity of the L of C in Assam and east Bengal was approaching a level sufficient to meet the required airlift to China of 10,000 tons per month as well as sustaining three Chinese divisions in NCAC, three divisions and a tank brigade in IV Corps at Imphal, and four divisions in XV Corps on the Arakan coast. Overland L of C remained essential to long-term maintenance at the tactical level. However, the capacity and techniques had been developed, using air, water and animal transport, to supply substantial numbers of troops away from roads in contact with the enemy. That gave the British the tactical mobility essential to counter the Japanese in the jungle, in both defence and attack. The new-found capability still had to be demonstrated on a large scale, however, and the British did not yet believe that they had the operational or administrative capacity to sustain a major offensive from Imphal. Nevertheless, they were soon to show that they had the logistic means as well as the tactical confidence to fight on in defence when surrounded, and the results were to be devastating for the Japanese.

Following the decisions of the Quadrant Conference in August 1943, Churchill's initial directive to Mountbatten had instructed him to engage the Japanese as aggressively as possible, to expand the link to China and to examine the feasibility of amphibious operations in Burma, Malaya and the Netherlands East Indies.<sup>2</sup> In his initial assessment of the tasks given him, Mountbatten decided to mount an air offensive, that being the only means immediately available, by which he could engage the Japanese really aggressively. It was important also for the achievement of air superiority, which was a pre-requisite to the success of virtually all other operations.

On the ground, he planned to put his main effort into an advance by NCAC from Ledo, co-ordinated with a parallel advance by a new CEF from Yunnan, to capture sufficient territory for a new road to China through Myitkyina, in north Burma. Chiang Kai Shek's condition for the Yunnan advance was that the British mount substantial naval operations in the Bay of Bengal and amphibious operations in southern Burma or Malaya in order to draw off Japanese forces and prevent their reinforcement. As the first objective for an amphibious operation, Mountbatten chose the Andaman islands, which lay astride the Japanese sea L of C from Singapore to Rangoon (see Map One). A lodgement there would provide a forward base for domination of the Bay of Bengal and the Andaman Sea, as well as further amphibious advances, whilst being within reasonable range of support from Ceylon. In further support of the Chinese advances from the north, Mountbatten considered three alternative objectives for a subsidiary offensive by IV Corps from Imphal: an overland advance to Yeu via the Kabaw valley and Kalewa, an airborne assault on Mandalay, and an airborne assault on Indaw to cut the the Mandalay-Myitkyina railway (see Map Five). In addition were to be as yet unspecified long range penetration (LRP) operations by Wingate's Special Force to harass Japanese supply routes. The Yeu option was rejected because the tactical overland L of C would have been unable to sustain the force required and it would not have supported the Chinese advance adequately. The Mandalay option, the most ambitious of the three, was regarded as beyond the capacity of the air transport force available to SEAC and too exposed to Japanese counter attack. The Indaw option would require between forty and sixty additional transport aircraft, but, given those, it was thought to be achievable.<sup>3</sup>

The whole set of proposals, however, unravelled quickly as a result of resource constraints. To begin with, the British COS withheld most of the amphibious shipping needed for the Andaman operation (Operation BUCCANEER), so a reduced alternative on the Arakan coast (Operation PIGSTICK) was substituted, using what few landing craft were left available to SEAC. That did not satisfy Chiang Kai Shek's conditions, so the Chinese advance from Yunnan was cancelled. With that, the COS withdrew the remainder of SEAC's amphibious shipping, leaving only some ninety decrepit minor landing craft that could not have made the passage to Europe. It was also made clear that there would be no increase in SEAC's air transport fleet in



the near future.<sup>4</sup> Consequently, the Indaw operation by IV Corps was cancelled and the only deep offensive operations remaining to the 14<sup>th</sup> Army were those of the Special Force, who were to cut the Japanese L of C to their troops facing the planned NCAC advance from Ledo. The NCAC offensive began in January 1944, with the 14<sup>th</sup> Army preparing to act in a much reduced supporting role to divert Japanese attention and disrupt their L of C. There was, for the time being, no formal allied intent to recapture the whole of Burma, though, of course, it remained a long term British aspiration. All this was reflected in a cautiously worded operation instruction issued by General Giffard, commanding 11 Army Group, to Slim, commanding the 14<sup>th</sup> Army, on 9 January 1944. XV Corps was to secure the mouth of the Naf river and the port of Maungdaw, as well as Buthidaung, on the Kalapanzin river to the east, in preparation for a further advance to clear the Mayu peninsular (see Map Four). IV Corps was to clear the Chin hills, dominate the west bank of the Chindwin river as far south as Sittaung and contain the Japanese in the Kabaw valley (see Map Five). Apart from those of the Special Force, offensive operations across the Chindwin were only to be mounted 'if a favourable situation developed'.<sup>5</sup> Slim, meanwhile, was convinced that the 14<sup>th</sup> Army needed to win a decisive victory on ground of his choosing, with the shortest possible tactical L of C behind him, in order to cement the confidence of his army and weaken the Japanese substantially before he attempted any offensive on the far side of the Chin hills or the Chindwin river.<sup>6</sup>

As these thoughts were being developed on the allied side, the Japanese were in an advanced stage of planning their own further offensive into India. Their operational objective was to seize IV Corps' administrative base at Imphal, but, in advance of that, they intended to draw British reserves into a diversionary battle on the Arakan coast. By capturing Imphal, they would forestall any planned British offensive into Burma. The allies perceived further that it would also put the Japanese into a good position to move on and cut the Assam L of C. By achieving that, they could also cut the American supply line to China through north east Assam. That, in turn, should enable some Japanese troops currently in China to be re-deployed against the American advance in the Pacific. At the time, it was thought also that the Japanese might be hoping to cause the downfall of British rule in India, thereby ending Indian involvement in the war.<sup>7</sup> Post-war access to Japanese records seems to suggest that their aims were less ambitious. The Imperial High Command in Tokyo appears only

to have sanctioned an attack to seize and defend Imphal in order to disrupt allied plans for an offensive. Strategically, at that time, the Japanese were turning to the defensive in the face of increasing allied pressure in the Pacific and the growth of allied strength in India.<sup>8</sup> It seems that their objective was limited and essentially logistic in nature: to deny to the allies the main British administrative base in Assam. Nevertheless, the allied response was based on what the Japanese were perceived to be doing at the time. There would have been clear strategic logic in a Japanese attempt to cut the Assam L of C, and a further Japanese victory on that front, resulting in their seizing a significant swathe of Indian territory, might have triggered renewed Indian nationalist uprisings. In the event, however, the outcome of the subsequent encounter was to secure India effectively against any further serious Japanese threat and would lead eventually to a substantial change in allied strategic objectives in Burma.

*The second Arakan campaign, January – May 1944*

The opening moves over the winter of 1943-44, by both Japanese and British forces, took place on the Arakan coast (see Map Four). Following the defeat of the first abortive British offensive in Arakan during the previous winter, the Japanese established a strong defensive position along the line of the Maungdaw to Buthidaung road. This was a position of great natural strength, anchored on each flank by tidal rivers: the Naf to the west and the Kalapanzin to the east. In the centre of the Mayu peninsular, the road ran through an area of steep, tangled, jungle-covered hills, passing through two tunnels on the way. It was an area which lent itself to the construction of strong, mutually supporting defensive positions. On either side of the hills were particularly formidable redoubts at Razabil, on the western side, and Letwedet to the east.<sup>9</sup> These tactical considerations aside, the layout and strength of the Japanese position had important logistic implications. By holding the line of the road, the Japanese controlled the mouths of both the Naf and Kalapanzin rivers, which were important L of C for both sides. Maungdaw and Buthidaung were small but important river ports and the road connecting them was the only all-weather route for motor transport across the Mayu peninsular. Once these two ports had been seized from the Japanese, XV Corps would be able to gain secure access to the Naf river from the sea and to make much better use of the Kalapanzin than it had been able to

do hitherto.<sup>10</sup> Up to then, it had had to rely on the difficult mule-borne link over the Goppe pass. With the road to Buthidaung opened, the corps would have less difficulty sustaining strong forces in the Kalapanzin valley and would gain access to routes leading to the port and airfield at Akyab. The seizure of these features was vital to further operations on the Arakan coast, which, in turn, were important to the drawing of Japanese opposition away from the NCAC advance, and this was reflected by their being the first task set out in the 11 Army Group operation instruction of 9 January 1944.<sup>11</sup>

At the start of 1944, the 5<sup>th</sup> Indian Division occupied the Naf river valley, the 7<sup>th</sup> Indian Division occupied the upper Kalapanzin valley, and the 81<sup>st</sup> West African Division was deployed in the Kaladan valley. The 26<sup>th</sup> Indian Division was in reserve at Chittagong. XV Corps' first offensive move, which had actually started in advance of 11 Army Group's directive, was for the 5<sup>th</sup> Division to seize Maungdaw and attack the western Japanese redoubt at Razabil in order to start opening the road to Buthidaung. At the same time, the 7<sup>th</sup> Division started making preparations to seize Buthidaung. Maungdaw was evacuated by the Japanese on 9 January 1944, opening the entrance to the Naf river and making available the small port and airfield there, which were quickly developed by the engineers. By the beginning of February, however, despite sustained air and ground attacks, the Razabil redoubt had still not fallen and the 5<sup>th</sup> Division's advance stalled.<sup>12</sup>

On the night of 3-4 February, the Japanese launched their own attack, aimed at scattering XV Corps and drawing 14<sup>th</sup> Army reserves to the Arakan coast before the main Japanese offensive was mounted against Imphal. While two Japanese battalions (the 'Doi Column') pressed against the boundary of the 5<sup>th</sup> and 7<sup>th</sup> Divisions at the front, five Japanese battalions and an engineer regiment (the 'Sakurai Column') infiltrated by night, northwards up the east bank of the Kalapanzin river to encircle the 7<sup>th</sup> Division. Despite the precaution taken by the 7<sup>th</sup> Division of placing a brigade on the east side of the Kalapanzin, the Sakurai Column evaded detection in the mist and darkness until they attacked Taung Bazaar at dawn on 4 February, dispersing the small group of XV Corps' administrative units there. The Japanese crossed the Kalapanzin in abandoned craft and divided into three groups. One group set out to seize the Ngakyedauk pass in order to cut the 7<sup>th</sup> Division's L of C, isolating

it on the east side of the Mayu peninsular from the 5<sup>th</sup> Division to the west. A second went off across the Goppe pass to attack XV Corps' logistic units around Bawli Bazaar and cut the coast road there. The third group turned back southwards down the west bank of the Kalapanzin to attack the 7<sup>th</sup> Division from the rear.<sup>13</sup> Based on their previous experience of fighting the British, the Japanese calculated that the 7<sup>th</sup> Division, once surrounded and isolated, would retreat, abandoning the supplies stockpiled at their new tactical administrative base at Sinzweya. They would be destroyed as they attempted to withdraw, and the same fate would then be inflicted on the neighbouring 5<sup>th</sup> Division in the Naf river valley. Thereafter, the Japanese planned to advance to Chittagong to cut that point of access to the allied Assam and east Bengal L of C and to use the supplies there to sustain themselves. They expected to reach the port within a week of defeating XV Corps on the Mayu peninsular so they launched their offensive with only ten days' supplies.<sup>14</sup>

By the morning of 7 February, three days after the start of their attack, the Japanese had cut the Ngakyedauk pass, isolating the 7<sup>th</sup> Division. Meanwhile, the Japanese force heading for Bawli Bazaar encountered an Indian mule company, who fought back and forced them off the track.<sup>15</sup> The Japanese then descended on the coast road south of the town and cut it there instead. In the past, even that would probably have been sufficient to precipitate a withdrawal by XV Corps. On this occasion, however, supply by air to the 7<sup>th</sup> Division commenced, while the 5<sup>th</sup> Division continued to be maintained by sea and IWT. Thus, for the first time, the two divisions were able to fight on while a counter attack by the 26<sup>th</sup> Indian Division and the 36<sup>th</sup> British Division was mounted from the north. During this phase of the battle, the 7<sup>th</sup> Division's besieged administrative base at Sinzweya became the principal British redoubt and the focus of the fiercest fighting, demonstrating the advantage of having a compact, defended divisional administrative base. Once the British counter attack began, it was the Japanese who then became trapped with dwindling supplies. After arriving at Bawli Bazaar from Chittagong, the 26<sup>th</sup> Division crossed the Goppe pass into the northern Kalapanzin valley and, without an adequate ground L of C to sustain high intensity contact with the enemy, also went on to air supply. XV Corps then had four divisions in contact, three being supplied by air and one by sea and IWT. In addition to their existing tasks in support of NCAC and preparing for forthcoming LRP operations, this air supply commitment was too much for the 126 Dakotas then

available to the TCC. Mountbatten was forced, therefore, to seek permission from the American COS for the release of twenty five American Commando aircraft from the ATC on the China airlift, which were not under his command, to tide over the crisis, estimated then to last until about mid-March.<sup>16</sup> After a week's deliberations, the American COS granted the request, but, in the event, air supply to the 7<sup>th</sup> and 26<sup>th</sup> Divisions reduced dramatically in late February and ceased by 5 March with the re-opening of ground L of C.<sup>17</sup>

The Ngakydauk pass to the 7<sup>th</sup> Division's administrative base at Sinzweya was re-opened on 23 February, the division having been cut off for sixteen days. By that time, the Japanese had been cleared from the coast road south of Bawli Bazaar and, denied the supplies they had planned to capture, were forced to withdraw, leaving more than 5,000 of their troops dead on the battlefield.<sup>18</sup> XV Corps resumed the offensive and, by the end of March, had seized Buthidaung, Razabil and the tunnels on the Maungdaw – Buthidaung road. By that time, however, the main Japanese offensive had been launched against Imphal. The 5<sup>th</sup> and, later, 7<sup>th</sup> Divisions were replaced in Arakan by two other divisions and re-deployed by air and rail to reinforce the Assam front, where the decisive defensive battles of Imphal and Kohima were then just starting. XV Corps' attention then turned to establishing a sustainable deployment for the forthcoming monsoon, when active operations would have to cease because of the wet and windy conditions, which are usually extreme on the Arakan coast during that season. Buthidaung would become untenable in the rains, but the road from Maungdaw was secured as far forward as the eastern foothills of the Mayu range. North of the Maungdaw-Buthidaung road, the front then faced eastwards across the Kalapanzin river. The 81<sup>st</sup> West African Division was withdrawn from the Kaladan valley into reserve at Chiringa.<sup>19</sup> Stocks were run down and the Sinzweya administrative base, which was expected to become flooded, was abandoned. Some 31,000 men, 2,400 animals, 760 vehicles and 140 guns were withdrawn to India to minimise the logistic liability on the Arakan L of C.<sup>20</sup> As was anticipated, when the monsoon started, many bridges on the road south of Chittagong were soon washed away and the road was frequently out of use over much of its length to the front. By then, however, maximum use was being made of coastal shipping and IWT, and a good deal of movement to and from XV Corps then went by sea through Cox's Bazaar and along the Naf river, both of which were adequately

sheltered for continued use during the monsoon.<sup>21</sup> Without that, XV Corps would probably have had to withdraw a good deal further northward, losing much of what had been gained and putting the security of Chittagong at risk.

In terms of ground, the gains had not been particularly impressive, except that, with the seizure of the entrance to the Naf river, the port of Maungdaw and the most defensible, mountainous part of the road to Buthidaung, XV Corps was in a much better tactical and logistic position than it had been at the start of the year, and would be ready to continue the advance the following winter. The really important gains were the physical and moral victories achieved over the Japanese. XV Corps had tied down and defeated two Japanese divisions, drawing them away from the NCAC and IV Corps fronts, and spoiling Japanese plans for the start of their main offensive against Imphal. In this respect, XV Corps' operations in February 1944 have been cited as the turning point of the war in south east Asia.<sup>22</sup> Before then, the allies had not won a major battle in that theatre. After that, they won them all. The structure of the battle was exactly the way Alexander and Slim had envisaged a successful defence could be mounted against Japanese outflanking tactics after the lessons of defeats in Malaya, Burma and the first Arakan campaigns.<sup>23</sup> British forces had finally proved themselves able to stand and fight when surrounded and then to counter attack across country, independent of roads. In fact, it would have been disgraceful had they failed to do so, because they outnumbered the enemy by some five to one, but, until then, the Japanese had held the moral advantage and were fully confident of succeeding yet again against numerically superior British forces. The deployment of a brigade of the 7<sup>th</sup> Division as eastern flank guard to XV Corps' main axis of advance had failed to prevent Japanese penetration of the front but it was fully accepted by then that no defensive line in the jungle would be impervious. Prevention of such infiltration was almost impossible. The counter to it was to be able to fight on when it had happened, and that the British were finally able to achieve. The brigade in question was able subsequently to cut the Japanese supply route in the Kalapanzin valley, which, together with their failure to capture the 7<sup>th</sup> Division's administrative base at Sinzweya, eventually precipitated the Japanese withdrawal. The 81<sup>st</sup> Division, although not directly involved in the main battle, was enough of a threat to the Japanese flanks to cause the enemy to deploy a reconnaissance regiment against the Africans and to withhold two infantry battalions

from the offensive in order to defend Akyab. A further Japanese battalion was held back in defence of the Mayu peninsular because of previous small scale raids by the 5<sup>th</sup> Division and the 3<sup>rd</sup> Commando Brigade along the coast using minor landing craft and IWT.<sup>24</sup> Had these Japanese troops been committed to the offensive, the outcome of the battle might have been very different.

Success was due in large part to much improved training and leadership over the previous year, but crucial to it also was to the new-found ability to maintain substantial isolated forces in sustained, high intensity combat by air, water and animal transport. Of these, the emergent lessons concerning air supply were particularly significant because the circumstances of the three divisions supplied or maintained by air were all different. The 81<sup>st</sup> Division's arrangements were pre-planned because it was known in advance that they would have to operate without adequate ground L of C in the Kaladan valley. They were able, therefore, to use the experience gained by the first Chindit expedition and establish a strong rear base airfield organisation built around part of the divisional headquarters administrative staff and units at Comilla, from where their supply missions were mounted. Similarly, they had well organised and practised teams receiving and distributing supplies at the front, and the two parts of the organisation were properly co-ordinated and understanding of each others' problems. Moreover, the 81<sup>st</sup> Division could, to an extent, plan and set up its dropping zones at its convenience because it was mobile and held the initiative in the Kaladan Valley. It was also able to construct airstrips for the evacuation of casualties by light aircraft or, towards the end of the operation, by Dakotas, so that, in the latter part of the operation, it was maintained fully, rather than just being supplied, by air.

On the other hand, although the possibility of the 7<sup>th</sup> Indian Division's being cut off had been anticipated, it was not organised in the same way as the 81<sup>st</sup> Division specifically for air maintenance or supply. It was not rehearsed, as were the Africans, and, understandably, the marking, communications and ground management of the dropping zones at the start of the battle were found wanting. The division did not have its own administrative organisation at the mounting airfield, so it had to rely on outside agencies to look after its interests, with the inevitable breakdowns in communication and understanding. Nor did it have a properly trained and organised receiving and distributing organisation at the front, so that aspect had to be

improvised from the troops available at the time. The size and location of its supply dropping zones were dictated by tactical conditions, and several zones had to be used because its brigades and units were widely dispersed, with enemy forces interposed between them. Many casualties were suffered by animal transport companies taking supplies from the dropping zones to the troops who needed them through enemy occupied territory. The 7<sup>th</sup> Division did have the advantage, though, of being static during the period of its being surrounded, so the dropping zones were well known to both aircrews and ground troops. However, the enemy were equally familiar with them, and did their utmost to render them unusable. At Sinzweya, the dropping zone was so overlooked by enemy positions that tanks sometimes had to be used to recover stores in the open, where men or 'soft skinned' vehicles could not go safely in daylight. It was found necessary to engage the enemy aggressively during supply dropping in order to prevent them from shooting at the dropping aircraft, but, even so, enemy ground fire forced much of the dropping to be done by night. Despite the tactical hazards, frequent light aircraft landings were made at Sinzweya and some 200 of the severest casualties were evacuated during the battle. The majority, though, had to be held within the division until overland communications were re-established. Given the tactical circumstances and its lack of preparation for air supply, the 7<sup>th</sup> Division made the best possible use of a means of sustainment that was entirely unfamiliar to it. The 26<sup>th</sup> Division, like the 7<sup>th</sup>, found itself having to use air supply during its counter attack without prior planning, practise and organisation, with the added complication of being on the move and having to find new dropping zones as it went. However, it was able to receive some supplies by animal transport from Bawli Bazaar and to evacuate casualties overland, so it was able to overcome the difficulties encountered.<sup>25</sup>

With these three different sets of air maintenance and supply circumstances, the experience gained during this second Arakan battle was of great importance. It was a significant advance on the pioneering lessons of the first Chindit expedition of the previous year and was on a scale not previously contemplated, let alone attempted. During February alone, some 3,000 tons of supplies were dropped to formations of XV Corps: 1,636 tons to the 7<sup>th</sup> Division, 1,074 to the 81<sup>st</sup> and the balance to the 26<sup>th</sup>. Eight Dakotas were lost.<sup>26</sup> Air maintenance and supply had very largely determined the conduct and outcome of the engagement and it was to be crucial to forthcoming



operations elsewhere in the theatre. None of it could have been achieved, of course, without the 3<sup>rd</sup> Tactical Air Force having first won air superiority, in which the transport aircraft could operate. Coordinating that whilst, at the same time, providing continuous offensive air support for the troops on the ground, was a complex undertaking, requiring the closest cooperation of army and air force staffs.

### *The Imphal front*

At the time the battle started on the Arakan coast, IV Corps at Imphal was well placed to carry out the tasks assigned to it in 11 Army Group's Operation Instruction of 9 January 1944.<sup>27</sup> Both the 17<sup>th</sup> Indian Division, in the Chin hills, and the 20<sup>th</sup> Indian Division, on the Chindwin river front, were in contact with the Japanese, while the 23<sup>rd</sup> Indian Division and the 254<sup>th</sup> Tank Brigade were in reserve on the Imphal plain (see Map Five). The 17<sup>th</sup> Division, in particular, was experiencing increasing Japanese pressure in the vicinity of Fort White, south east of Tiddim, and had lost some ground, which it had been unable to retrieve. The most worrying weakness of IV Corps' tactical and logistic posture was the wide dispersion of its two forward divisions and the alignment of its roads, both forward and rearward, which ran parallel to the front and were thus vulnerable to attack by the Japanese from across the Chindwin. Thus far, however, there had been no direct threat to those roads. Balanced against those problems, the Imphal plain had, by then, three substantial airfields in operation, two of which were of all-weather standard, as well as a number of fair-weather auxiliary landing grounds, so the scene was well set for IV Corps to be maintained by air when its overland L of C was cut by the enemy.

The stocking position of the corps and its divisions was satisfactory after a long, hard build up. Some thirty five days' supplies for the corps had finally been stored at Imphal and there was increasing confidence in the potential of air maintenance, which was to be confirmed by events in Arakan in early February. The logistic arrangements were considered adequate for the immediate tasks facing the corps and, indeed, had been instrumental in the limits set on IV Corps' tasks by Giffard in his operation instruction of 9 January 1944. Nevertheless, it was calculated by both IV Corps and 14<sup>th</sup> Army staffs that the upper limit of force levels that could be sustained

at, or forward of, Imphal under the current supply arrangements and the capacity of the overland L of C had been reached.<sup>28</sup>

By early February, there were increasing indications of the imminent Japanese offensive on the Assam front. The Arakan battle was under way, growing Japanese resistance and troop strengths were being detected by the forward divisions in contact, and reinforcements from new Japanese formations were identified in the Chindwin valley. IV Corps and the 14<sup>th</sup> Army had to re-assess their tasks on the Imphal front in the developing situation. The potential threat to the Assam L of C and the China airlift should Imphal fall were all too evident. Holding Imphal had to take priority in the short term over plans for any offensive operations, and a successful defence of the base would undoubtedly engage a large number of Japanese, thereby contributing to the tasks assigned to IV Corps in drawing Japanese opposition away from NCAC's advance. However, there were strong, conflicting arguments over how the defence of Imphal was to be effected. Should the Japanese be engaged well forward to prevent their reaching the base at all, or should they be brought to battle at Imphal itself? If the Japanese were permitted to advance from the Chindwin, they would be invading Indian territory, which, thus far, they had not done. There were substantial political arguments in favour of preventing them from doing so, particularly in the light of the simmering Indian nationalist movement and the allied perception at the time that the Japanese intended to foment an uprising against British rule in India. Moreover, bringing the Japanese to battle at Imphal would involve significant tactical withdrawals by the two forward divisions of IV Corps and the loss of the administrative bases they had built up painstakingly at the front. That would be bad for the morale of both divisions and the withdrawal of the 17<sup>th</sup> Division in particular, along the tenuous Tiddim road, would involve a very difficult and dangerous operation before the main battle had even begun. Hence, there was a strong case for engaging the Japanese on the Chindwin and in the Chin hills.

On the other hand, if IV Corps attempted to stop the Japanese advance well forward, its two divisions, still untested in a major battle and too widely dispersed to support each other, would be fighting at the end of long, vulnerable L of C against an enemy, known to be skilled in the jungle, fighting close to his own logistic artery on the Chindwin river. Even with air maintenance, IV Corps would be at a significant

disadvantage. Consequently, on 29 February 1944, Lieutenant General Scoones, commanding IV Corps, produced an appreciation in which he advocated withdrawing the 17<sup>th</sup> and 20<sup>th</sup> Divisions to the Imphal plain to fight the Japanese there. By doing that, he would be able to capitalise on his own superiority in armour, artillery and air power on ground of his own choosing, which well known to his troops and on which strong defences could be prepared in advance. He would be fighting in close proximity to his own tactical base, with well established airfields for maintenance if the road from Dimapur was cut, which he anticipated. Meanwhile the Japanese would be forced to extend and complicate their own tactical L of C. There were significant risks to Scoones' plan but there were even stronger tactical and logistic arguments in favour of it.<sup>29</sup>

Slim agreed with Scoones' thinking. This was exactly the opportunity he sought to achieve a decisive victory over the Japanese before he attempted an offensive, however limited that might be. If he could inflict a major defeat on the Japanese at Imphal, he would be in a position, not just to carry out the tasks given him in Giffard's operation instruction, but to invade Burma in strength. That would assist greatly in securing territory for the overland link to China and might also provide the opportunity to recapture the whole of Burma without the need for a major amphibious operation, for which the resources still did not appear to be forthcoming.

The plan was accepted, but, aside from the political, tactical and morale difficulties it raised, there were other potential problems to overcome. First, the timing of the withdrawal into Imphal was critical. If it went ahead too early, contact might be lost with the Japanese who would consequently be handed complete initiative. They might then by-pass Imphal altogether and go straight to cut the Assam L of C. If it were left too late, the forward divisions could become isolated and vulnerable to defeat in detail. Second, judging by previous experience of Japanese tactics, there was every chance that they would attempt to cut the Dimapur-Imphal road, probably at Kohima, an intermediate supply base on a naturally defensible ridge, where a strong road block could be sustained at minimum cost, using captured supplies. Measures were needed to prevent that, but IV Corps would be stretched to find the resources, so preparations had to be made to sustain the whole of IV Corps by air for a protracted period in case the Japanese succeeded in cutting the road. Third, even if

the Japanese were brought to battle at Imphal, there remained the possibility of their sending a force to attack Dimapur, which, therefore, had to be defended. That would require the deployment of additional troops, who would have to be sustained on the already over-stretched northern line of the Assam L of C.<sup>30</sup> Preparations were set in hand to move the 2<sup>nd</sup> British Division, then training in southern India, to Dimapur. During March, the headquarters of XXXIII Corps moved to Jorhat to control operations in defence of Kohima and the Assam L of C so that IV Corps could focus on the forthcoming Imphal battle. With the exception of one brigade of the 2<sup>nd</sup> Division, which had taken part in the abortive first Arakan campaign, the units then assigned to XXXIII Corps had no operational experience in the jungle, having been held back in preparation for future amphibious operations. The corps headquarters had not operated together in the field at all.<sup>31</sup> The 2<sup>nd</sup> Division was also extensively mechanised and would take time to move.

Lieutenant General Mutaguchi Renya's 15<sup>th</sup> Army started its offensive in early March 1944. The 33<sup>rd</sup> Japanese Division advanced from the south east against the 17<sup>th</sup> and 20<sup>th</sup> Indian Divisions, while sending strong detachments through the jungle to cut the Tiddim road between the 17<sup>th</sup> Indian Division and Imphal. The Japanese 15<sup>th</sup> Division advanced from the east against Imphal and their 31<sup>st</sup> Division, further north, went for Kohima. Both the 17<sup>th</sup> and 20<sup>th</sup> Indian Divisions were reluctant to withdraw, giving up the positions and administrative bases they had developed. The 20<sup>th</sup> Division however, made a timely and orderly withdrawal from Tamu to new positions in the hills blocking the entrance to the Imphal plain above the airfield and supply depot at Palel. The division carried away much of the stocks it had built up at its administrative base at Moreh, but large quantities also had to be destroyed in order to prevent their falling into the hands of the Japanese. In contrast to the situation at Sinzweya, on the Arakan front, where a well defended administrative base had been crucial to British victory, the stocking level of the 20<sup>th</sup> Division's base proved to be something of an embarrassment when the time came to withdraw.

In the Chin hills, the timing of the withdrawal of the 17<sup>th</sup> Division from Tiddim went wrong. It was not started until 14 March, by which time the division was already cut off with the Japanese having established a number of blocks on the road back to Imphal, including seizing the lay-back supply dump at milestone 109.<sup>32</sup> Although

carrying considerable stocks with it, the 17<sup>th</sup> Division had to be supplied by air almost daily from 18 March as it made its way back to Imphal.<sup>33</sup> The division had to make a hard-fought withdrawal, gradually clearing the Japanese from road blocks in its path while holding off those in pursuit along the road, inflicting substantial damage on the Japanese 33<sup>rd</sup> Division on the way. Nevertheless, it became necessary for Scoones to send the 23<sup>rd</sup> Indian Division, the core of his reserve, southwards down the road from Imphal to help clear the road. By this means, the supply dump at milestone 109 was re-captured almost intact, but IV Corps had lost most of its essential reserve force, and it was anticipated that the 17<sup>th</sup> Division would need a period of rest and refitting when it finally reached Imphal. A replacement reserve formation was needed, both for the Imphal plain and for the short term defence of Dimapur until the arrival of the 2<sup>nd</sup> British Division. The 5<sup>th</sup> Indian Division, released from XV Corps on the Arakan coast, was given the task and plans were drawn up to move it to Assam by rail. By this time, however, the Japanese were, as predicted, approaching the Dimapur-Imphal road in strength and Imphal's isolation on the ground appeared imminent. It was becoming clear that a whole Japanese division was heading for Kohima with a view to seizing that place and possibly going on to Dimapur. The 5<sup>th</sup> Division's re-deployment suddenly became urgent and the movement plans were changed to fly the division to Assam.<sup>34</sup> Thereafter, whether or not the Japanese managed to cut the Dimapur-Imphal road, the addition of the 5<sup>th</sup> Division to the garrison at Imphal would take the administrative liability on the plain above that which could be sustained by road alone. Whatever happened, air maintenance of IV Corps would be required.

While all this was taking place, the fly-in of the LRP brigades of the Special Force had started on 4 March 1944. The Special Force was supported directly by fighters, bombers, Dakotas and gliders of the USAAF 1<sup>st</sup> Air Commando. However, that formation had insufficient Dakotas for the task of deploying and supporting all the LRP brigades together, so a substantial part of the commitment fell on the TCC as well. The strength of the TCC had, by then, been increased to 152 Dakotas by the addition of two more American squadrons. Nevertheless, with the deployment of the Special Force in addition to its ongoing commitments in support of NCAC as well as the air supply of the 17<sup>th</sup> Division, the TCC could not cope with the re-deployment of the 5<sup>th</sup> Division from Arakan to Assam.<sup>35</sup> Once again, Mountbatten was forced take aircraft from the China airlift to solve the crisis. On the previous occasion, he had

sought permission from the American COS and had to wait seven days for their reply. This time, he could not afford to wait, and, as soon as the 17<sup>th</sup> Division began its withdrawal, he gave orders on his own initiative to divert thirty Dakotas from the ATC for the move of the 5<sup>th</sup> Division. This was well beyond the authority granted to him by the Combined COS, but he was able to argue that failure at Imphal would probably result in the termination of the China airlift in any case, so his initiative was justified.<sup>36</sup> In this he was supported by American commanders in theatre. On 18 March, the American COS gave their approval for twenty Commandos instead of thirty Dakotas to be diverted for a period of one month, which appeared adequate to meet the immediate crisis.

The 17<sup>th</sup> Division arrived back at Imphal on 5 April 1944. Meanwhile, the re-deployment of the 5<sup>th</sup> Division from Arakan was completed between 20 and 26 March, during which time two brigades, comprising 5,924 men, 129 jeeps, 313 mules and forty field guns, were moved to Imphal in 531 aircraft sorties.<sup>37</sup> The third brigade of the 5<sup>th</sup> Division, the 161<sup>st</sup> Brigade, was sent to Dimapur to secure the depots there until the arrival of the 2<sup>nd</sup> British Division by rail. As soon as the leading brigade of the 2<sup>nd</sup> Division began to arrive on 4 April, the 161<sup>st</sup> Brigade moved forward to hold Kohima. On that day, one battalion managed to get into the town before it was surrounded by the Japanese. The rest of the 161<sup>st</sup> Brigade occupied a separate defensive position at Jotsoma, about two miles outside Kohima, before it, too, was cut off from Dimapur by a further Japanese outflanking movement.<sup>38</sup> The tactical situation at the beginning of April, then, was as follows: IV Corps, comprising the equivalent of four divisions and a tank brigade, was cut off at Imphal; the 161<sup>st</sup> Brigade was isolated in two enclaves at Kohima and the 2<sup>nd</sup> Division was starting to concentrate at Dimapur, which was otherwise almost undefended. The 5<sup>th</sup> Division's re-deployment by air had negated Japanese plans to draw 14<sup>th</sup> Army's reserves to the Arakan before the start of their main offensive and ensured that IV Corps had sufficient forces to hold Imphal, but the Assam L of C were still vulnerable. The Japanese, however, chose to lay siege to the isolated British forces rather than by-passing them to attack Dimapur or the Assam L of C.

XXXIII Corps' first priority was to build up sufficient force at Dimapur to secure the advance base there and the Assam L of C. After that, the Kohima garrison could be

relieved. Then the road to Imphal could be re-opened, destroying the Japanese forces encircling IV Corps in the process. All this was reflected in Slim's directive to Lieutenant General Stopford, commanding XXXIII Corps.<sup>39</sup> Meanwhile, IV Corps would have to fight on, living off its reserves and supplies delivered by air in an operation known as STAMINA. The whole of the IV Corps tactical administrative base on the plain was put into a state of defence while continuing to fulfil its role of sustaining the fighting troops.<sup>40</sup>

For their part, the Japanese were already making some serious errors of judgement. As in the Arakan campaign, they had started their offensive with inadequate logistic support, assuming from past experience that IV Corps would withdraw as soon as they were surrounded, abandoning their supplies for the Japanese to use. The 17<sup>th</sup> Division's withdrawal from Tiddim to Imphal may well have reinforced that notion, but the Japanese had failed to heed the lessons from their recent defeat in Arakan and to comprehend the tactical potential of air maintenance both there and during the 17<sup>th</sup> Division's withdrawal. They also chose to ignore the fact that their plan to draw off 14<sup>th</sup> Army's reserves had misfired due to the rapid air re-deployment of the 5<sup>th</sup> Division from Arakan to Assam. Finally, once stalled at Imphal, they failed to seize the opportunity to by-pass the defences there, capture Dimapur and cut the Assam L of C before the 2<sup>nd</sup> Division arrived in strength. This last apparent failure lends strength to the argument that the Japanese objective was limited to that of seizing Imphal, and did not extend to cutting the Assam L of C. In any event, they failed to observe some obvious vital signs that things were not turning out as they had anticipated. They forged ahead rigidly with a plan that was rapidly becoming logistically flawed against an enemy they had, for the first time, seriously underestimated.<sup>41</sup> IV Corps just had to hold out to deny the Japanese 15<sup>th</sup> Army the supplies they needed and, like the 5<sup>th</sup> and 7<sup>th</sup> Indian Divisions in Arakan, to be the 'anvil' on which the Japanese would be crushed by XXXIII Corps' eventual counter attack to re-open the Imphal road.<sup>42</sup> Operation STAMINA enabled IV Corps to do that.

### *Operation STAMINA – the air maintenance of IV Corps*

At the beginning of April 1944, when the Imphal-Dimapur road was closed, IV Corps had a ration strength of 155,000 men and 11,000 animals, including labour, non-combatants and attached army-level troops. By that time 22,000 non-combatants had already been sent out by road to reduce the maintenance liability and it was estimated that somewhere between 26,000 and 50,000 more could be evacuated without unacceptably detrimental effect on operations and administration.<sup>43</sup> That became especially important with the addition of the 5<sup>th</sup> Indian Division to IV Corps' order of battle. There was no telling at that stage how long it would take to re-open the road from Dimapur. Before that could even begin, the 2<sup>nd</sup> British Division had to be built up to full strength, including the operating stocks and reserves needed to clear the Japanese 31<sup>st</sup> Division out of Kohima, which already threatened to be a formidable battle. Moreover, an additional brigade, the 268<sup>th</sup> Indian Infantry Brigade, had to be deployed to Dimapur to secure the base once the 2<sup>nd</sup> Division started its advance. All this, on the already stretched Assam L of C would take time. It was clear that IV Corps might have to be maintained by air for a protracted period, so, as a precaution, rations were reduced by thirty five per cent.<sup>44</sup> Even with the additional twenty American Commandos already diverted from the China airlift for the re-deployment of the 5<sup>th</sup> Division, the TCC was not able to start maintaining IV Corps until 18 April, mainly because of its commitment to flying in and sustaining the Special Force. By that time, it was estimated, IV Corps would have approximately fifteen days' supplies remaining. On that same date, however, the aircraft on loan from the China airlift were due to be returned. Another crisis in airlift availability loomed, for which Mountbatten once again had to seek permission from the Combined COS to divert aircraft from the China airlift. To begin with, the COS were reluctant to agree to this, especially after Mountbatten's earlier ordering of the diversion of aircraft from the ATC without authority, which had been considered precipitate in Washington. However, the Americans were forced to recognise that failure to hold Imphal would result in the Assam L of C and, therefore, the China airlift, being placed at risk. It was accepted also that large numbers of SEAC's own aircraft, which would otherwise have been available to help maintain IV Corps, were tied up sustaining the Special Force, whose operations in support of NCAC's efforts to open the ground link to China had been given a high priority by the Combined COS. For these reasons, the



COS ordered the diversion of eighty Dakotas from the middle east to SEAC until mid-June, after which they would be replaced by new American squadrons. The availability of transport aircraft remained a matter of concern throughout the Imphal battle. However, after much negotiation, the number of Dakotas was increased from 152 to 232 between 18 April and 15 June, after which it fell back to 191. An additional twenty Commandos were provided for the second half of April.<sup>45</sup>

Operation STAMINA began on 18 April. The original plan envisaged three phases. Phase one was to spend the remainder of April building stock levels back up to thirty days, requiring an estimated average daily lift of 720 tons, or 240 Dakota sorties. During phase two, the rate was to be relaxed somewhat to fly in a reduced rate of daily maintenance while stocks were consumed back down to fifteen days by 30 June, requiring a daily rate of 373 tons, or 124 Dakota sorties. Finally, during phase three, full daily maintenance of 475 tons would be delivered in 159 Dakota sorties per day, allowing the fifteen days' reserves to be maintained until the road was re-opened.<sup>46</sup> These figures all referred to sorties landing at airfields on the Imphal plain. In addition were those required for air dropping supplies by parachute to isolated units, which would alter daily, depending upon the tactical situation. It was not anticipated that they would be sufficient to affect the plan significantly, but they did, in the event, contribute to the overall airlift's being slower than planned, because aircraft payloads were reduced and additional time was needed for packing stores to be dropped.

To begin with, the base airfields for cargo flights were the British fields at Chittagong and Agartala, with Comilla used also for personnel flights (See Map Three). All three were on the southern L of C, served by sea and rail through Chittagong or directly by rail through Mymensingh. That was necessary to handle the weight of stores required by IV Corps. They were also on, or close to, the principal POL route from Chittagong, which would enable them to sustain the increased flying rate required. These three airfields alone proved inadequate for the weight of supplies that had to pass through them. For these reasons, in the latter part of the operation, the British field at Feni and the American fields at Sylhet, on the southern line, and Jorhat, on the northern line, were added. Those were also on the rail and pipeline routes, and all the airfields were well within the Dakota's critical 250-mile economic operating radius of Imphal. Until the start of Operation STAMINA, IV Corps had

been sustained entirely by the northern line through Dimapur, but, with most of the base airfields served by the southern line, virtually all supplies for the corps had to be re-routed, which was no simple task. The problem was partially alleviated by the reduction in troop numbers and activity in XV Corps, which also drew on the southern line, as operations slowed down in Arakan prior to the monsoon. Nevertheless, the change resulted in considerable congestion of unused supplies left on the northern line. In the event, that turned out to be fortuitous as those supplies became available to sustain the eventual counter attack by XXXIII Corps from Dimapur.<sup>47</sup>

The main receiving airfields on the Imphal plain were the two all-weather fields, Imphal Main and Palel, with Tulihal planned to act as a back up. None were entirely satisfactory. Imphal Main was congested and had a narrow runway, resulting in a number of aircraft accidents on the ground. Palel was close to the front, came under occasional shellfire, and its surface began to break up, requiring much engineer maintenance. It was raided by a strong Japanese fighting patrol during the siege and a number of aircraft were destroyed on the ground. Tulihal was a fair-weather strip only. Stone and steel planking to upgrade the strip to all-weather standard were due to have been delivered by road. However, the road was closed before the delivery was made and a number of the early air sorties were taken up flying in PBS as an expedient measure at the expense of maintenance supplies. The Commando aircraft flying in the PBS then proved to be too heavy for the runway at Palel, the only field long enough to handle them, and caused considerable damage, which hindered subsequent operations. Then it was found that the PBS surface could not be laid satisfactorily because of early monsoon rain, so the effort was wasted. Thereafter, Kangla, an auxiliary fair-weather strip, was used as back up, and proved serviceable for a large part of the operation, due to its being naturally well drained. Nevertheless, the limited capacity of the receiving fields on the Imphal plain was a serious constraint on the rate of delivery. The other main limiting factors were the rate at which supplies could be delivered to the base airfields, shortage of transport and labour, shortage of aircraft refuelling equipment and, increasingly, weather problems. Due to the effectiveness of air defence measures, enemy action was not a significant problem.<sup>48</sup>

After a slower-than-planned start, the onset of the monsoon in May continued to constrain the flying rate even when the number of aircraft available reached its peak and problems at the base airfields were being overcome. By the end of that month, the supply situation at Imphal was giving cause for alarm. Ration scales were reduced by a further fifteen per cent and all remaining non-essential personnel were evacuated, causing a number of problems with local administration. Fighter and bomber squadrons based on the Imphal plain were withdrawn to Dimapur and other airfields nearby from where they could continue to fly in support of the battle without drawing on scarce supplies on the plain. A staging depot was established on the airfield at Kumbhirgram, on the route to Imphal and seventy miles short of it. There, aircraft forced back by bad weather over the mountains surrounding the plain could leave their loads to be ferried forward the short remaining distance during the next gap in the weather instead of having to take them all the way back to base.<sup>49</sup>

Towards the end of June, although the number of transport aircraft available had declined again, so, too, had some other commitments, particularly those in support of the Special Force. IV Corps' new supply chain on the southern line was, by then, properly established; transport and refuelling problems at the base airfields were being addressed; the additional airfields were included in the operation; and the air and ground crews were, by then, used to operating in monsoon conditions. At that stage, also, a number of bombers had been taken off operations to fly ammunition into Imphal. The air delivery of full daily maintenance was achieved just as the road was re-opened on 22 June. Flown into Imphal over the course of the operation were 18,824 tons of supplies, against a target of 27,493, as well as 12,561 reinforcements, against a target of 18,500. 43,000 non-combatants and 13,000 casualties were evacuated on returning aircraft.<sup>50</sup>

Although the airlift failed to achieve its planned targets until late in the operation, the effect was not as bad as might at first appear. The planned rebuilding of thirty days' stocks in phase one did not happen. However, by the completion of phase two, at the end of May, due to consumption being less than anticipated, IV Corps still had seventeen days' reserves, which was two days more than had been planned for at that stage of the operation. Full daily maintenance of the Corps had been achieved, even if the planned initial re-stocking had not. Whatever the anxieties, IV Corps had been

enabled to go on fighting and the Japanese were denied the supplies they had intended to capture. The Assam L of C were secure and, with the re-opening of the road, the 'hammer' of XXXIII Corps descended on the 'anvil' of IV Corps, inflicting the decisive defeat the Slim sought before he took the offensive.

Following the lessons of the first Chindit expedition and the successful arrangements for the air sustainment of the 81<sup>st</sup> West African Division in the Kaladan valley, a joint army-air force control mechanism was established by the headquarters of the 14<sup>th</sup> Army, the TCC and the 3<sup>rd</sup> Tactical Air Force at Comilla to run Operation STAMINA. On the air force side, the 3<sup>rd</sup> Tactical Air Force planned the airlift in co-ordination with air defence operations, while TCC planned and executed the actual transport flying.<sup>51</sup> Unlike the Chindits and the 81<sup>st</sup> Division, however, IV Corps did not run its own affairs at the base airfields from which supplies were flown forward. Because the IV Corps logistic staff and units were fully occupied with their normal duties on the Imphal plain, the 14<sup>th</sup> Army logistics staff represented their interests at the base end. They received the corps' requirements; arranged for the delivery of supplies to the base airfields; and organised the packing, loading and despatching. Resulting from the experience of Operation STAMINA, a permanent joint army-air force air maintenance organisation was established in October 1944. The army side of the partnership was run by a new permanent Combined Army Air Transport Organisation (CAATO), which brought together the necessary army logistic and engineering staff to plan and run air maintenance operations. This was the role that had been undertaken variously by the rear headquarters of the 77<sup>th</sup> Brigade, Special Force and the 81<sup>st</sup> West African Division during the air-maintained operations of those formations, and by an *ad hoc* group of 14<sup>th</sup> Army logistic staff during Operation STAMINA. Within the CAATO, the actual assembly, packing, loading and despatching of supplies at base airfields were then to be undertaken on behalf of air-maintained units and formations by a number of newly formed Rear Air Maintenance Organisations (RAMO), one of which was permanently allocated to each base supply airfield, and which also incorporated personnel of all the appropriate logistic corps. Previously, this work had been done exclusively by the air supply companies of the Royal Indian Army Service Corps. A number of new Forward Air Maintenance Organisations (FAMO) stood by to run the reception and distribution of supplies at forward tactical airfields. On the air force side, the TCC was replaced by the Combat

Cargo Task Force (CCTF). It is not entirely clear whether this was anything more than a name change, but the CCTF did, henceforth, work right alongside the CAATO.<sup>52</sup>

*XXXIII Corps' counter offensive to open the Dimapur-Imphal road*

Switching IV Corps' supply chain from the northern line to the southern during Operation STAMINA, released sufficient capacity on the northern line to sustain XXXIII Corps' counter attack from Dimapur to open the road to Imphal (see Map Five). To begin with, XXXIII Corps comprised the 2<sup>nd</sup> British Division only, but that division, being established for amphibious operations, came with a greater weight of transport and heavy equipment than the divisions of IV Corps.<sup>53</sup> XXXIII Corps was soon reinforced by the 23<sup>rd</sup> LRP Brigade, part of the Special Force which had been held back in reserve, and the 268<sup>th</sup> Indian Infantry Brigade, a larger-than-usual independent brigade of six battalions. During May, the 7<sup>th</sup> Indian Division, recently released from XV Corps in Arakan, was added to XXXIII Corps' order of battle, so the capacity made available on the northern line was essential. Without it, either NCAC's operations in north Burma or the China airlift would have had to be retarded in order to sustain the defence of Dimapur and XXXIII Corps' forthcoming counter offensive to relieve Imphal.

The 2<sup>nd</sup> Division started to advance along the Imphal road to the relief of Kohima on 10 April 1944, while the 23<sup>rd</sup> LRP Brigade began a long outflanking movement, supplied by air, to cut the Japanese deep L of C to the Chindwin. The 268<sup>th</sup> Brigade remained in defence of Dimapur. Having broken through a Japanese road block on the Dimapur-Kohima road, the 2<sup>nd</sup> Division made contact with the 161<sup>st</sup> Brigade, at Jotsoma, on 15 April and the defenders of the small remaining enclave in Kohima were relieved three days later.<sup>54</sup> During the siege, the British garrison of the town had been supplied by air on a dropping zone smaller than half a football pitch, which, by the time of the relief, was on the front line and being fought over at small arms range. Following the relief of the garrison, there began a prolonged and intense battle to drive the Japanese 31<sup>st</sup> Division, who were, by that time, well dug in, out of the remainder of the town. Initial frontal attacks along the road failed, as they had almost always done against the Japanese in well prepared positions. Two brigades of

the 2<sup>nd</sup> Division then attempted to turn the flanks of the Japanese defence by marching some ten miles through mountainous jungle around the town in order to cut the Japanese L of C and attack their positions from the rear. The division, however, did not have sufficient animal transport for off-road movement in such strength, and the troops, though well trained for their intended assault role in amphibious operations, lacked operational jungle experience. The country through which they tried to march was particularly difficult and very little air supply could be spared because of the priority attached to Operation STAMINA, which was going on at the same time. Local Naga porters were used to help carry supplies, but the intended outflanking movements could not be sustained at the depth required and both ended up engaging the strongly held flanks of the Japanese position without threatening their L of C. The 2<sup>nd</sup> Division was still, essentially, engaged in a costly frontal assault. In early May, a brigade of the 7<sup>th</sup> Division reinforced the 2<sup>nd</sup> Division to strengthen the attack, and, in the latter stages, the whole of the 7<sup>th</sup> Division was brought in to make the final clearance of Kohima a full corps-sized operation.<sup>55</sup>

The failure to defeat the Japanese by manoeuvre was offset by XXXIII Corps' eventual ability to overwhelm the enemy through the weight of combat power it could deliver. The 2<sup>nd</sup> Division was well equipped with armour, artillery and transport, and, although the country was mountainous and forested, it was proved possible to make effective use of them. XXXIII Corps' tactical L of C from the well stocked railhead and advance base depots at Dimapur was only forty five miles long and, by then, the road was in reasonably good condition. Supplying the forward units and clearing casualties away from the battlefield were relatively simple undertakings compared to many actions elsewhere in south east Asia. Although artillery gun positions were hard to site because of limited flat, clear space off the road, they could be well supplied with ammunition, and field batteries of eight guns were enabled to fire up to 1,500 rounds in a day on occasions.<sup>56</sup> Tanks could be taken forward and were, if necessary, winched up tracks cut through the jungle on the steep hillsides to positions in which they could be used to destroy, by direct fire, Japanese defences, which were virtually invulnerable to air or artillery attack. So great was the flow of supplies that, after Kohima had been cleared, XXXIII Corps admonished both its divisions for the profligate quantities of supplies and ammunition brought forward and dumped on the battlefield and the lack of care for them.<sup>57</sup>

By contrast, the Japanese, supplied, if at all, along jungle tracks some sixty miles from the Chindwin, could not bring anything like the same weight of material or fire power to bear, having to rely chiefly upon the courage and skill of their infantry soldiers in well prepared defences. At a late stage in the Kohima battle, Lieutenant General Sato, commanding the Japanese 31<sup>st</sup> Division, complained bitterly to Lieutenant General Mutaguchi, commanding the 15<sup>th</sup> Army, that he had received no supplies or ammunition, other than that which his division had brought with it, since the start of the battle. Nevertheless, the frontal battle was protracted and costly; the road from Dimapur became badly congested and presented an easy target for occasional Japanese air attacks. It was not until the last week of May that the enemy was finally ejected from Kohima, and there remained the rest of the road to be cleared before Imphal was relieved. The 2<sup>nd</sup> Division had suffered heavy casualties, particularly amongst its infantry, for whom British replacements were not readily available in the normal reinforcement supply chain. Consequently, the war establishment of infantry battalions in the division was modified from 753 to 619 personnel. 1,300 reinforcements for infantry battalions were found by transferring excess logistic vehicles to the L of C Command and re-assigning their British drivers; men of redundant British anti aircraft artillery units in India were drafted to infantry battalions and the 2<sup>nd</sup> Division's administrative units were combed out to make up infantry numbers.<sup>58</sup>

For the final advance southwards to Imphal, the 2<sup>nd</sup> Division, with its attached armoured regiment, cleared the road, being supplied by motor transport along it as the advance progressed. The withdrawal of so many logistic vehicles and re-deployment of their drivers to be infantrymen then presented problems as the division's remaining transport was barely able to sustain the advance and the continued heavy expenditure of ammunition. Two companies of third line transport were loaned to the division by XXXIII Corps to make up the shortfall and some drivers had to be returned from battalions, to which they had only recently been transferred.<sup>59</sup> The 7<sup>th</sup> Indian Division, better equipped and experienced for cross-country movement, advanced through the jungle to the east of the Imphal road, supplied by jeeps and animal transport on jungle tracks, to outflank the withdrawing Japanese and cut their escape routes.<sup>60</sup> Meanwhile, the 23<sup>rd</sup> LRP Brigade, still supplied by air and animal transport

only, continued its deep outflanking move even further out to the east, cutting the Japanese L of C from the Chindwin. The 23<sup>rd</sup> Brigade's march of over 100 miles proved the ability to sustain a formation in mobile operations by air in monsoon conditions, which was to be crucial to forthcoming operations. Contact with the 5<sup>th</sup> Indian Division, advancing north along the road from Imphal, was made on 22 June, and the first road convoy, carrying beer, passed through that night.<sup>61</sup> From then on it was clear that the Japanese offensive had failed. Their 15<sup>th</sup> and 33<sup>rd</sup> Divisions, which had tried to seize Imphal, were forced onto the defensive and began a hard fought withdrawal. The Japanese 31<sup>st</sup> Division, which had laid siege to Kohima, virtually disintegrated as a fighting formation and scattered back to the Chindwin in disorder. Although the road was open, the airlift continued until the end of June in order to speed up the re-building of reserve stocks on the Imphal plain in preparation for the next phase of operations: the pursuit of the withdrawing Japanese 15<sup>th</sup> Army back into Burma.

### *The pursuit to the Chindwin*

Following the relief of Imphal, much of IV Corps was withdrawn for rehabilitation, and XXXIII Corps took control of all operations on the Imphal front. Although the Japanese invasion had been decisively defeated, Mountbatten and Slim both saw it as essential to pursue the withdrawing Japanese remorselessly, regardless of the weather, in order to deny them the opportunity to rest, refit and reinforce. Thus, XXXIII Corps was faced with a new logistic challenge: sustaining large scale mobile offensive operations though the monsoon, which had hitherto been attempted only by specially trained LRP brigades of the Special Force. The pursuit followed three axes of advance. The 7<sup>th</sup> and 20<sup>th</sup> Indian Divisions followed the Japanese 15<sup>th</sup> Division to Ukhrlu, at which point, effective Japanese resistance crumbled in July and a brigade of the 2<sup>nd</sup> British Division took up the chase. At the same time, the Japanese 33<sup>rd</sup> Division started to retreat along the Tiddim road, by which the 17<sup>th</sup> Indian Division had previously withdrawn into Imphal at the start of the battle, and through the Kabaw valley. The 5<sup>th</sup> Indian Division advanced down the former route and the 11<sup>th</sup> East African Division, recently brought in from Ceylon, down the latter.<sup>62</sup>



At this stage, operations were delayed by a severe shortage of animal transport due to the exhaustion of both mules and their leaders, who had been at the front without a break for nearly eighteen months. In the monsoon, with fair-weather roads often closed to motor traffic, units and formations became ever more dependant upon air supply and animal transport for sustainment and mobility. It was decided that rest for the mules and their leaders had to take precedence over operations in the short term or the pursuit would simply grind to a halt. Despite the pressure to pursue the Japanese with maximum strength, fifty per cent of the mules at a time had to be put out to grass while their leaders went on leave.<sup>63</sup>

Meanwhile, air supply also became increasingly difficult and unreliable in the prevailing weather, and many of the units being supplied by air were not trained or organised for that form of sustainment, even in good conditions. On two occasions in the earlier stages of the Ukhrul pursuit, brigades were left isolated without rations and in danger of finding themselves in severe difficulty. Consequently, all men in any units being supplied by air were required to carry a minimum reserve of three days' rations, and to halve their consumption in the event of a drop failing, in order to continue operations.<sup>64</sup> Despite the delays, these measures and the experience gained enabled the subsequent pursuit down the Tiddim and Kabaw Valley roads to continue with two complete divisions being supplied by air whilst on the move through extremely difficult weather conditions in the mountains.

In September 1944, the 5<sup>th</sup> Division set off down the Tiddim road to the site of the Manipur river bridge, by then destroyed, 126 miles south of Imphal. Although the road that far was in a dreadful state of repair, it was just possible to sustain the division along it with light 4x4 vehicles. The Manipur river, however, was in full flood, and it was anticipated that the Japanese would defend the crossing in strength. It was judged that an opposed crossing would not be possible. One brigade of the 5<sup>th</sup> Division was sent, therefore, on a long, cross-country march of over 100 miles from the Imphal plain down the opposite side of the river to outflank any Japanese defences at the bridge site.<sup>65</sup> That brigade was supplied by air and animal transport throughout its march. In order to find sufficient mules in the crisis then afflicting them, animals had to be taken from mountain artillery units, delaying the subsequent deployment of a complete mountain battery to the 36<sup>th</sup> British Division, by then part of NCAC.<sup>66</sup>

Once the Manipur river crossing had been secured in late September, the remainder of the 5<sup>th</sup> Division was ferried across. However, that was achieved only with extreme difficulty and it was clear that the division could not be maintained over the crossing until the river could be bridged after the monsoon, when the water level and current dropped. The whole division, therefore, was then supplied by air for the remainder of the advance, with only one GPT company, equipped with jeeps and fifteen-cwt 4x4 trucks, accompanying it for second line transport. Not only was this to continue through the remainder of the monsoon, but, in the Chin hills, there was nowhere to build an airfield except for one small site at Tiddim, which could take light aircraft. Hence, all supplies had to be dropped. With only relatively light opposition, few vehicles and a sizeable proportion of administrative troops left behind, the division was able to make do with only seventy tons of supplies per day, which was all that the air force was able to deliver in the prevailing conditions. Tuliha airfield, on the Imphal plain, by then upgraded to all-weather standard, was established as the base airfield for air supply to the 5<sup>th</sup> Division, and an American squadron of thirteen aircraft was assigned to the operation. The division was able to augment the newly formed RAMO from its own headquarters and administrative units left behind, and a very good rapport was developed with the American aircrew assigned to the task.<sup>67</sup> All but the most serious casualties had to be carried forward with the division until a Dakota strip could be found or built, and that was not to happen until the division was clear of the Chin hills at Kalemyo. A number of female nurses volunteered to go along with the division to help cope with casualties until they could be evacuated. Hence, despite numerous difficulties, the advance was able to continue and the Japanese were denied the chance to rest or refit.

Meanwhile, the 11<sup>th</sup> East African Division advanced down the Kabaw valley road, held up more by the environmental conditions than by enemy action for most of the way.<sup>68</sup> The road from Palel to Tamu, although improved to all-weather standard before the battle of Imphal, had deteriorated through the effects of battle, weather and neglect to the extent that it was passable only to small numbers of tracked and 4x4 wheeled vehicles. On one occasion, an entire section of the road slid off down the mountainside, and had to be re-cut. South and east of Tamu, the fair-weather roads were all but impassable and a large proportion of the 11<sup>th</sup> Division's fighting troops

were employed cutting and laying bamboo and timber road surfaces to try and improve the going rather than fighting the enemy. All troops south and east of Tamu were supplied by air, with only the very occasional vehicle convoy getting through, mainly for the evacuation of casualties. Reports suggest that arrangements within the 11<sup>th</sup> Division for air supply were not entirely satisfactory. The division lacked experience of that form of maintenance and had not been trained or organised for it. It did not provide its own representation in the RAMO at the base airfield, so there was not the intimate control over supplies being sent forward, or the rapport with the aircrews enjoyed by the 5<sup>th</sup> Division. There was no FAMO yet available, and arrangements for the receipt of supplies on the dropping zones and their distribution forward were not good, with the result that units near the dropping zone were well supplied while those more distant often went without.<sup>69</sup> Despite these problems, the advance went ahead and, on 13 November, the 5<sup>th</sup> and 11<sup>th</sup> Divisions met at Kalemyo, at the foot of the Kabaw valley. Then, after overcoming some of the hardest resistance encountered during its advance, the 11<sup>th</sup> Division entered Kalewa on 2 December 1944 and, by the middle of the month, had established a firm bridgehead on the east bank of the Chindwin.<sup>70</sup>

### *Special Force operations*

Throughout the battles of Imphal and Kohima, the LRP brigades of the Special Force, had been operating deep inside north Burma to cut Japanese L of C to their forces opposing NCAC's advance to open the overland link to China. The utility of these operations has been widely debated, and it is not intended to re-enter that argument in any depth here. Certainly, the boldness of the plan to insert a complete division onto the enemy's L of C and sustain it there for nearly five months into the monsoon, and the courage, skill and endurance of the men who carried it out, cannot be faulted. It was an outstanding logistic as well as operational achievement and there can be little doubt that it assisted the Chinese advance considerably. However, in most other respects, it is hard to see that it had a significant influence on the shape of the overall campaign. The air assault, conducted in a series of brigade lifts, was the only one of its type conducted in south east Asia. Similar operations were considered at future stages, but were, for one reason or another, discarded. The scale of the endeavour occupied large numbers of troops, aircraft and supplies, which might otherwise have

been available for the Imphal and Kohima battles, although that did not, in the event, affect the outcome of those actions. The maintenance of LRP brigades by air well into the monsoon was formidable achievement, and one which gave the 14<sup>th</sup> Army the confidence to continue its pursuit of the Japanese through the worst of the weather following their defeat at Imphal. In the precedent it set, however, one particular action by the Special Force was to have a significant impact on the future shape of the campaign. The 77<sup>th</sup> Brigade's block on the road and railway at Mawlu from 15 March to 9 May 1944 served as the model for a much more ambitious and significant operation at Meiktila to break Japanese defences on the Irrawaddy river during the final phase of the campaign, in February and March 1945, but that is to anticipate.

### *The turn of the tide*

1944 witnessed a complete reversal of military fortunes for the British in south east Asia. It was testament to immense strides taken, not only in the tactical ability of the British troops to fight in the jungle, but also in the logistical capacity at every level of warfare to sustain them there. By the end of the year, these capabilities had been achieved on a scale, which turned the tide of the campaign, marking the limit of Japanese expansion in south east Asia, and laid the foundations for a significant change in strategic and operational direction for the theatre.

At the beginning of 1944, the ability of British troops in south east Asia to fight the Japanese effectively on any significant scale had yet to be proved. This uncertainty, combined with resource constraints, the weakness of the India base and the limited capacity of the L of C, relegated the 14<sup>th</sup> Army to a supporting role in fulfilling SEAC's principal task: expanding the link to China. During the course of the year, all that changed. The battle of Sinzweya, on the Arakan coast, in February and March 1944, demonstrated that the 14<sup>th</sup> Army and the 3<sup>rd</sup> Tactical Air Force had the tactical and logistic ability to sustain an isolated defence and to mount an effective counter attack independently of roads. That proven success, and the limited capacity of the tactical L of C forward of Imphal, were crucial factors in Scoones' and Slim's determination to bring the Japanese to a decisive battle at Imphal, rather than attempting an unsustainable offensive on the far side of the Chin hills. The Japanese obliged with their own offensive plans, which were rigid and ill-supported

administratively, leading to their defeat. They left too long a gap between their diversionary attack on the Arakan coast and the main offensive against Imphal, allowing Slim to switch his reserves by air in sufficient time. The enemy failed to learn from the Arakan operations that British troops would no longer withdraw, abandoning their supplies, when surrounded and made inadequate logistic provision for the Imphal and Kohima offensive.

Despite their residual weaknesses, the India base and Assam L of C had just sufficient capacity to sustain the forces required for a decisive defensive victory. Specifically, the switch of IV Corps' supply chain to the southern line of the Assam L of C during Operation STAMINA released sufficient logistic capacity on the northern line to sustain XXXIII Corps' counter attack. That was crucial to its success. The speed with which the 2<sup>nd</sup> Division was moved from southern and western India to Dimapur was testament to the improving capacity of the Indian railways, as well as a new-found level of efficiency within the movements organisation when the situation demanded. The ability to sustain the pursuit of the defeated Japanese 15<sup>th</sup> Army through the monsoon was unprecedented. It denied the Japanese time to reconstitute their three badly depleted divisions and put the 14<sup>th</sup> Army into a position from which it would subsequently be able to advance into central Burma, making the most of the dry weather during the forthcoming winter of 1944-45. In January 1944, the 14<sup>th</sup> Army had been directed to cross the Chindwin into central Burma only if a favourable opportunity presented itself. By the end of the year, the 14<sup>th</sup> Army and the 3<sup>rd</sup> Tactical Air Force had created that opportunity and were about to exploit it. The outcome would lead the overland recapture of Rangoon, a strategic concept which had been discarded as unachievable by SEAC and the Combined COS at the start of the year.

Without decrying the improvement in tactical ability and training that made all this possible, it is clearly arguable that the decisive battles of Imphal and Kohima were shaped and decided very largely by logistic considerations. The Japanese invasion of India took place in pursuit of an operational objective that was primarily logistic in nature: the seizure of the British administrative base at Imphal in order to forestall an allied offensive. Strategically, the allies assumed at the time that the Japanese intended to cut the Assam L of C, and their response was tailored accordingly. At the

operational level, the battle was shaped by the crucial importance of the the Imphal plain. Slim needed to fight there, with the shortest possible L of C behind him, in order to guarantee success, and the Japanese had to seize the supplies there in order to sustain themselves after the battle. At the operational level also, the re-deployment of the 5<sup>th</sup> Division by air from Arakan to Assam at the critical juncture of the battle was of decisive importance. At the tactical level, the ability to sustain isolated forces by air and water, and to enable them to manoeuvre away from roads for days on end over long distances, using animal transport or porters, finally delivered the essential early victory that was needed before the 14<sup>th</sup> Army attempted to cross the Chindwin in strength. It is equally true to say, however, that the battles of Sinzweya, Imphal and Kohima were won by a measure of brute force. Underestimating their enemy, the Japanese attacked with inadequate combat power and logistic sustainability. The British enjoyed very considerable superiority over the Japanese in numbers, firepower and supplies across both the Assam and Arakan fronts, and brought them all to bear. They had to. The outcome should never have been in doubt, but it turned out to be a remarkably hard fought series of battles, due largely to the tenacity of the individual Japanese soldier in adversity. During the next phase of the campaign, however, logistic constraints were to force the British to attack the Japanese in a much more evenly balanced contest, when new-found skill and confidence in both tactics and administration had to be used to bring British victory.

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Notes:

<sup>1</sup> See Appendix Six for details of forces available to SEAC in Dec 43.

<sup>2</sup> SEAC Report, Appendix C, p. 223.

<sup>3</sup> TNA WO 172/4699, Arminia telegram 83834/SEACOS, 10 Nov 43.

<sup>4</sup> SEAC Report pp. 27-29; Ministry of Defence (Navy), *War With Japan, Volume IV* (London, HMSO, 1995), p. 12.

<sup>5</sup> TNA WO 172/4145, 11 Army Group Operation Instruction No 2, 9 Jan 44.

<sup>6</sup> Slim, *Defeat Into Victory*, pp. 214-216.

<sup>7</sup> SEAC Report, p. 39.

<sup>8</sup> Woodburn Kirby, *The War Against Japan, Volume III*, pp. 71-76.

<sup>9</sup> *Ibid.*, p. 113.

<sup>10</sup> SEAC Report, pp. 31-32.

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- <sup>11</sup> TNA WO 172/4145, 11 Army Group Operation Instruction No 2, 9 Jan 44
- <sup>12</sup> SEAC Report, p. 32; Woodburn Kirby, *The War Against Japan, Volume III*, pp. 123-126.
- <sup>13</sup> SEAC Report, p. 41; Woodburn Kirby, *The War Against Japan, Volume III*, pp. 137-143.
- <sup>14</sup> SEAC Report, p. 42.
- <sup>15</sup> Army Supplies and Transport, Volume II, pp. 62-63.
- <sup>16</sup> SEAC Report, pp. 42-43; Woodburn Kirby, *The War Against Japan, Volume III*, pp. 142-150.
- <sup>17</sup> TNA WO 172/4208, XV Corps Q Branch War Diary, 5 Mar 44; Woodburn Kirby, *The War Against Japan, Volume III*, pp. 512-513.
- <sup>18</sup> SEAC Report, p. 43.
- <sup>19</sup> Woodburn Kirby, *The War Against Japan, Volume III*, pp. 270-277.
- <sup>20</sup> TNA WO 172/4208, XV Corps Q Branch War Diary, 17 Apr 44.
- <sup>21</sup> TNA WO 172/4208, XV Corps Administrative Order No 26, 3 Mar 44; TNA WO 172/4210, Chief Engineer XV Corps letter, Jul 44.
- <sup>22</sup> SEAC Report, p. 44; Slim, *Defeat Into Victory*, p. 246.
- <sup>23</sup> TNA WO 203/5711, Despatch by Lieutenant General Alexander, First Burma Campaign, 16 Jun 42; TNA WO 172/1838, Appreciation by Commander XV Corps, 26 Apr 43.
- <sup>24</sup> Woodburn Kirby, *The War Against Japan, Volume III*, pp. 126, 136.
- <sup>25</sup> TNA WO 172 4215, XV Corps report, Air Supply, No 20774/98/Q, 19 May 44.
- <sup>26</sup> NTW 19, p. 28; Army Supplies and Transport, Volume II, p. 63; Woodburn Kirby, *The War Against Japan, Volume III*, p. 512.
- <sup>27</sup> TNA WO 172/4145, 11 Army Group Operation Instruction No 2, 9 Jan 44.
- <sup>28</sup> Prasad, *Reconquest of Burma Volume I*, pp. 149-151.
- <sup>29</sup> *Ibid.*, pp. 181-182; Woodburn Kirby, *The War Against Japan, Volume III*, pp. 187-190.
- <sup>30</sup> Slim, *Defeat Into Victory*, pp. 286, 290-295.
- <sup>31</sup> Army Tactical Doctrine Retrieval Cell [hereafter, ATDRC], Account of Operations by XXXIII Indian Corps [hereafter, XXXIII Corps Ops], Apr- 22 Jun 44, p. 3.
- <sup>32</sup> Woodburn Kirby, *The War Against Japan, Volume III*, pp. 192,195; Slim, *Defeat Into Victory*, p. 295.
- <sup>33</sup> Moharir, *The Army Service Corps*, p. 383.
- <sup>34</sup> SEAC Report, p. 45; Woodburn Kirby, *The War Against Japan*, pp. 195-198.
- <sup>35</sup> There is some wide discrepancy in the records over how many transport aircraft were actually available at this time. The official history quotes the figure of 152 (Woodburn Kirby, *The War Against Japan, Volume III*, p.514). Mountbatten records the figure of seventy six (SEAC Report, p. 55). This is too wide a discrepancy to ignore. Mountbatten was possibly referring to the number of serviceable aircraft at that time while the official history refers to the number of aircraft assigned. Since, at that time, Mountbatten was trying urgently to persuade the Chiefs of Staff to release more aircraft, it is also reasonable to infer that he might paint the bleakest picture within the bounds of truth when trying to argue his case.
- <sup>36</sup> SEAC Report, pp. 45-46.
- <sup>37</sup> TNA WO 172/4192, Appendix F to IV Corps Q Branch War Diary, Mar 44.

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- <sup>38</sup> ATDRC, XXXIII Corps Ops, Apr to 22 Jun 44, p. 6; Woodburn Kirby, *The War Against Japan, Volume III*, pp. 300-301.
- <sup>39</sup> Woodburn Kirby, *The War Against Japan*, p. 302.
- <sup>40</sup> TNA WO 172/4192, IV Corps Administrative Instruction No 40, 27 Mar 44.
- <sup>41</sup> Army Administrative Planning, p. 82.
- <sup>42</sup> The analogy of the 'hammer and anvil' was used by Slim in respect of the Arakan counter attack by the 26<sup>th</sup> and 36<sup>th</sup> Divisions (Slim, *Defeat Into Victory*, p. 243).
- <sup>43</sup> TNA WO 203/736, Notes on Operation STAMINA, p. 1; Woodburn Kirby, *The War Against Japan, Volume III*, pp. 320-321 and 514.
- <sup>44</sup> TNA WO 203/736, Notes on Operation STAMINA; Army Supplies and Transport, Volume II, p. 64; Woodburn Kirby, *The War Against Japan, Volume III*, p. 321.
- <sup>45</sup> SEAC Report, p. 56; Woodburn Kirby, *The War Against Japan, Volume III*, p. 514.
- <sup>46</sup> These figures require some explanation. Returning stock levels to thirty days after eighteen days' worth had been used required a total of 3,180 tons, or a daily average of 245 tons during phase one. At the same time IV Corps would require routine maintenance of 475 tons per day in order to prevent its having to draw on the reserves as they were being rebuilt (TNA WO 172/4168, Daily Lift of Army Stocks and Reinforcements to IV Corps 18 April – 30 June 1944; Woodburn Kirby, *The War Against Japan, Volume III*, p. 322 and fn.). The intended daily total during phase one, therefore, was 720 tons.
- <sup>47</sup> Woodburn Kirby, *The War Against Japan, Volume III*, p. 322.
- <sup>48</sup> TNA WO 203/736, 3<sup>rd</sup> Tactical Air Force report, Operation STAMINA, 10 Jul 44; Woodburn Kirby, *The War Against Japan, Volume III*, p. 323; Pakenham-Walsh, *Royal Engineers*, p. 217.
- <sup>49</sup> TNA WO 203/736, Notes on Operation STAMINA; NTW 19, pp. 44-49; Woodburn Kirby, *The War Against Japan, Volume III*, p. 326.
- <sup>50</sup> Monthly figures for air deliveries to IV Corps during Operation STAMINA are at Appendix Seven.
- <sup>51</sup> NTW 19, p. 6.
- <sup>52</sup> *Ibid.*, p. 116; TNA WO 203/736, Notes on Operation STAMINA, Part II; Army Supplies and Transport, Volume II, pp. 76-77.
- <sup>53</sup> Woodburn Kirby, *The War Against Japan, Volume III*, p. 298.
- <sup>54</sup> ATDRC, XXXIII Corps Ops, Apr to 22 Jun 44, pp. 7-8; Woodburn Kirby, *The War Against Japan*, pp. 203-306.
- <sup>55</sup> ATDRC, XXXIII Corps Ops, Apr to 22 Jun 44, pp. 10-20; Woodburn Kirby, *The War Against Japan*, pp. 329-332, 335-339, 345-346.
- <sup>56</sup> Diary of Lieutenant Colonel R J Uniacke, Commanding Officer, 16<sup>th</sup> Field Regiment, Royal Artillery, 8 May 44.
- <sup>57</sup> TNA WO 172/4230, XXXIII Corps Q Branch War Diary, 25 May 44, 12 Jun, 14 Jun 44; Minutes of XXXIII Corps A/Q conference, 6 Jun 44, Corps Commander's opening statement.
- <sup>58</sup> TNA WO 172/4230, XXXIII Corps Q Branch War Diary, 25 May 44; Annex D to XXXIII Corps Q Branch War Diary, Jun 44, Manpower Situation in 2<sup>nd</sup> Division. Woodburn Kirby, *The War Against Japan, Volume III*, p. 346.
- <sup>59</sup> Army Supplies and Transport, Volume II, p. 65.



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<sup>60</sup> ATDRC, XXXIII Corps Ops, Apr to 22 Jun 44, pp. 24-33; TNA WO 172/4230, XXXIII Corps Administrative Instruction No 108, 19 May 44.

<sup>61</sup> ATDRC, XXXIII Corps Ops, 23 Jun to 16 Dec 44, p. 93.

<sup>62</sup> ATDRC, XXXIII Corps Ops, 23 Jun to 16 Dec 44, pp. 4-78.

<sup>63</sup> TNA WO 172/4230, XXXIII Corps Q Branch War Diary, 2 Aug 44.

<sup>64</sup> ATDRC, XXXIII Corps Ops, Apr to 22 Jun 44, pp. 94-95.

<sup>65</sup> *Ibid.*, pp. 33, 45-54.

<sup>66</sup> Army Supplies and Transport, Volume II, p. 75.

<sup>67</sup> TNA WO 172/4230, XXXIII Corps Administrative Instruction No 137, 23 Sep 44; Q Branch War Diary, 17 Oct 44; TNA WO 172/4282, 5<sup>th</sup> Indian Division Administrative Instruction No 23, 19 Sep 44; ATDRC, XXXIII Corps Ops, 23 Jun to 16 Dec 44, p. 105.

<sup>68</sup> *Ibid.*, pp. 54-60.

<sup>69</sup> *Ibid.*, pp. 101-103.

<sup>70</sup> *Ibid.*, pp. 66-76.

**CHAPTER SIX**  
**THE LOGISTIC INFLUENCE -**  
**OFFENSIVE VICTORY 1945**

The end of 1944 ushered in the final stages of the Burma campaign: the destruction of the Japanese Army in Burma and the recapture of Rangoon. At that time, however, although keeping pace with current operations, the strategic logistic build up was still behind its planned schedule. Resources earmarked to be re-assigned from Europe were still being withheld because of slower-than-anticipated progress in the war with Germany, and preparations to support them when they finally arrived in India were not yet complete. The eventual allied force levels, for which India was to provide the base, had been increased to twenty seven and two thirds divisions, 215 combat air squadrons and some 600 transport aircraft. In addition, the L of C for a further ninety one USAAF squadrons based in China would pass through India.<sup>1</sup> The facilities to support these forces were still only sixty five to seventy per cent complete, and they were not expected to be finished until late 1945.<sup>2</sup> Although SEAC's current strength of seventeen divisions and 119 air squadrons were being maintained adequately, resource constraints and India's capacity as a base continued to set limits on the force levels and logistic support that could be committed to operations and, consequently, the scope of strategic intentions and operational plans.<sup>3</sup>

At the operational level, however, the position on the Assam and east Bengal L of C improved dramatically as 1944 progressed, and, by the end of the year, many of the problems identified earlier appeared to have been solved by the resources then being committed and the experience gained (see Map Three). The capacity of the northern line was expected to reach nearly 11,000 tons per day by the end of 1944, exceeding the estimated requirement at that time by some 500 tons. That of the southern line would be nearly 7,500 tons per day, some 800 tons above the anticipated demand.<sup>4</sup> The railhead and base depots at Dimapur were expected to be able to handle 3,200 tons per day, exclusive of POL, easily matching the estimated needs of the 14<sup>th</sup> Army and its supporting 221 Group of the Eastern Air Command on the Assam front.<sup>5</sup> Transport on the much improved Dimapur to Imphal road could handle up to 2,800 tons per day by October 1944. This rate of supply was sufficient to sustain five

divisions as well as labour, corps and L of C troops at Imphal, with 170 tons per day left over for stocking the advanced base, which had been moved forward from Dimapur to Imphal.<sup>6</sup> The POL pipeline from Chandranathpur to Dimapur was due to be extended all the way from Chittagong to Imphal by the beginning of March 1945, delivering 10,000 tons per month. Meanwhile, ample POL was delivered to Dimapur by the existing pipeline from Chandranathpur for onward distribution to Imphal by road, for which adequate bulk transport was, by then, available.

At the tactical level, on the Arakan front, the combination of road, river and coastal L of C developed since the spring campaign of 1944 was sufficient to sustain a force of up to four divisions indefinitely. In the autumn of 1944, only three divisions were deployed in Arakan, so there was plenty of capacity for stocking XV Corps' new advanced base at Maungdaw in preparation for renewed operations over the forthcoming winter dry season. On the Assam front, however, by the start of the winter dry season of 1944-1945, the roads on the tactical L of C forward of Imphal were in a very poor state following the fighting in pursuit of the Japanese 15<sup>th</sup> Army during the monsoon. A great deal of work would be required before they could sustain protracted operations in central Burma.

The need for plentiful air transport to sustain operations in south east Asia had been proved beyond doubt by the battles of Sinzweya, Kohima and Imphal, as well as the Special Force operations and the pursuit of the withdrawing Japanese. As far back as March 1944, in addition to short term assistance for Operation STAMINA, the American COS had already undertaken a long term commitment to increase SEAC's current assignment of 152 Dakotas by four USAAF combat cargo groups, each having 100 of the same type of aircraft, and four troop carrier squadrons, each having sixteen. The reinforcements were due to arrive between July 1944 and January 1945, and were intended specifically for the support of ground operations in SEAC, as opposed to the China airlift, which remained a separate American national commitment, fulfilled by the ATC. With these added aircraft, the total number of Dakotas available to the Supreme Allied Commander should have been 616.<sup>7</sup> In the event, the Americans withheld a number of those promised to SEAC, so that, by the beginning of 1945, the Eastern Air Command still only had a total of 464. Of this total, 148 were assigned specifically to the 10<sup>th</sup> USAAF for the support of NCAC, leaving only 316 in the

CCTF to support the 14<sup>th</sup> Army and all other allied, as opposed to American national, commitments.<sup>8</sup>

At that time, XV Corps, in Arakan, was preparing an attack to seize the Japanese base on Akyab island. Meanwhile, the 14<sup>th</sup> Army was poised to cross the Chindwin with IV and XXXIII Corps to link up with NCAC, which was advancing down from north Burma, to secure space for the overland link to China (see Map Two). Once across the Chindwin, the British would soon begin to encounter countryside markedly different from that in which they had been operating since May 1942. South and east of Kalewa, in the dry central belt of Burma, the ground becomes flat or undulating, as opposed to mountainous, and the jungle gives way to arid scrub or cultivated fields, mainly of rice. The existing road between Kalewa and Yeu, running largely through dry forest, was in very poor condition, with a limited capacity in fair weather only. Thereafter, in the more open country, a good road and railway led south to Rangoon. However, the Ava bridge, near Mandalay, by which both road and rail routes crossed the Irrawaddy, was still broken, having been demolished by the British in 1942. Its repair was such a formidable project that it was not to be undertaken until after the war was over, and, meanwhile, all traffic had to be ferried across the river. There was no rail ferry. South and east of the Irrawaddy was a relatively extensive network of roads of varying quality. Those roads, along with the more open nature of the countryside in the dry belt, gave promise of greater mobility for armoured and mechanised forces than had been possible in the jungle-covered hills, in which most of the fighting had taken place so far.

#### *Strategic and operational level planning for the 1945 campaign*

In order to understand how the final phase of the campaign was shaped, it is necessary to step back in time to examine the development of planning and preparation for operations in 1945 that took place during 1944, while the defensive battles of Imphal and Kohima were still being fought. As things turned out, the 14<sup>th</sup> Army's achievements in 1945 were to be a great deal more far-reaching than were planned or, indeed, considered possible in many quarters in mid-1944.

On 3 June 1944, whilst the Imphal battle still hung very much in the balance, the Combined COS had issued their second directive for operations in SEAC, in which Mountbatten was instructed, *inter alia*, 'to develop, maintain, broaden and protect the air link to China, in order to provide the maximum and timely stock of petrol and stores to China in support of Pacific operations'. Insofar as was consistent with the above, he was to 'press advantages against the enemy, by exerting maximum effort, ground and air, particularly during the current monsoon season, and, in pressing such advantages, to be prepared to exploit the development of overland communications to China'. The design and pace of all these operations were to be dictated by the forces then available, or firmly allocated, to SEAC.<sup>9</sup>

At that stage, therefore, although the actual operation of the air bridge remained an American national responsibility, the foremost strategic purpose of the whole allied campaign in Burma remained that of supporting the link to China, and operations were to be directed towards sustaining that purpose. By that time, virtually all SEAC's amphibious resources had been withdrawn to Europe. However much the British might have aspired to recapture the whole of Burma or Malaya as soon as possible, there was no intention at the allied grand strategic level to attempt that until the war in Europe was over. Nevertheless, it was clear by inference that SEAC would have to liberate a substantial area of northern and central Burma in order to secure sufficient space for a long-term link to China free of Japanese interference. It was concluded quickly that, in pursuit of this, the 14<sup>th</sup> Army, having defeated the Japanese invasion of India, should exploit the anticipated success by advancing across the Chindwin to establish a link with NCAC, which was soon to start advancing south from Myitkyina. Further operations in Arakan were to be limited to those sufficient to ensure the security of Chittagong, which was, by then, the principal port of entry to the southern line of the Assam and east Bengal L of C and the network of airfields in the vicinity of the port. Consequently, apart from completing the Imphal battle, which was then at its height, Mountbatten's supporting directive of 9 June 1944 instructed General Giffard, commanding 11 Army Group, to prepare to advance across the Chindwin in the area of Yuwa, near Sittaung. On the Arakan front, for the remainder of the monsoon, he was to maintain an active defence where the front had stabilised in the spring of 1944, and then capture Akyab by an advance starting as early as possible in the following dry season.<sup>10</sup>

In his assessment of the tasks given him, Giffard recognised the importance of pursuing the earliest possible offensive in order to deny the Japanese the opportunity to reinforce and rehabilitate following their anticipated defeat at Imphal. It was essential to prevent them from going back onto the offensive. He concluded also that the 14<sup>th</sup> Army should have objectives as far east as the Irrawaddy valley in order to establish contact with NCAC and to secure the territory required to protect the China link. Apart from the successful conclusion of the Imphal battle, the timing of the 14<sup>th</sup> Army's offensive would, however, depend upon a number of key factors. First was the availability of reliefs, and the speed with which divisions could be refurbished and made available for operations after the current battles for Imphal. Second was the availability of sufficient transport aircraft and bases for them. Third was the completion of engineer and administrative preparations, such as the building and stocking of bases, and development of the tactical L of C. Finally, all would depend upon the effects of the monsoon. Within these factors, Giffard anticipated that the main logistic problem areas were likely to be in development of the ground tactical L of C, shortages of transport and engineer resources, the availability of base and forward airfields and uncertainties over American plans for the China air bridge.

Giffard calculated that, by January 1945, the 14<sup>th</sup> Army would have available to it a total ground force of eleven divisions and two tank brigades. Of those, four divisions were required on the Arakan front if an offensive against Akyab was to be undertaken, and Giffard believed that two should remain in reserve. That left only five divisions for operations in Assam and Burma, which Giffard felt was insufficient to place an adequate force across the Chindwin whilst ensuring the security of the base at Imphal and the tactical L of C. He therefore recommended that the intended attack on Akyab be discarded, allowing the force level on the Arakan front to be reduced to three divisions, which he believed to be the bare essential for the defence of Chittagong. In addition, he was prepared to risk reducing the reserve to one division. These measures would permit him to field seven divisions on the Assam front. That number, he felt, was just sufficient for the tasks he had to fulfil there.

If such decisions on the assignment of ground forces could be made within SEAC, the provision of transport aircraft was a more complex problem for Giffard, much of it

beyond the control of the theatre command. Mountbatten had already suffered considerable difficulties with the Combined COS finding sufficient aircraft to sustain defensive operations on the Arakan and Assam fronts, and many more aircraft would be needed to maintain the forthcoming offensive. Despite their promises to provide additional aircraft, the Americans were demonstrating a tendency to blur the distinction between the allied SEAC and their own national China-Burma-India (CBI) theatre command. The latter had been established at the start of the Japanese war to conduct American operations in support of China. American forces and resources, which, on the face of it, had been assigned to SEAC, were regarded by the Americans as being there primarily to fulfil their own national interests. They remained under the ultimate control of the United States chain of command and were liable to be re-directed without warning from SEAC to CBI. This carried the constant risk of denying to the allied command, at short notice, American resources upon which the 14<sup>th</sup> Army depended, particularly transport aircraft. Consequently, it was very difficult to plan accurately with their availability being so uncertain. Giffard believed that all the 464 additional transport aircraft promised by the Americans in March 1944 would be needed by SEAC to meet the total NCAC and 14<sup>th</sup> Army maintenance requirements in north and central Burma as well as other standing commitments. Any delay or interruption in their provision, or their diversion to CBI, would jeopardise the programme of ground operations. Giffard was also concerned that the administrative preparations for, and maintenance of, operations in central Burma, particularly the construction of roads and airfields, would require transport and engineer resources beyond those already assigned to SEAC. If this proved to be the case, the allied command would need reinforcements which might not be available with the war in Europe still far from over. Moreover, Mountbatten would then be in breach of the stipulation that the scope of his operations was to be dictated by the forces currently assigned to him.

Despite these concerns, Giffard identified two possible objective areas in the Irrawaddy valley for the 14<sup>th</sup> Army's offensive (see Map Five). The first was the area of Indaw, Katha and Wuntho, which, being the northerly of the two options, was closer to NCAC's current limit of advance in July 1944, but would leave a substantial part of central Burma unsecured, thus increasing the risk of subsequent Japanese interference with the China link. The alternative was the area of Yeu and Shwebo,

further south, which would require longer advances by both NCAC and the 14<sup>th</sup> Army to effect a link-up, but which would secure a broader slice of central Burma, providing better protection to the China link. In order to ensure the security of the 14<sup>th</sup> Army's advanced base at Imphal, which was essential to the sustainment of any deep operation across the Chindwin, Giffard was convinced that the area of Kalewa and Kalemyo would have to be secured. It was there that the main approaches to Imphal from the south converged, as well as being the principal crossing for routes over the Chindwin. If holding that area was a pre-requisite, it militated strongly towards the selection of Yeu and Shwebo as the objective of the 14<sup>th</sup> Army's advance. A crossing of the Chindwin at Kalewa led naturally towards Yeu along the existing fair-weather track, which, though poor, might be developed as the ground L of C. The route down the Kabaw valley, in particular, would require much engineering work to make it passable for heavy traffic, but Giffard reckoned that a water-borne L of C could be developed on the Chindwin between Sittaung and Kalewa to take some of the strain off the Kabaw valley road. In spite of the difficulties, therefore, Giffard favoured the Yeu-Shwebo option. As things turned out, even as these early ideas were being developed, the concurrent course of events, in the pursuit by the 5<sup>th</sup> Indian and 11<sup>th</sup> East African Divisions towards Kalemyo and Kalewa during latter months of 1944, increased the attractions of this route.<sup>11</sup>

### *Operation CAPITAL – planning*

Mountbatten accepted Giffard's proposal, which became known as Operation CAPITAL, and which was to be conducted in four phases. Phase one was to be the establishment of a bridgehead over the Chindwin at Kalewa; phase two, the seizure of a forward base in the vicinity of Yeu and Shwebo; phase three, the seizure of Mandalay and Pakokku, and link up with NCAC; and phase four, further exploitation southwards if a favourable situation was created. Mountbatten also harboured residual aspirations for an amphibious assault on Rangoon (Operation DRACULA). The latter, he felt, if mounted in conjunction with CAPITAL, would hasten the collapse of Japanese resistance in Burma, thereby opening the China link without the need to sustain protracted operations across the difficult Indo-Burmese border. Moreover, it would ensure the early recapture of Burmese rice supplies and give the allies a good base from which to continue an amphibious advance into Malaya,



without further straining the resources of India. In late July 1944, Mountbatten recommended to the Combined COS that he undertake both CAPITAL and DRACULA together. His joint planning staff were more optimistic than Giffard about the extent of air transport support needed for CAPITAL as well as NCAC operations, and believed that it required only three of the promised four American combat cargo groups. The fourth, however, would be needed, along with the necessary amphibious shipping and two further divisions not yet assigned to SEAC, if DRACULA were to be mounted simultaneously with CAPITAL.<sup>12</sup>

At the same time as Mountbatten made his submission to the COS, Giffard directed the 14<sup>th</sup> Army and 3<sup>rd</sup> Tactical Air Force staffs to prepare a detailed appreciation and plan for CAPITAL. Giffard gave the 14<sup>th</sup> Army the mission of seizing the line of the Irrawaddy between Mandalay and Pakokku in order to link up with NCAC and secure the territory required for the China link. The planners were to assume that an airborne assault would be mounted to seize the Yeu-Shwebo area, with ground forces following up to open the overland L of C in order to bring in armour and heavy equipment. They were to assume also that DRACULA would be going ahead concurrently.

The enemy strength immediately in front of the 14<sup>th</sup> Army was estimated to be five divisions, albeit the three divisions of the Japanese 15<sup>th</sup> Army, at that time being pursued out of India, having suffered considerable damage from their defeat at Imphal and Kohima. Still, they could be reinforced and rehabilitated if given the opportunity, so it was important to keep them under pressure. Three further Japanese divisions were thought to be on the Arakan front, facing XV Corps, and two more south of Myitkyina, facing the NCAC advance from the north. One division was known to be in reserve near Rangoon, making a total estimated enemy ground force in the country of eleven divisions. The Japanese Air Force in Burma was thought to have 150 fighters, but that number could be increased rapidly to 300 for specific operations by re-deployment from elsewhere in the theatre. Apart from defending central Burma and going back onto the offensive in that area if the opportunity arose, the Japanese were thought to be attracted to the idea of seizing Chittagong. The denial of that port to the allies would close the principal access to the southern line of

the Assam and east Bengal L of C, including the POL pipeline terminal, as well as a number of vital airfields.

From the outset, it was clear that the ability to deploy adequate strength to overcome the Japanese threat in central Burma would be constrained by resource and logistic considerations. First, the planners confirmed that, if the DRACULA landing force was to be found from SEAC's anticipated resources, the 14<sup>th</sup> Army would not have enough troops to secure Chittagong and carry out CAPITAL concurrently. Moreover, the engineering and administrative capacity available to 11 Army Group was insufficient to fulfil the tasks that would be required in support of CAPITAL whilst, at the same time, preparing base facilities at Chittagong to support DRACULA. Hence, it was confirmed that reinforcement of engineer and logistic troops from outside SEAC would be needed, as well as additional divisions, if both operations were to go ahead simultaneously. At that time, however, it was not at all certain that India could accommodate and sustain the additional forces that would be needed.

Second, even if the overall force level issue could be resolved, there was the problem of maintaining sufficient force in central Burma. Assuming promised American and planned British reinforcements of transport aircraft, and allowing for NCAC commitments, it was estimated that about 114 Dakotas should be available to the 14<sup>th</sup> Army for CAPITAL in September 1944, rising to 234 by December and 350 from January 1945 onwards. For maintenance and stocking purposes the 14<sup>th</sup> Army would have thirty seven GPT companies, each of 100 three-ton truck equivalents for phase one, rising to forty eight companies during phase two and fifty seven in phase three. However, the capacity of the ground L of C depended upon unpredictable road conditions. Given that uncertainty and the continuing lack of guarantee surrounding the availability of aircraft, the maximum force that could be sustained in central Burma by air and road could only be estimated approximately at that stage. The most optimistic figure arrived at was five divisions and two tank brigades for the capture of Yeu and Shwebo, reducing by one division once that object had been achieved. In pure numerical terms, the ground force ratio seemed barely sufficient for further offensive operations against Mandalay and Pakokku after a fight for Yeu at the end of a tenuous air and ground L of C. The 14<sup>th</sup> Army would have substantial superiority

in armour, artillery and air power but that would only be decisive if the L of C and air transport could deliver adequate fuel, ammunition and spare parts for them. The enemy air threat could be neutralised by the allied air forces provided sufficient forward fighter bases could be built and maintained. That was to be a major commitment for the 14<sup>th</sup> Army engineers in addition to improving the L of C. With such a delicate and uncertain force balance anticipated in central Burma, it was important that aggressive operations be mounted to divert and tie down Japanese forces on other fronts. The defence of Chittagong should not, therefore, be purely passive, implying that an assault on Akyab should go ahead if possible, despite Giffard's earlier recommendations to the contrary. In addition, if it happened that DRACULA could not be mounted concurrently with CAPITAL due to resource constraints, it was important that the Japanese should at least be presented with a credible threat to the Rangoon area from whatever allied amphibious or airborne forces could be mustered.

The outline plan produced from these deliberations in early September 1944 complied broadly with Giffard's initial ideas. Phase one, the seizure of Kalemyo, Kalewa, and a bridgehead over the Chindwin, was to be achieved, if possible, through the existing pursuit of the retreating Japanese 33<sup>rd</sup> Division by XXXIII Corps, which had just started. In phase two, IV Corps, comprising two divisions and a parachute brigade, was to seize Yeu and Shwebo in a parachute and glider-borne assault, for which 462 gliders and 250 Dakotas would be required. Those numbers were within the totals expected to be available to the 14<sup>th</sup> Army. XXXIII Corps, comprising two divisions and two tank brigades, was to advance overland from Kalewa to effect a link up with IV Corps. The 17<sup>th</sup> Indian Division was to be the 14<sup>th</sup> Army reserve. In phase three, one of the tank brigades was to be transferred from XXXIII Corps to IV Corps in order to balance the two corps. Then IV Corps was to seize Monywa and Pakokku while XXXIII Corps seized Mandalay and effected the link up with NCAC. In phase four, the 14<sup>th</sup> Army would, if circumstances favoured it, cross the Irrawaddy and exploit as far south as Meiktila. At that stage, it was not thought possible to sustain the army south of Meiktila.<sup>13</sup> Slim's over-riding intention in all this was not just to seize territory but to destroy the Japanese Army in Burma as an effective fighting force.<sup>14</sup> Only by doing that, he felt, could he guarantee the security of the China link, and it had to be done sooner or later in any case if Burma was to be liberated, which

was, by then, finally beginning to be accepted as an allied strategic objective. He was convinced that if he failed to achieve a decisive victory before May 1945, he would not be able to guarantee fulfilling his mission because of the difficulties of maintaining sufficient force in central Burma during the monsoon over deteriorating ground and air L of C. He calculated that the Japanese would give battle on the Shwebo plain in order to prevent the link up between NCAC and the 14<sup>th</sup> Army, so it was there that he had to concentrate his force for phases two and three as quickly as possible.<sup>15</sup>

The 14<sup>th</sup> Army's advanced base to support ground operations was to be Imphal for phase one, the seizure of Kalemyo and Kalewa. For phase two, the capture of Yeu and Shwebo, it was to be moved forward to Indaingyi, near Kalemyo. For phases three and four, the capture of the Irrawaddy shore and any further exploitation southwards, it was to be in the area of Yeu and Shwebo. Imphal was to be the base for the air assault on Yeu and Shwebo, and subsequent air maintenance flights would operate out of Imphal as well as the existing east Bengal airfields.<sup>16</sup> Forward tactical airfields were to be built or developed as a matter of urgency at the advanced bases for phases two and three once they had been captured, so that maximum quantities of stores could be flown forward while the roads were being improved.

The daily delivery requirement through Dimapur to Imphal to support the force in Burma, the 14<sup>th</sup> Army's rear area and the advanced base at Imphal was estimated to be no higher than 2,211 tons, which was well within the forecast capacity of that part of the supply chain. The problems, however, started forward of Imphal. The capacity of the road and river L of C forward to Kalewa and Shwebo was unknown and it was anticipated that, once the 1945 monsoon started, it would reduce drastically. Indeed it might not be possible to keep the roads east of the Chindwin open at all during the monsoon, even though they were close to the dry zone. At that time also, air maintenance or supply would once again become inconsistent and unpredictable due to the adverse flying conditions. In addition to daily maintenance deliveries, therefore, a reserve of sixty days' supplies, ammunition and POL for five divisions, weighing 63,000 tons and requiring covered depot accommodation of 1,314,800 square feet, was to be stockpiled at Yeu and Shwebo to sustain operations in the event of a break in the air and ground L of C. Given anticipated transport

constraints, the reserve stockpile was only expected to reach 45,000 tons by the start of the monsoon, and it was accepted that completion would have to take place as quickly as possible by air after the rains had started.

A number of important logistic engineer tasks in support of the plan were identified. The engineers were to bridge the Chindwin at Kalewa with a class thirty pontoon bridge (that is one that would support a thirty ton load). They were to improve the road from Imphal to Kalewa and, if possible, that from Kalewa to Yeu, to all-weather, two-way standard by the start of the 1945 monsoon. At that stage, there was no way of knowing whether such improvement could be achieved along the Kalewa-Yeu stretch on time. Upgrading the Tamu-Kalewa section alone would be a formidable undertaking, particularly as there was a shortage of suitable road building stone in the Kabaw valley. They were to restore the fair-weather airfield at Tamu and construct two fair-weather fields suitable for transport aircraft in the vicinity of Kalemyo. They were to build or develop four more fair-weather and four all-weather airfields in the area of Yeu and Shwebo. Finally, they were to erect covered stores depots at Indaingyi and Shwebo. It was the extent of these tasks, which were regarded as the minimum needed to sustain the force in central Burma, that would prevent the engineers from preparing the base at Chittagong for Operation DRACULA at the same time.<sup>17</sup>

### *The postponement of DRACULA*

Giffard presented the plan to the Supreme Allied Commander on 14 September 1944. Despite the shortfall in the resources required, it reinforced the latter's belief that CAPITAL and DRACULA should be conducted simultaneously. Apart from the advantages he had already identified, Mountbatten now also believed that mounting DRACULA against Rangoon would be the best possible diversion of Japanese forces away from CAPITAL. Back in July, when he had first recommended DRACULA to the British COS, they had been instinctively drawn to the operation for the same reasons that had then attracted Mountbatten. However, they estimated that six additional divisions would be needed from outside SEAC. They were prepared to provide them after the defeat of Germany, which was, at that stage, expected in the autumn of 1944, if India could support the additional force levels. Auchinleck

undertook to find a way to do so. However, if the defeat of Germany was delayed until the end of the year or later, these extra divisions would not be available for operations in SEAC before March 1945 at the earliest. By that date, it was thought, the forthcoming monsoon would render DRACULA impossible until October of that year. Meanwhile, despite the attractions of DRACULA, the British COS recognised that it was essential for CAPITAL to go ahead as soon as possible because of the importance of the China link and the terms of SEAC's extant directive from the Combined COS. This view was shared by Mountbatten's subordinate Cs-in-C on the separate grounds of maintaining the initiative they then enjoyed over the retreating Japanese. Hence, on 17 August 1944, the British COS directed Mountbatten to proceed with the first two phases of Operation CAPITAL, up to the seizure of Yeu and Shwebo, as soon as possible, with decisions on the later phases and Operation DRACULA being dependant on the progress of the war in Europe.

On 1 September 1944, the American COS agreed to DRACULA provided there was no weakening of CAPITAL, which was, to them, of course, the over-riding priority because of its importance to the China link.<sup>18</sup> The British Chiefs accepted, therefore, that all land forces for DRACULA would have to be found from outside SEAC, and it was far from certain when those additional troops would be available. Consequently, following the Octagon conference, in September 1944, a new directive was issued to Mountbatten by the Combined COS as follows:

1. Your object is the recapture of all Burma at the earliest date. Operations to achieve this object must not, however, prejudice the security of the existing air supply route to China, including the air staging post at Myitkyina and the opening of overland communications.
2. The following are approved operations:
  - a. The stages of Operation CAPITAL necessary to the security of the air route and the attainment of overland communications with China.
  - b. Operation DRACULA. The CCOS attach the greatest importance to the vigorous prosecution of Operation CAPITAL and the execution of Operation DRACULA before the monsoon of 1945, with a target date of 15 March.
3. If DRACULA has to be postponed until after the monsoon of 1945, you will continue to exploit Operation CAPITAL as far as may be possible

without prejudice to preparations for the execution of Operation DRACULA in November 1945.<sup>19</sup>

The continued priority attached to supporting the China link was clear but, in addition, for the first time since the formation of SEAC, the recapture of Burma was stated as an allied strategic objective in south east Asia.

On 2 October 1944, as a result of receiving the 14<sup>th</sup> Army-3<sup>rd</sup> Tactical Air Force plans, Mountbatten once again urged the British COS to give him the additional resources needed for CAPITAL and DRACULA to be run concurrently. Apart from the extra ground forces, the requirement then included 826 Dakotas in addition to the total of 560 already assigned to SEAC and CBI. Shortly afterwards, however, the Americans withdrew the fourth promised combat cargo group of 100 Dakotas and it was clear that the demand for additional aircraft was quite unrealistic. Even if the numbers had been available, which they were not, the existing airfield capacity and POL supply in the theatre could not have sustained them. At the same time, the British COS decided that the additional ground forces they had considered sending from Europe and the middle east for DRACULA would have to remain where they were for the foreseeable future because of continued delays in the defeat of Germany. The forces for CAPITAL and any amphibious operations would, after all, have to be found from SEAC's existing resources, including the three American combat cargo groups that had by then arrived in theatre. Despite indications that the long-awaited arrival of SEAC's assigned Amphibious Force 'W' would finally take place at the end of 1944, therefore, DRACULA had to be postponed until after the 1945 monsoon. Preparations for CAPITAL, however, went ahead.<sup>20</sup> On 11 October, Giffard directed Slim to cross the Chindwin by mid-December 1944 in order to secure Yeu and Shwebo by mid-February 1945. Despite the widening of the strategic objective to include the recapture of Burma, the shape of the Burma campaign at the operational level was still dictated primarily by the needs of the China link and the shortage of British resources.

In the absence of Operation DRACULA to divert Japanese attention away from central Burma, aggressive action on the Arakan front assumed increased importance, not only to secure Chittagong but also to divert maximum numbers of Japanese away

from central Burma. By reducing his reserves, finding them from formations refurbishing and using them to assist in the security of the Imphal base, Giffard was able to commit four divisions to the Arakan front, while still finding the five divisions necessary for CAPITAL. Meanwhile, back in September 1944, Slim had already directed XV Corps to ensure the security of Chittagong, Cox's Bazaar and the entrance to the Naf river; conduct small scale amphibious raids; destroy any Japanese attempts to attack northwards and exploit any subsequent Japanese withdrawal.<sup>21</sup> As a result of the postponement of DRACULA, Mountbatten and Giffard then pressed for a wider offensive by XV Corps in order to seize Akyab and clear the Japanese out of north Arakan. The achievement of those objectives should enable at least one division of XV Corps to be withdrawn subsequently from Arakan, reducing the logistic liability there and increasing the forces available to CAPITAL if necessary.<sup>22</sup>

### *Reorganisations in SEAC*

At about that time, some major changes took place in personalities and organisation, which were to have significant operational and logistic implications, and it is necessary to divert from the main narrative to examine them briefly. On 12 November 1944, General Sir Oliver Leese replaced Giffard as C-in-C 11 Army Group. The functions of that formation were then subsumed by the newly formed Allied Land Forces South East Asia (ALFSEA). XV Corps, on the Arakan coast, and the L of C Command were taken out of the 14<sup>th</sup> Army's order of battle to come directly under command of ALFSEA, so that Slim could concentrate on CAPITAL and the growing pace of operations in central Burma. The 14<sup>th</sup> Army would then comprise IV and XXXIII Corps only. The 3<sup>rd</sup> Tactical Air Force was disbanded and 221 Group RAF was assigned to the direct support of the 14<sup>th</sup> Army while 224 Group was assigned to support XV Corps. Just prior to that, in October, the joint army-air force air maintenance organisation, developed as a result of the experience of operations earlier in 1944, was formally established. The CCTF, comprising a total of nine USAAF and four RAF squadrons, came directly under the Eastern Air Command of SEAC.<sup>23</sup> The army component, the CAATO, including the RAMOs, came directly under command of ALFSEA, relieving the 14<sup>th</sup> Army of the responsibility for managing army supply activities at the base airfields. The two organisations worked alongside each other, sharing an operations room. Despite their



close co-operation, however, the separate chains of command for the CAATO and CCTF, and the removal of the 14<sup>th</sup> Army and its subordinate formations from the management of their own supplies at the base airfields, were to have a detrimental effect on air maintenance once CAPITAL got under way. Air maintenance arrangements for NCAC were handled differently. The 10<sup>th</sup> USAAF, another autonomous component of Eastern Air Command, supported NCAC using the reserved 148 American Dakotas.<sup>24</sup> NCAC was represented directly in the headquarters of the 10<sup>th</sup> USAAF and communications between the front and the headquarters were better than the CAATO-CCTF arrangement. Consequently, the service that the 10<sup>th</sup> USAAF and NCAC were able to provide to their troops proved to be a good deal more effective than CAATO and the CCTF could offer to the 14<sup>th</sup> Army, but this was not to become apparent until after the operation had started.<sup>25</sup>

#### *Operation CAPITAL – the first changes*

To return to the main chain of events, plans for CAPITAL changed before the operation had even begun. By November 1944, it had already become clear that the air assault on Yeu and Shwebo for phase two was both unnecessary and impractical. The shortfall of transport aircraft after the fourth American combat cargo group was withheld had delayed the training of the 50<sup>th</sup> Parachute Brigade. It was thus most unlikely that the airborne assault could be mounted before February 1945, by which time the overland advance would already have seized Yeu if the pursuit was continued at the pace currently being achieved. Even if that did not happen, it would be very difficult to sustain an isolated airborne force with the reduced number of transport aircraft then available. There was more to be gained by carrying on with the pursuit in contact overland, denying the Japanese the opportunity to rest and refurbish, than there was by waiting for the airborne force to get ready.<sup>26</sup>

Consequently, IV Corps was ordered to discontinue plans for its airborne assault on Yeu and Shwebo. Instead it was to prepare an overland advance eastward across the Chindwin, to the north of XXXIII Corps, in order to effect the link up with NCAC, and then turn southwards to join XXXIII Corps at Shwebo for the anticipated decisive battle. XXXIII Corps' mission remained unchanged. Its leading elements captured Kalewa on 2 December and crossed the Chindwin on the night of 3-4 December, two

weeks ahead of schedule.<sup>27</sup> A class thirty floating bridge, 1,153 feet long, across the river, was completed on 10 December.<sup>28</sup>

The abandonment of the airborne assault meant that far greater numbers of troops, vehicles and material than planned would have to pass along the Imphal to Kalewa road because IV Corps, no longer flying to Yeu and Shwebo, would then be using the road as well as XXIII Corps. Giffard's earlier proposal for a water-borne L of C down the Chindwin had to be discarded when it was found impractical to build a road of sufficient capacity to feed an up-river terminus at Sittaung in the time available. The additional capacity required of the Kabaw valley road was made possible by the ground having dried out, combined with a Herculean effort by the engineers to restore and improve the existing, but derelict, fair-weather track through the valley, a task which they had already started in October 1944. Three construction groups were formed, each comprising a field company, an engineer battalion, a transport platoon and a mechanical engineer platoon. Two of these groups leap-frogged their way forward, making the track passable to motor traffic to bring forward the engineer equipment, with the third following up, improving it to class seventy standard for sustained use by logistic transport, including the tanks of two brigades on transporters. An elephant company constructed culverts along the route. In this manner, the roadhead reached Indainggyi by the end of November and Kalewa by mid-December, a total of some 160 miles from Imphal. At the same time, five fair-weather airfields, suitable for transport aircraft, were built in the Kabaw valley, three more than originally planned. All this work was completed with just ten bulldozers, six graders and three scrapers, as well as a great deal of pioneer and local labour.<sup>29</sup> This engineering achievement allowed the revised programme to go ahead on time although space on the road, and at holding areas along it, was at a premium. There was also the added risk of malaria due to greater numbers of troops spending a longer-than-planned period in the disease-prone Kabaw valley.

#### *Operation CAPITAL becomes EXTENDED CAPITAL – planning considerations*

Even as this first change in the plan for CAPITAL was being effected, it was becoming increasingly clear that, contrary to Slim's expectations that they would fight on the Shwebo plain, the Japanese were, instead, withdrawing across the Irrawaddy.

They were seen to be preparing their main defensive position on the south east bank of the river, either side of Mandalay, leaving only delaying forces west of the river. It was thought then that, by re-deployment and reinforcement, the Japanese might be able to muster up to eight divisions for the defence of the Irrawaddy, although many of them were expected to be depleted by recent action.<sup>30</sup> This change of circumstances presented Slim with a number of serious additional problems. In order to bring the Japanese to the decisive battle he needed to win before the monsoon, the 14<sup>th</sup> Army would now have to force a crossing of the Irrawaddy, which ran up to a mile wide and flowed at up to four knots on the 14<sup>th</sup> Army's front. Since the river was the best defensive obstacle in central Burma, it was likely to be fiercely contested by the Japanese, and an assault over such a barrier would usually require the attacker to enjoy a numerical superiority of at least three to one over the defender. Although Slim deployed a substantial superiority in armour, artillery and air power, he could not sustain a numerical advantage sufficient for a head-on assault to overwhelm the Japanese defence by sheer brute force in the time available to him. If he attempted that, he anticipated a protracted, attritional battle on the far side of the Irrawaddy. If they were overwhelmed on the river, the Japanese would be able to make a fighting withdrawal towards Rangoon with good L of C, while the 14<sup>th</sup> Army would be extending its own over very difficult country and across two major rivers, one of which could not be bridged. The chances of destroying the Japanese Army in Burma before the monsoon like that were remote, and Slim would not be able to sustain such a battle thereafter.<sup>31</sup> He needed a quicker way of achieving victory. He would have to deceive and out-manoeuve the enemy, finding the vulnerable points in their defence and concentrating his own forces to achieve local superiority against them in order to hasten their collapse. But that manoeuvring would have to be achieved on tenuous tactical L of C with limited transport. He would also have to move forward substantial quantities of engineer equipment to facilitate the assault crossing, adding to the strain on the L of C.

Furthermore, Slim would have to prevent the Japanese from withdrawing southwards in the face of his attack. That required him to place a substantial force at a critical point on the enemy's L of C. If this could be achieved correctly, however, it might serve the double purpose of weakening their defences by denying them replenishment and forcing them to re-deploy troops from the front in order to counter attack the

British blocking position. This was just a reversal, on a grand scale, of the tactics used so successfully by the Japanese against the British in 1942. The best place to put such a block was the area of Meiktila, which had airfields suitable for transport aircraft and which lay astride the road and rail links between Rangoon and Mandalay.<sup>32</sup> It would not be possible, with the force levels that could be sustained, to secure an overland L of C to any blocking force established at Meiktila, so, once in place, it would have to be maintained entirely by air. Meiktila lay slightly beyond the Dakota's 250-mile economic radius of action from Imphal or the nearest east Bengal airfields, and that would limit the size of the force that could be maintained by air.<sup>33</sup> Such an operation had been achieved by the 77<sup>th</sup> Brigade at 'White City' during the Special Force operations of 1944, but that had been in a remote location, where it was difficult for the Japanese to concentrate sufficient force for a successful counter attack. Meiktila was on the confluence of a number of road and rail routes, including the main Rangoon to Mandalay L of C, and the enemy would be able to counter attack in strength. Slim calculated that the minimum strength of the blocking force would have to be a division and a tank brigade, and that was also likely to be the maximum force that could be maintained by air until overland relief could be effected. It would not be possible to deliver a force of that strength by air, so it would have to fight its way in, preferably from an unexpected direction, quickly enough to seize the town before the Japanese could strengthen its defences. The infantry division would, therefore, have to be as highly mechanised as the tank brigade. That would require substantial re-equipping as well as re-training for a division currently established on light scales for fighting in the jungle.<sup>34</sup>

Even if that operation could be achieved successfully, once the 14<sup>th</sup> Army had defeated the Japanese on the Irrawaddy, it would then have to keep advancing south to reach Rangoon, 400 miles from Mandalay, by mid-May in order to maintain itself during the monsoon, which would start about that time.<sup>35</sup> In the monsoon, it would not be possible to sustain the army on the long, tenuous L of C across the un-bridged Irrawaddy from the north, and the central Burma stockpile would only last for sixty days at the most. The alternative of withdrawal would be well nigh impossible for the whole army to achieve in good order in the weather conditions, and it would leave the Japanese free to reinforce and rehabilitate their forces in southern Burma. Slim could afford to go on to Rangoon as long as he did not have to fight a protracted,

attritional battle to get there. The speed of advance that would be required in order to crush any residual enemy resistance and reach the port before the monsoon demanded mechanised and armoured forces as much as the planned dash to Meiktila.<sup>36</sup> It dictated also that the preponderance of the 14<sup>th</sup> Army's engineer effort would have to go into supporting the mobility of the fighting formations rather than maintaining the overland L of C, which had been its priority in the plans hitherto.<sup>37</sup> The idea of advancing onward to Rangoon before the 1945 monsoon was some six months ahead of the schedule anticipated in engineer planning, and a nine month lead time was required for demanding engineer stores from the United Kingdom, so the engineers were not well placed to cope.<sup>38</sup> Continued heavy reliance would have to be placed, therefore, on air maintenance of the forward formations.

The one essential overland link that had to be built and maintained in the tactical L of C was a high capacity, all-weather road from Imphal to the Chindwin at Kalewa. The existing track had already been repaired to fair-weather standard. It was, however, to be replaced by a two-way, all-weather road, capable of carrying a minimum of 350 tons per day throughout the monsoon. It was to follow a new alignment, seventy six miles long, avoiding the areas most liable to flooding, which would require 145 bridges, totalling over 8,500 feet in length, and an average of five culverts per mile. With the lack of suitable road-making stone available in the Kabaw valley, the new road was to be surfaced with PBS, the first time this had been attempted on a high capacity route. The weight of PBS required, approximately 150 tons per mile, was only about one twentieth of the weight of stone needed for an all-weather surface, but it would demand much more maintenance than a stone-built road and there was uncertainty about how well it would stand up to sustained heavy traffic. In the event, the road carried an average of 1,000 vehicles per day, with peaks of up to 2,700 - far more than the design specification - and it was found that continuous use actually improved the surface by constantly compacting it, provided that any holes in the PBS were repaired promptly.<sup>39</sup>

East of the Chindwin, however, the road to Yeu, the only practicable overland route from Kalewa to Mandalay, was not to be improved beyond one-way, fair-weather standard. Its maximum capacity, even in the dry season was estimated to be just short of 440 tons per day and it was reckoned that it would become virtually

impassable to logistic transport during the monsoon.<sup>40</sup> Improving that road to two-way, all-weather standard would take too much effort away from maintaining the speed of the advance and the traffic could be carried more efficiently by air or river transport, which could continue to run during the monsoon. Consequently, the idea of a water-borne L of C on the Chindwin was resurrected, this time with its up-river terminus at Kalewa. This route was to complement and, if necessary, by-pass the Kalewa-Yeu road by carrying freight down the Chindwin and straight across the Irrawaddy to a down-river terminus at Myingyan, on the east bank of the river. The main central Burma stockpile could then be located at Myingyan instead of Yeu, minimising the need for cross-handling of supplies between air, road and water transport. In October 1944, despite the 14<sup>th</sup> Army staff's earlier misgivings about Giffard's ideas for a water-borne L of C, a successful trial had been undertaken by 11 Army Group to deliver a powered lighter, in sections, by road from the railhead at Dimapur to Sittaung, where it was assembled.<sup>41</sup> Following that demonstration, plans were made to establish a boat-building yard at Kalewa to assemble craft made from local materials as well as those delivered from India in kit form by rail, road and even flying boat. It was estimated that, by the start of the 1945 monsoon, the new all-weather road from Imphal to Kalewa would have adequate capacity to support the yard as well as existing commitments in the plans for EXTENDED CAPITAL.

Nevertheless, it was obvious to the planners from an early stage that the Kalewa-Yeu road and the Chindwin L of C combined would not be able to carry sufficient freight to meet the 14<sup>th</sup> Army's daily maintenance requirements, as well as filling the central Burma stockpile. It was decided that daily maintenance down to corps level should be carried out as far as possible by air while the road and river routes would reserved primarily for heavy or bulky loads and deliveries to the stockpile. Even so, some of the airlift would be needed for the stockpile as well. The two corps were directed to build a tactical airstrip every fifty miles to maintain their advance.<sup>42</sup> In mid-December, the requirement for air-delivered daily maintenance supplies for the 14<sup>th</sup> Army and 221 Group, based on anticipated consumption by each division of 100 tons per day, was calculated as follows:

<b>Period</b>	<b>Tons per day</b>
16-31 Dec 44	705
1-15 Jan 45	688
16-31 Jan 45	813
1-15 Feb 45	763
16 Feb-2 Mar 45	906
3-17 Mar 45	1,190
18-31 Mar 45	1,270
1 Apr-15 May	1,205 <sup>43</sup>

In addition, 700 tons per day were required for the central Burma stockpile. In order to achieve this rate of delivery as well as supporting XV Corps and meeting a new requirement of forty aircraft for delivering civil supplies in liberated Burma, it was calculated that some 415 Dakotas would be required by 1 February, provided they could operate within the 250-mile economic radius of their base airfields. If not, further aircraft would be needed. In December, however, the thirteen squadrons of the CCTF available to support the 14<sup>th</sup> Army and XV Corps comprised a total of only 316 aircraft. It was thus nearly 100 aircraft short of the requirement.<sup>44</sup>

To add to the problems at that time, a renewed Japanese offensive in China threatened Chiang Kai Shek's principal logistic base at Kunming, which was also the Chinese terminus of the air link. Chiang demanded the urgent re-deployment of two Chinese divisions from NCAC to defend Kunming. This move not only reduced the pressure that NCAC could bring to bear on the Japanese, enabling them to re-direct effort against the 14<sup>th</sup> Army, but it also precipitated the diversion of three American combat cargo squadrons and one air commando squadron, some ninety aircraft in all, from the CCTF at almost no notice.<sup>45</sup> This move left just 226 aircraft to support CAPITAL, which was quite inadequate for the planned scale and pace of operations. To compensate in the short term, the 14<sup>th</sup> Army provided additional trucks to XXXIII Corps by delaying the movement of reinforcements. Two RAF training squadrons of twenty five aircraft each were pressed into operational service and all parachute training was stopped. The planned central Burma stockpile was reduced from sixty days to forty five days and the stocking programme was reduced in favour of daily maintenance to allow the overland pursuit to continue. Even so, Slim reckoned that the loss of the aircraft would delay the remainder of CAPITAL by two to three weeks and the aircraft remaining were not sufficient to sustain operations after February.<sup>46</sup>

Once again, emergency measures were needed to find the numbers of aircraft needed. Mountbatten sent his new Chief of Staff, Lieutenant General Browning, to convince the COS in London of the urgent requirement for more aircraft, and strong representations were made simultaneously in Washington. Consequently, the Americans undertook to return the squadrons diverted to China by 1 February. They would be available until the end of June. That ending date reinforced the urgency of opening the port of Rangoon before the monsoon.<sup>47</sup> In addition, RAF aircraft were diverted from the Mediterranean and the Far East Fleet. The establishment of the eight RAF squadrons in theatre was increased from twenty five to thirty aircraft each (though the records do not indicate where the forty additional aircraft thus found, or their crews, actually came from). By these measures the numbers of aircraft eventually made available were: 275 in January 1945, 325 in February and 415 in March. Those numbers were just sufficient to sustain the 14<sup>th</sup> Army as far as Meiktila under the current air basing arrangements.<sup>48</sup> South of Meiktila, however, the 14<sup>th</sup> Army would go beyond the 250-mile economic range of Dakotas from their existing base airfields. When that happened, the numbers of aircraft available would be unable to deliver the quantities of supplies required. New base airfields, which could be replenished at a rate sufficient to sustain the 14<sup>th</sup> Army, 221 Group and the supplying aircraft themselves, had to be found within a 250-mile radius of the route from Meiktila to Rangoon.<sup>49</sup>

#### *Operation EXTENDED CAPITAL – the new plan*

Under the revised operational plan, Operation EXTENDED CAPITAL, XXXIII Corps was to continue with its mission as already planned for phase two of CAPITAL: the seizure of Yeu, Shwebo and Monywa (see Map Six). It was then to cross the Irrawaddy north and west of Mandalay and seize the city. IV Corps was given a completely new role. Instead crossing the Chindwin and linking up with XXXIII Corps at Yeu as planned, it was to move covertly down the Kabaw and Myittha valleys on the west side of the Chindwin to seize Pakokku, some fifty miles behind the Japanese front, where it was to cross the Irrawaddy. It was then to send a mechanised division with the 255<sup>th</sup> Tank Brigade forward to seize and hold Meiktila until the Japanese Irrawaddy front was broken and relief could be effected.<sup>50</sup>



The 17<sup>th</sup> Division was re-assigned from 14<sup>th</sup> Army reserve to IV Corps and was given the task of seizing Meiktila after the corps had established a bridgehead on the east bank of the Irrawaddy. For this mission, the organisation and equipment of the 17<sup>th</sup> Division had to be changed radically from those it had used in the jungle. All available cross-country troop and cargo-carrying vehicles were given to the division. With these, two of its brigades were mechanised to enable them to cross the seventy miles of the arid dry belt from the Irrawaddy to Meiktila, in company with the tanks, as quickly as possible. However, there were insufficient such vehicles to mechanise all three brigades of the division, so the third brigade was organised for air portability and plans were made to fly it forward from Imphal as soon as a suitable airfield near Meiktila had been captured.<sup>51</sup>

The problem of the 250-mile economic operating limit of transport aircraft, which constrained plans to maintain forces at Meiktila and beyond by air, was to be resolved by seizing the island of Akyab, and developing the airfield there to mount air maintenance operations to sustain the 14<sup>th</sup> Army. Although beyond the reach of the east Bengal operational L of C, Akyab airfield and the aircraft operating from it could be replenished by sea directly from India through the small port on the island. The port would require clearing and improvement, but was sufficiently sheltered to be usable during the monsoon.<sup>52</sup> The 250-mile radius from Akyab encompassed Mandalay, Meiktila and Toungoo, but did not reach all the way to Rangoon.<sup>53</sup> Although this was a cause for some concern there was, at the time, little that could be done about it, and the risk was accepted, given that most of the route would be covered. Consequently, Lieutenant General Christison, commanding XV Corps, was directed to engage as many Japanese forces as possible on the Arakan coast in order to prevent their reinforcing the Irrawaddy front, and to seize and develop the airfield at Akyab in order to support the 14<sup>th</sup> Army.<sup>54</sup> If he achieved those objectives, his existing primary mission of ensuring the security of Chittagong would be fulfilled in any case. Thus, the operations of XV Corps on the Arakan coast were to be instrumental to the success of the 14<sup>th</sup> Army's advance in central Burma, and sustaining the main effort on the 14<sup>th</sup> Army front would become the central driving purpose of an army group level manoeuvre involving the close co-operation of all three services. Since XV Corps' operations in Arakan had to proceed in order to set

the conditions for the 14<sup>th</sup> Army's crossing of the Irrawaddy and onward advance to Rangoon, we will examine the Arakan first.

### *XV Corps' Arakan campaign 1945*

Christison had four divisions, the 50<sup>th</sup> Tank Brigade and the 3<sup>rd</sup> Commando Brigade at his disposal in XV Corps by December 1944. Intimate naval support was provided by Force 64, comprising the Arakan Coastal Forces of inshore gunboats and the ninety-odd minor landing craft, too decrepit to have been sent to the Mediterranean in 1943. These forces had been working closely alongside XV Corps throughout the previous campaigning season together with the corps' own substantial IWT Group, providing waterborne tactical and logistic support along the coast and rivers. In addition, Amphibious Force 'W', which arrived at last from the Mediterranean at the end of 1944 with some eighty two landing ships and heavier landing craft, was to support an amphibious assault on Akyab. Christison formed a joint service headquarters to command the forthcoming operations, with Rear Admiral Martin, commanding Force 'W' as the Naval Commander, and Air Vice Marshal The Earl of Brandon, commanding 224 Group, as the Air Commander.<sup>55</sup>

The first phase of the advance was to be the overland seizure of Foul Point, at the southern tip of the Mayu peninsular, during January 1945. Once that had been achieved, the 26<sup>th</sup> Indian Division was to make an amphibious assault on Akyab, landed by Force 'W' on 20 January (see Map Four).<sup>56</sup> ALFSEA L of C Command would then take control of Akyab and develop the new base to support the 14<sup>th</sup> Army while XV Corps carried on with the clearance of north Arakan, sustained by the amphibious craft and its own IWT.<sup>57</sup> The corps' advance started on 14 December 1944, just as the main breakout of XXXIII Corps was starting from the bridgehead east of the Chindwin at Kalewa, and it proceeded a good deal quicker than anticipated. The Mayu peninsular was cleared by 27 December, well before Force 'W' and the 26<sup>th</sup> Division were ready to make the landing on Akyab. In order to maintain the momentum of the advance, it was decided mount the assault early, directly across the mouth of the Kalapanzin River, using the 25<sup>th</sup> Indian Division with the commandos, the landing craft of Force 64 and the corps IWT, who were already occupying the south end of the Mayu peninsular. Heavy artillery, naval gunfire and

air bombardment were to support the landing. In the event, however, on 2 January, an airborne artillery observer, flying over Akyab, noticed that the island had been evacuated. Consequently, the landing went ahead unopposed and without the planned bombardment, thus avoiding substantial damage to the limited facilities on the island and easing its subsequent development as a base in time to sustain the 14<sup>th</sup> Army's advance.<sup>58</sup>

The relative ease with which these operations proceeded released Force W and the 26<sup>th</sup> Division from their planned task at Akyab and thus made them available to seize Ramree Island, some seventy miles south of Akyab, as well (see Map Six). With a second airfield there, it would be possible for transport aircraft to reach all the way to Rangoon within their 250-mile economic radius, thus filling in the gap in air maintenance cover between Toungoo and Rangoon.<sup>59</sup> While the remainder of XV Corps continued with amphibious operations to clear the north Arakan coast, a landing was made at Kyaukpyu, at the north end of Ramree Island on 21 January 1945, one day later than the original planned assault on Akyab. This operation was opposed and further hard fighting was needed before the whole island was finally cleared on 17 February, but work started straight away to develop the small port and airfield at Kyaukpyu while the rest of the island was being cleared.<sup>60</sup> With Ramree island secured, XV Corps continued operations along the coast to tie down the maximum number of Japanese and prevent their reinforcing the Irrawaddy front. All this activity was sustained by sea and IWT.

Meanwhile, back at Akyab, a major supply and engineer effort was committed to developing the port and airfield. Despite the lack of damage caused to the island's facilities during the landing, the effects of earlier air attacks had to be overcome and the speed of the island's capture had outrun planned logistic arrangements. The first replenishment ships did not arrive until 15 January, twelve days after the assault. Even then, a number of wrecks in the harbour, sunk by previous air raids, dictated that ships had to be offloaded by lighters and port operating craft, which had to be brought down from Chittagong. In addition, all the cranes, pontoons and mechanical handling equipment required had to be imported. A certain amount of unskilled local labour was available, but a specialist army docks operating group had to be provided. It was planned that, by the end of February, the port would be importing 800 tons per

day to develop and stock the airfield as well as sustaining a substantial element of XV Corps. That flow was expected to fall to 600 tons per day in mid April, due to worsening sea conditions with the approach of the monsoon, and 350 tons per day after the monsoon started in May.<sup>61</sup> Despite the difficulties, progress was better than anticipated. Sixty Dakotas were able to start flying supply missions from Akyab on 20 March, with a further sixty on 1 April, by which time, Akyab port and airfield were actually handling 1,200 tons per day. Similar work took place at Kyaukpyu, on Ramree Island, where ninety Dakotas started flying on 16 April, and Kyaukpyu also was handling 1,200 tons per day by that time.<sup>62</sup> Thus the 14<sup>th</sup> Army's entire route to Rangoon was covered by air maintenance within the 250-mile economic radius from base airfields before the onset of the monsoon and in step with its advance.

*Operation EXTENDED CAPITAL – XXXIII Corps' crossing of the Irrawaddy*

At the same time as the supporting Arakan operations were getting under way in mid-December 1944, XXXIII Corps began its advance from the Chindwin to the Irrawaddy. The advance followed three axes (see Map Six). The 20<sup>th</sup> Indian Division followed the line of the Chindwin downstream to its junction with the Irrawaddy, which it reached by the beginning of February after some hard fighting on the way. The 2<sup>nd</sup> British Division was given the task of opening the main L of C: the road from Kalewa to Yeu and on towards Mandalay. The first few miles of the road, between Kalewa and Shwegyin, on the east bank of the Chindwin, were found to be impassable, so a ferry service, using forty DUKWs and rafts, had to be established along the river to Shwegyin to enable the advance to progress while the road was being repaired.<sup>63</sup> The 2<sup>nd</sup> Division reached Yeu against relatively light opposition by 2 January 1945. At Yeu, better roads were encountered and, after overcoming enemy resistance at Shwebo, the division advanced to the Irrawaddy some fifteen miles west of Mandalay by the beginning of February. The 19<sup>th</sup> Indian Division followed small tracks across country on the northern flank of the corps, reaching the Irrawaddy, some forty miles north of Mandalay, on 11 January. Encountering no immediate opposition on the far bank, it seized the opportunity and crossed the river in local craft and on improvised rafts. Thereafter, the 19<sup>th</sup> Division had a very hard battle to hold onto its bridgehead while the other divisions crossed the river. By the end of January 1945, therefore, XXXIII Corps had occupied the north western bank of the Irrawaddy

for some forty miles either side of Mandalay and the 19<sup>th</sup> Division was already across the river north of the city.<sup>64</sup>

To support the advance, XXXIII Corps established a forward maintenance area (FMA), which was stocked mainly by air and sited just east of the Chindwin, on the track to Yeu.<sup>65</sup> The FMA was a new concept in Burma: a single integrated organisation comprising the previously separate forward supply, ordnance, ammunition and POL depots, which had been established to support corps and L of C troops in 1942. The mobile nature of recent and anticipated operations rendered the existing concept of the divisional tactical administrative base less satisfactory than it had been during the static operations of 1942 and 1943. Divisions on the move did not want to be encumbered with unnecessary stocks. Consequently, the role of providing the more static tactical administrative base, in which all the principal logistic functions were concentrated, integrated and protected, was assumed as much as possible by corps in the FMA, which did not need to be as mobile as the divisions. Divisions still had administrative areas, but they were kept as small and mobile as possible.<sup>66</sup> Replenishment of divisions was normally conducted by road from the FMA, but direct air supply was available to them, by-passing the FMA, if required.

By late January 1945, serious problems were being encountered with air maintenance of XXXIII Corps. Apart from the shortfall in the planned number of transport aircraft, other administrative and organisational difficulties were emerging. Responsibilities in the new CAATO-CCTF organisation for sending supplies forward were divided, with no one person in overall charge at the appropriate level. The 14<sup>th</sup> Army had the responsibility of keeping its subordinate corps maintained, but the CAATO and RAMOs, which despatched the supplies direct to the corps, were run by ALFSEA, while the aircraft, which delivered them, were commanded by Eastern Air Command. Whilst co-operation between the various component parts of the joint organisation was close, actual unified responsibility was not vested in one individual below the level of the Supreme Commander, and that, of course, was far too high. With the RAMOs removed from 14<sup>th</sup> Army to ALFSEA level of command, moreover, formations and units from army level downwards lacked having their own people in the base organisation and the airfields supporting them to ensure that despatches actually met the requirements of the client units at the front. Such direct

representation of the receiving formation at the despatching airfield had been instrumental to the successful air maintenance of the 81<sup>st</sup> West African Division, the Special Force and the 5<sup>th</sup> Indian Division earlier in 1944. Those formations that had not enjoyed that close relationship or been properly organised for air maintenance had not fared so well. Operation STAMINA, the sustainment of Imphal during the siege, had worked as satisfactorily as could be expected under the circumstances, with 14<sup>th</sup> Army staff looking after the interests of IV Corps, who were in relatively static defence. However, the new CAATO-CCTF organisation was far more stretched supporting XXXIII Corps in a rapid advance at longer ranges. Replenishment of the base airfields failed to match demands from the front in either quantity or the correct mix of commodities. Deliveries were often incomplete and/or sent to the wrong forward airfield or dropping zone. Loads were frequently unbalanced, with petrol arriving without the appropriate matching quantity of oil, for example, or meat without vegetables. Pressures on the available aircraft were such that if one day's supply mission was lost or aborted, it could not be made up on subsequent days, so units went increasingly short of supplies. As things got progressively worse, formations and units regularly over-bid for supplies in an attempt to compensate for missed deliveries, so plans for the supply chain became further distorted and vital supplies were not delivered to where they were most needed. It was also found that the allowance of 100 tons of combat supplies per day for a division was inadequate, and XXXIII Corps calculated that 130 tons were required. This was borne out by the 14<sup>th</sup> Army's operational research report on maintenance of field formations.<sup>67</sup>

The CAATO and RAMOs were clearly overloaded and unable to despatch supplies from base airfields in a timely or orderly manner. RAMOs were not dedicated to support specific formations and personal interest in making sure despatches were correct was lacking. The CAATO-CCTF air supply organisation did not compare well with the American system used in 10<sup>th</sup> Air Force and NCAC, and urgent improvements were needed to cope with later phases of the operation, when ranges would be more extended and successful air maintenance even more critical than hitherto. Mountbatten, who saw the problem at first hand on a visit to Shwebo, commissioned an Air Ground Supply Committee to conduct a review of the CAATO-CCTF procedures.<sup>68</sup> In the event, however, the 14<sup>th</sup> Army was to have reached Rangoon before that committee produced its report. In the meantime, the CAATO

organisation was strengthened to cope with the workload, and RAMOs and FAMOs were allocated to specific formations in an attempt to improve the quality of their service.<sup>69</sup> These interim measures worked adequately to sustain the rest of the advance.

On top of these difficulties with air maintenance, the administrative 'tail' of XXXIII Corps was, by this time, strung out over 300 miles from Imphal to Shwebo. Due to congestion and the state of the roads, the turnaround time for supply vehicles in dry weather was up to eight days and double that in wet.<sup>70</sup> Lacking sufficient vehicle or air transport capacity, the corps 'tail' was unable to move forward quickly enough to fulfil its logistic functions properly. On 18 January, XXXIII Corps reported that the 2<sup>nd</sup> Division had arrived at Yeu out of fuel and on half rations, and the 19<sup>th</sup> Division, across the Irrawaddy north of Mandalay, was very stretched out, with no second line ammunition and short of POL. Nearly a quarter of the corps' 400 supply vehicles were unserviceable due to the lack of replacement engines being delivered, and many of those that did work were employed on unplanned duties in support of the air force at the forward airfields rather than maintaining the subordinate formations and units of the corps. Only the 20<sup>th</sup> Division, able to use IWT on the Chindwin in addition to air and overland maintenance, was in reasonable order, but it, too, was stretched out with unbalanced rations.<sup>71</sup> The corps had achieved a good opening advance against relatively light opposition, but was in poor shape to withstand a Japanese counter attack, which was anticipated, or to mount the forthcoming assault crossing of the Irrawaddy. The situation caused XXXIII Corps to have to pause for a further two weeks on the west bank of the Irrawaddy, while the supply situation was corrected and engineer equipment moved forward, before it could cross the river. The accumulated delay in the planned schedule for the advance due to logistic problems by then, therefore, was four to five weeks. The latter two week delay gave the corps time to reconnoitre the crossing sites carefully and to carry out some training for the assault, so it was not entirely wasted. It also gave the Japanese time, however, to work out where XXXIII Corps was planning to cross and to prepare their defences accordingly. Most importantly, it ate into the time left available to reach Rangoon.

On 12 February 1945, the 20<sup>th</sup> Division, on the right flank of XXXIII Corps, started to cross the Irrawaddy at Myinmu, some thirty miles west of Mandalay. The division

was complete across the river by 22 February and the 2<sup>nd</sup> Division started its crossing at Ngazun, fifteen miles west of the city, two days after that. There was a severe shortage of engineer equipment for the crossings. Many assault boats were found to be unserviceable after the long journey forward on the rough roads. DUKWs were too scarce and valuable to risk in the assault and many of the rafts needed for heavy equipment had to be improvised from the recovery of sunken Japanese pontoons and local barges.<sup>72</sup> There was no diving equipment available for the salvage of these craft so the engineers improvised a device, using a gas mask with a pipe, attached to the mask by adhesive insulating tape, leading to a workshop air compressor on the surface. So successful was this expedient arrangement that it was taken into routine use in the theatre and its preparation was taught in a subsequent army training manual.<sup>73</sup> It was the shortage of assault craft, however, that prevented the two divisional crossings from being made simultaneously. Consequently, the 20<sup>th</sup> Division, isolated on the east bank for twelve days, was subject to very heavy counter attack by the Japanese and yet more delay was imposed on the advance, eating further into the time left to get to Rangoon before the monsoon broke. However, by early March, both the 2<sup>nd</sup> and 20<sup>th</sup> Divisions were complete across the river and had set off eastwards to cut off Mandalay from the south while the 19<sup>th</sup> Division attacked the city from the north. Mandalay fell on 21 March. During this phase, with no usable airfield available to XXXIII Corps east of the Irrawaddy, and the river too fast and wide to be bridged, the whole corps was supplied by parachute or by stores ferried across the river.<sup>74</sup>

#### *Operation EXTENDED CAPITAL – IV Corps' capture and defence of Meiktila*

While XXXIII Corps was approaching the Irrawaddy across the Shwebo plain, IV Corps advanced down the west side of the Chindwin to cross the Irrawaddy between Pakokku and Nyaungu (see Map Six).<sup>75</sup> The corps, concentrated at Imphal in readiness for its original role in Operation CAPITAL, was not well placed to make the change to its new task at short notice and had nearly 400 miles to travel, the latter half of the journey on a particularly bad road, just to get to the crossing site. The engineers moved forward first, starting on 19 December 1944, in order to improve the Myittha valley road, between Kalemmyo and Pakokku, sufficiently for the corps to pass. In order to concentrate engineer resources at the front, no effort was to be put



into maintaining the road for further use thereafter.<sup>76</sup> While the main body of the corps advanced towards Pakokku, the 17<sup>th</sup> Division stayed back at Imphal to reorganise itself into the mixed mechanised and airportable roles of its brigades for its forthcoming dash to Meiktila. The two mechanised brigades then moved forward in early February 1945, leaving the third brigade at Imphal, to be flown forward when a suitable airfield on the road to Meiktila had been captured.

Even with improvement, the 230-mile Myittha valley road from Kalemmyo to Pakokku was barely able to sustain the passage of the corps. It was narrow, hilly and mostly unmetalled with a number of weak bridges. Along one twenty-mile stretch of the road, tanks had to be unloaded on no less than seventeen occasions in order to tow the transporters that were meant to be carrying them. The road was not able to carry the traffic needed to sustain the corps so, although an initial FMA was established just south of the 14<sup>th</sup> Army's advanced base at Indaingyi, all maintenance forward of that place was carried out by air direct to subordinate formations, with ground transport used for local distribution only. In order to minimise the use of vehicles, troops and mules marched on foot. As the advance continued, airfield engineers built fair-weather airfields for transport aircraft at Kan, Tilin and Sinthe, the latter some thirty miles short of Pakokku, and the corps' FMA was moved forward alongside them in stages. Engineer equipment for crossing the Irrawaddy was flown into Sinthe. In the longer term, the Chindwin water-borne L of C was to be used increasingly as its capacity was developed.<sup>77</sup>

On 13 February 1945, the day after the XXXIII Corps' crossing of the Irrawaddy at Myinmu, IV Corps started to cross the river between Pakokku and Nyaungu. By that time, the two mechanised brigades of the 17<sup>th</sup> Division had moved forward from Imphal and concentrated at Sinthe, ready to cross as soon as a bridgehead had been secured. Once again, the crossing was held up and complicated by the shortage and decrepitude of engineer equipment as well as its late arrival, which prevented training.<sup>78</sup> Consequently, the initial assault very nearly failed, but the Japanese had been taken by surprise and their inability to counter attack in time permitted IV Corps to establish its bridgehead on the east bank. On 22 February, the two mechanised brigades of the 17<sup>th</sup> Division, along with the 255<sup>th</sup> Tank Brigade, broke out of the Nyaungu bridgehead and set off for Meiktila, supplied entirely by air. Four days

later, Thabukton airfield, some ten miles north west of Meiktila, was captured and the division's third brigade was flown in while the airfield was still under fire.<sup>79</sup> Meiktila fell on 7 March, but the 17<sup>th</sup> Division was then surrounded, besieged and subjected to fierce counter attacks for a further three weeks until the Japanese Irrawaddy front finally collapsed on 28 March. Throughout this period, the 17<sup>th</sup> Division continued to be maintained directly by air through Meiktila airfield, which was still being fought over for much of the battle. On a couple of occasions, the Japanese wrested control of part of the airfield and supply flights had to be withheld until the enemy could be ejected. It was not until 20 March, that transport aircraft started operating from Akyab, just in time to sustain the onward advance towards Rangoon.<sup>80</sup>

*The Chindwin water-borne line of communication*

Meanwhile, as soon as the two corps of the 14<sup>th</sup> Army had begun their southward and eastward advances from Kalewa, work started on developing the Chindwin L of C. The initial target for the river route was to move 500 tons per day from Kalewa to Myingyan by 1 May, increasing to over 700 tons per day by the end of that month and thereafter. On 2 January 1945, the boat-building yard at Kalewa started producing the following craft:

Craft name	Type/capacity	Planned number	In service Mar 45	In service Jul 45
RCL	Powered kit lighter/15 tons	50	8	45
Higgins Barge	Kit barge/70 tons	50	13	97
Unicraft Barge	Kit barge/35 tons	150	25	129
Burley Boat	Powered kit boat/3 tons	50	48	48
EA Boat	Locally built pontoon/10 tons	480	129	110
GP Launch	Motor boat/tug	50	25	57
Unicraft Tug	Kit tug	100	18	95 <sup>81</sup>

Myingyan was chosen as the down-river terminus because it was an existing river port on the east side of the Irrawaddy, providing direct access to the rail and road networks

of southern Burma, which, even if damaged, were of reasonably good quality and could probably be rehabilitated quickly for all-weather use.<sup>82</sup> Even though it was intended that Rangoon should be captured before the monsoon, a back-up was needed. It was anticipated also that a good deal of the maintenance of troops remaining in the vicinity of Mandalay, Meiktila and along the Irrawaddy as far south as Prome would need to take place through Myingyan. The town was captured by IV Corps on 22 March after a prolonged fight, which took place concurrently with the siege of Meiktila. That delayed the opening of the port. It started working, however, on 26 March, just as the final advance from Meiktila to Rangoon was about to begin.

It was intended that the railways south and east of Myingyan would achieve a capacity of 500 tons per day by the end of May. To make use of the system, six five-ton locomotives were flown into the new base by American heavy-lift aircraft. In addition, 200 freight wagons, along with three seventy-ton and two six-ton locomotives were brought overland and by river from Dimapur via Kalewa and the Chindwin L of C.<sup>83</sup> On the railway from Myitkyina, north of the Ava bridge, the 36<sup>th</sup> Division was already using a number of jeeps converted into improvised locomotives by having rail wheels fitted to their axles.<sup>84</sup> Each such jeep could tow three freight wagons, and this expedient was to be added to the locomotive capacity on the southern railways. Use of the railways, however, depended upon the whole area between Myingyan, Mandalay and Thazi being cleared of Japanese, which was taking longer than expected.

#### *Operation EXTENDED CAPITAL - the advance to Rangoon*

With the Chindwin water-borne L of C already starting to run by the beginning of March and the Arakan airfields due to be operating by the end of the month, the ALFSEA staff re-calculated the logistic position in preparation for the final advance to Rangoon. For this last phase, the overall daily maintenance and stocking requirement, and the total movement capacity in tons per day, including air, overland and river, were estimated to be as follows:

Period	Requirement (tons)	Capacity (tons)
20-31 Mar 45	2,035	1,922
1-15 Apr 45	2,170	2,228
16-31 Apr 45	2,200	2,218
1-15 May 45	2,265	2,461

In spite of the increasing flow of supplies that the Chindwin service provided, however, the delay in opening the port of Myingyan and clearing the L of C area dictated that the daily maintenance of the 14<sup>th</sup> Army would have to go on being conducted almost entirely by air if the required speed of advance was to be achieved. The overland and river transport would continue to be reserved mainly for heavy or bulky items and building up the stockpile. With the aircraft available, the daily capacity of the CCTF to maintain the advance was calculated to be 1,710 tons. That was estimated to be sufficient for five divisions and two tank brigades, along with army troops, labour and air force requirements, as well as a small share of the stocking programme. With the 36<sup>th</sup> British Division having just joined the 14<sup>th</sup> Army from NCAC after the link up, two of the divisions currently on the 14<sup>th</sup> Army's strength would have to be withdrawn to India in order to keep the size of the army within the sustainable maximum.<sup>85</sup>

By these measures, the advance was sustainable in theory, but the calculations on which the judgement was made were uncertain at best. They could be upset by a host of influences including weather, accident, equipment failure, human incompetence and, of course, the enemy. Another potential logistic crisis was in the making and there was almost no reserve in the event of anything going wrong. The pace of operations was suddenly a great deal faster than had been anticipated in strategic planning for the development of the India base, which was, by then, having to cope with concurrent preparations for the planned invasion of Malaya (Operation ZIPPER), as well as operations in Burma. Demands for transport were outstripping availability. New support commitments were being taken on before existing ones had been fulfilled. Once again, the principal daily maintenance load for the 14<sup>th</sup> Army had been shifted from the northern line to the southern line when IV and XXXIII Corps went on to air maintenance in December 1944. That had resulted in the need to relocate large quantities of supplies stockpiled on the Assam L of C. Planned freight handling targets were being exceeded almost everywhere and there was little capacity

for any further increase. Supplies and resources earmarked for subsequent planned operations in the Andaman Islands and the eventual invasion of Malaya, were being used up in support of EXTENDED CAPITAL. India was described as 'a bare cupboard'.<sup>86</sup>

Against this background, the 14<sup>th</sup> Army made its own detailed plans. The Japanese Army in Burma had suffered a series of decisive defeats, but it had still not been destroyed, as Slim needed. Substantial elements of the Japanese 28<sup>th</sup> Army remained in the Arakan hills, west of the Irrawaddy. The remnants of the Japanese 15<sup>th</sup> Army, which faced the 14<sup>th</sup> Army, were withdrawing down the Irrawaddy and Sittang valleys towards Rangoon, and those of their 33<sup>rd</sup> Army, which had been facing NCAC, were dispersed in the hills of the Shan States east of the Sittang river. There remained the danger that they could re-group to prevent the 14<sup>th</sup> Army reaching Rangoon before the monsoon or counter attack the army's rear areas when the lead elements had passed through. The 14<sup>th</sup> Army planners, therefore, had two imperatives: first, to reach Rangoon before the monsoon, and second, to inflict final destruction on the Japanese Army in Burma.

Three alternative courses of action were considered. The first was to advance to Rangoon with the Irrawaddy valley as the main axis. Administratively, this was the easiest option. The roads were reasonable, the Irrawaddy could be used for heavy cargo and the route was the closest of the three to the new base airfields at Akyab and Ramree, facilitating air maintenance for the forward formations. However, without concurrent operations to the east, which would dissipate the 14<sup>th</sup> Army's forces and their logistic support, following this route would forego the chance to trap and destroy the Japanese in the Sittang valley and the Shan States. The second course was to advance with the main axis in the Sittang valley. This route enjoyed both the best road and the railway available, provided they had not been too badly damaged by allied air attacks and the withdrawing Japanese. It offered a reasonable chance to trap both the 15<sup>th</sup> and 28<sup>th</sup> Japanese Armies west of the Sittang river. It was, however, close to the limit of economic air maintenance from the Arakan airfields and was well beyond the range of the east Bengal and Assam fields. The third course, which could only be adopted in conjunction with one of the other two if there was to be any chance of reaching Rangoon before the monsoon, was to advance into the

Shan States, east of the Sittang. Only by this means could the total destruction of the whole Japanese Army in Burma be guaranteed, and, for this reason, Slim was attracted to it. However, it meant going well beyond the economic range of both the Arakan and Assam airfields. Fighting in the hills and jungle might result in too much effort being drawn away from the main effort of reaching Rangoon. Moreover, air supply would be required down to a low level, probably to individual units, and that would require the establishment of at least one further forward air base in the vicinity of Meiktila or Mandalay, which would, itself, need stocking, adding further to the overall supply problem.

However desirable it might have been to take the third course, there was just not enough capacity in the logistic or engineer organisations to sustain it.<sup>87</sup> Hence, the second course of action was adopted, with the main effort going to the Sittang valley axis. IV Corps was to follow that route. Meanwhile, XXXIII Corps was to advance as far as possible down the Irrawaddy valley. It was accepted that, with priority for operational and logistic effort going to IV Corps, XXXIII Corps was unlikely to make it all the way to Rangoon before the monsoon, but its parallel advance would draw opposition away from IV Corps and would help to contain the Japanese 28<sup>th</sup> Army in the Arakan hills. If necessary, XXXIII Corps could be maintained partly by IWT on the Irrawaddy and, once Rangoon was opened, by rail from there through Prome. IV Corps was joined by the 5<sup>th</sup> Indian Division, which had refitted as a mechanised-cum-airportable division in the same manner as the 17<sup>th</sup> Division. Together, these two divisions, organised as they were, would be best suited for the rapid advance that was needed to reach Rangoon in time.<sup>88</sup> Although that advance was to be maintained by air all the way, there would be local administrative rear areas between the forward airfields in use at any time and the formations at the front. In order to protect those areas, the non-mechanised 19<sup>th</sup> Division also joined IV Corps, making it up to three divisions and the 255<sup>th</sup> Tank Brigade. XXXIII Corps comprised the 7<sup>th</sup> and 20<sup>th</sup> Divisions and the 254<sup>th</sup> Tank Brigade.<sup>89</sup> Being the most expensive to maintain logistically, and running short of reinforcements, the two British Divisions, the 2<sup>nd</sup> and 36<sup>th</sup>, were withdrawn to India in order to bring the 14<sup>th</sup> Army down to a sustainable size.

Whilst these preparations were being made and the battles for Mandalay and Meiktila were still in progress, it became clear to the 14<sup>th</sup> Army that, due to the slower-than-planned progress of operations there was an increasing risk of its failing to reach Rangoon before the monsoon. Slim, therefore, had to request that a reduced version of Operation DRACULA, to seize the immediate area of the port, be prepared in case the 14<sup>th</sup> Army failed to get there in time, and this was agreed on 2 April. By that stage, operations were beginning to draw to a close on the Arakan front, and XV Corps was being reduced in strength in order to minimise the logistic liability there. Two of its four divisions were already in the process of withdrawing to India. The 26<sup>th</sup> Division, by then well experienced in amphibious operations after its assault and the subsequent fighting on Ramree island, was assigned to the reduced Operation DRACULA with Amphibious Force 'W'.<sup>90</sup>

At the beginning of April, IV Corps started to advance from Meiktila with six weeks at the most to reach Rangoon before the monsoon. With attached army troops, air force personnel and labour, it comprised then some 70,000 men, 250 tracked and 8,000 wheeled vehicles to be maintained entirely by air.<sup>91</sup> After a further battle, the town of Pyawbwe, twenty five miles from Meiktila on the Rangoon road, was captured on 10 April, nine days behind schedule. Thereafter, the advance became a fast-moving, running fight, in which the retreating Japanese and pursuing IV Corps soon became closely intermingled. For most of it, the Japanese were unable to put up any effective organised resistance or to carry out serious demolitions on the road. On 29 April, however, the leading elements of the corps encountered stiff resistance at Pegu, some fifty miles from Rangoon. On 2 May, the Japanese had just about been cleared out of the town when the monsoon broke, two weeks early, bringing the advance to a halt amid mud and rapidly rising rivers. On that day, however, the 26<sup>th</sup> Division of XV Corps was landed at the mouth of the Rangoon river by Force 'W'. As it happened, the city had already been abandoned by the Japanese, and it was seized on 3 May. The following day, the 14<sup>th</sup> Army and the 26<sup>th</sup> Division met at Hlegu, thirty miles north of Rangoon.<sup>92</sup>

During this final advance from Meiktila, the CCTF had delivered an average of 1,845 tons of supplies per day to the 14<sup>th</sup> Army, over 130 tons per day more than its estimated maximum capacity.<sup>93</sup> In order to achieve this, aircraft were routinely

overloaded and their flying hours permitted between servicing exceeded. Over fifty tactical airfields were built along the route from Imphal to Rangoon. Nevertheless, the margin between daily consumption and the maximum possible delivery was very small. Forward tactical airfields were of fair-weather standard only and, as the monsoon approached, were subject to frequent closure due to early rains. Reserves could not be built up and any aborted deliveries could not be made good on subsequent days because the CCTF was working beyond its planned full capacity. Despite these difficulties, the advance was never delayed for logistic reasons and there were always adequate ammunition and warlike stores available for battle. Something had to give, however, and, by the time Rangoon docks were opened, IV Corps had been living on half rations for thirty four days.<sup>94</sup>

With Rangoon captured, and the Japanese Army in Burma dispersed and rendered ineffective, if not completely destroyed, the link to China was secure. Burmese rice and oil supplies became available to relieve the strain on the Indian economy and logistic effort could be focused on the invasion of Malaya after the monsoon. By achieving that, the 14<sup>th</sup> Army had gone way beyond what was expected of it in original allied plans for the re-invasion of Burma, and the outcome was mainly the result of logistic necessity, rather than intention. Indeed, logistics had been the predominant factor in the shaping of this whole phase of the campaign. The capacity of the tactical L of C and airlift available determined the force level that could be sustained in Burma. Consequently, when the Japanese withdrew over the Irrawaddy, the limited strength of the 14<sup>th</sup> Army dictated that its crossing had to be achieved by a bold but high-risk outflanking manoeuvre instead of a head-on assault. Once the enemy had been defeated on the east bank of the river, logistics demanded that the advance be continued on to Rangoon, and sustaining that advance was the foremost *raison d'être* for the prolonged amphibious campaign on the Arakan coast. If the operations were shaped very largely by logistic considerations, they also stretched the logistic services to the limit and beyond, but those services matched, in every respect, the determination, skill and effort of the fighting troops they supported.



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Notes:

<sup>1</sup> The India Base, p. 5.

<sup>2</sup> TNA WO 203/2669, Auchinleck Despatch Jul – Dec 44, p. 3.

<sup>3</sup> LHCMA, Lindsell papers 3/9, Arminia telegram No 41/COS, 30 Apr 45; Woodburn Kirby, *The War Against Japan, Volume IV*, pp. 15-16, 441-445, 472, 493.

<sup>4</sup> Woodburn Kirby, *The War Against Japan, Volume IV*, p.19.

<sup>5</sup> TNA WO 172/6853, 14<sup>th</sup> Army and 3<sup>rd</sup> Tactical Air Force Joint Appreciation and First Outline Plan, Operation CHAMPION, Administrative Appendix, Annexe A, Movement Appreciation of Manipur Road Advance Base, undated. The name CHAMPION was changed to CAPITAL soon after this appreciation was produced due to the security of the name being compromised.

<sup>6</sup> Woodburn Kirby, *The War Against Japan, Volume IV*, pp. 21, 438.

<sup>7</sup> SEAC Report, p. 55.

<sup>8</sup> Woodburn Kirby, *The War Against Japan, Volume IV*, Appendix 4, pp. 442-445. The land and air transport forces available to SEAC at the beginning of January 1945 are shown in outline at Appendix Eight.

<sup>9</sup> SEAC Report, p. 64.

<sup>10</sup> *Ibid.*, pp. 72, 74.

<sup>11</sup> TNA WO 172/4145, C-in-C 11 Army Group Assessment of Tasks, 10257/G (O), 14 Jul 44.

<sup>12</sup> SEAC Report, p. 76; Woodburn Kirby, *The War Against Japan, Volume IV*, pp. 4-5.

<sup>13</sup> TNA WO 172/6863, 14<sup>th</sup> Army and 3<sup>rd</sup> Tactical Air Force Joint Appreciation and First Outline Plan, Operation CHAMPION, undated. The planners at first assigned the airborne assault role to XXXIII Corps and the overland advance to IV Corps, but, given the deployment of the two Corps by November 1944, with XXXIII Corps already in the Kabaw valley and IV Corps at Imphal, it made sense to reverse the roles.

<sup>14</sup> Slim, *Defeat Into Victory*, p. 378.

<sup>15</sup> *Ibid.*, p. 380.

<sup>16</sup> These airfields included Comilla, Agartala, Lalaghat and Chittagong (Hathazari), which had been used during Operation STAMINA and subsequent supply tasks during the pursuit.

<sup>17</sup> TNA WO 172/6863, 14<sup>th</sup> Army and 3<sup>rd</sup> Tactical Air Force Joint Appreciation and Joint Outline Plan Operation CHAMPION, undated; TNA WO 172/4145, C-in-C 11 Army Group letter to the Supreme Allied Commander South East Asia, 20768/G(O)2 Air/902, 14 Sep 44; Woodburn Kirby, *The War Against Japan, Volume IV*, pp. 101-106.

<sup>18</sup> SEAC Report, p. 77; Woodburn Kirby, *The War Against Japan, Volume IV*, pp. 7-13.

<sup>19</sup> SEAC Report, p. 83.

<sup>20</sup> *Ibid.*, pp. 83-84; Woodburn Kirby, *The War Against Japan, Volume IV*, p. 108.

<sup>21</sup> TNA WO 172/4164, 14<sup>th</sup> Army Operation Instruction No 68, 4 Sep 44; 14<sup>th</sup> Army Operation Instruction No 69, 28 Sep 44.

<sup>22</sup> SEAC Report, p. 84.

<sup>23</sup> Woodburn Kirby, *The War Against Japan, Volume IV*, pp. 442-443.

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- <sup>24</sup> *Ibid.*, p. 442.
- <sup>25</sup> SEAC Report, pp. 85-86.
- <sup>26</sup> TNA WO 172/6863, 14<sup>th</sup> Army Appreciation and Outline Plan, Op CAPITAL Phase Two, 15 Nov 44.
- <sup>27</sup> Woodburn Kirby, *The War Against Japan, Volume IV*, 153-154.
- <sup>28</sup> Army Engineering, p.104; Pakenham-Walsh, *Royal Engineers*, pp. 246-247.
- <sup>29</sup> ATDRC, XXXIII Corps Ops, 23 Jun to 16 Dec 44, p. 125.
- <sup>30</sup> Army Administrative Planning, p. 110.
- <sup>31</sup> *Ibid.*, pp. 110-111; Slim, *Defeat Into Victory*, p. 391.
- <sup>32</sup> Slim, *Defeat Into Victory*, pp. 393-394.
- <sup>33</sup> Army Administrative Planning, pp. 110-111; Woodburn Kirby, *The War Against Japan, Volume IV*, pp. 163-165; Slim, *Defeat Into Victory*, p. 393.
- <sup>34</sup> Woodburn Kirby, *The War Against Japan, Volume IV*, pp. 180-181.
- <sup>35</sup> *Ibid.*, p. 164, 166; Slim, *Defeat Into Victory*, p. 394.
- <sup>36</sup> Slim, *Defeat Into Victory*, pp. 480-483.
- <sup>37</sup> Army Engineering, pp. 104, 112-113.
- <sup>38</sup> Army Works, p. 212.
- <sup>39</sup> *Ibid.*, p. 206; Pakenham-Walsh, *Royal Engineers*, p. 244.
- <sup>40</sup> TNA WO 203/1865, ALFSEA Administrative Appreciation, Mar 45.
- <sup>41</sup> TNA WO 203/2848, Letter from Advance HQ ALFSEA to War Office, 16 Dec 44.
- <sup>42</sup> TNA WO 172/4168, 14<sup>th</sup> Army Administrative Instruction No 32, 22 Dec 44.
- <sup>43</sup> Woodburn Kirby, *The War Against Japan, Volume IV*, Appendix 13, p. 460.
- <sup>44</sup> SEAC Report, p. 113; Woodburn Kirby, *The War Against Japan, Volume IV*, Appendix 4, pp. 442-445. American combat cargo (CC) squadrons each comprised 25 aircraft. Their troop carrier (TC) squadrons each comprised 16 aircraft.
- <sup>45</sup> SEAC Report, p. 104.
- <sup>46</sup> *Ibid.*, p. 105.
- <sup>47</sup> Army Supplies and Transport, Volume II, p. 100.
- <sup>48</sup> SEAC Report, pp. 113-114; Woodburn Kirby, *The War Against Japan, Volume IV*, pp. 207, 462-463.
- <sup>49</sup> SEAC Report, p. 107.
- <sup>50</sup> TNA WO 172/4164, 14<sup>th</sup> Army Operation Instruction No 82, 19 Dec 44; SEAC Report, pp. 102-103; Woodburn Kirby, *The War Against Japan, Volume IV*, pp. 163-170.
- <sup>51</sup> SEAC Report, p. 115.
- <sup>52</sup> *Ibid.*, pp. 102, 107.
- <sup>53</sup> *Ibid.*, p. 112.
- <sup>54</sup> *Ibid.*, pp. 107 (SEAC directive 8 Nov 44), 124.
- <sup>55</sup> Woodburn Kirby, *The War Against Japan, Volume IV*, pp. 135-137.
- <sup>56</sup> *Ibid.*, pp. 138-139.
- <sup>57</sup> TNA WO 172/6913, XV Corps Administrative Order No 2, 2 Jan 45; XV Corps Administrative Instruction No 13, 28 Jan 45.

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- <sup>58</sup> Woodburn Kirby, *The War Against Japan, Volume IV*, pp. 139-142.
- <sup>59</sup> SEAC Report, p. 112.
- <sup>60</sup> Woodburn Kirby, *The War Against Japan, Volume IV*, pp. 219-220.
- <sup>61</sup> TNA WO 172/6913, 15 Corps Administrative Order No 2, 2 Jan 45.
- <sup>62</sup> TNA 203/1552, ALFSEA internal minute by DQMG (Mov & Tn) to MGA, 91622 Q(Mov)A, 21 Mar 45; Woodburn Kirby, *The War Against Japan, Volume IV*, Appendix 15, p. 463.
- <sup>63</sup> Army Supplies and Transport, Volume II, p. 74. The DUKW was an amphibious truck. The letters do not stand for anything. They were just the factory designation, and happened to sound rather appropriate.
- <sup>64</sup> ATDRC, XXXIII Corps Ops, Dec 44 to Mar 45, pp. 29-35, 54-55.
- <sup>65</sup> TNA WO 172/4230, HQ XXXIII Indian Corps Administrative Order No 144, 6 Dec 44.
- <sup>66</sup> J. F. Benoy, *Lindsell's Military Organisation and Administration* (Aldershot, Gale and Polden, 1950), pp. 89-95.
- <sup>67</sup> TNA WO 203/706, 14<sup>th</sup> Army operational research report No 24, Dec 44.
- <sup>68</sup> SEAC Report, p. 106; XXXIII Corps Ops Dec 44-Mar 45, pp. 56-57.
- <sup>69</sup> Army Supplies and Transport, Volume II, pp. 92-93; TNA WO 172/6810, ALFSEA letters 40052/Q6 and 40083/Q6, 19 Feb 45.
- <sup>70</sup> Army Supplies and Transport, Volume II, p. 91.
- <sup>71</sup> TNA WO 172/6934, DAA & QMG note to Commander XXXIII Corps, 18 Jan 45.
- <sup>72</sup> Army Supplies and Transport, Volume II, p. 86; Army Engineering, p. 109.
- <sup>73</sup> RETM 17, Aug 45, pp. 133-134.
- <sup>74</sup> ATDRC, XXXIII Corps Ops Dec 44 to Mar 45, pp. 40-53; ATDRC, XXXIII Corps Ops, 20 Mar 45 to 28 May 45, pp. 1-12.
- <sup>75</sup> SEAC Report, p. 115.
- <sup>76</sup> Army Engineering, p. 104.
- <sup>77</sup> TNA WO 1724192, IV Corps Administrative Instruction No 56, 24 Dec 44; TNA WO 172/6897, IV Corps Administrative Instruction No 58, 8 Jan 45; IV Corps Administrative Instruction No 60, 27 Jan 45; IV Corps Move Order No 38, 30 Jan 45; IV Corps Administrative Instruction No 62, 1 Feb 45; TNA WO 203/5882, Engineer Aspects of IV Corps Operations Imphal to Rangoon.
- <sup>78</sup> Army Engineering, pp. 107-108.
- <sup>79</sup> SEAC Report, pp. 129-132.
- <sup>80</sup> *Ibid.*, pp. 140-141.
- <sup>81</sup> TNA WO 203/1865, ALFSEA Administrative Appreciation, Mar 45; TNA WO 203/2617, Internal minute, AD Tn 6 to TN 1 ALFSEA, 13 Jul 45; Woodburn Kirby, *The War Against Japan, Volume IV*, p.467.
- <sup>82</sup> SEAC Report, p. 103.
- <sup>83</sup> TNA WO 203/1552, Notes on Visit to 14<sup>th</sup> Army by DQMG (Mov and Tn) ALFSEA, 18-20 Jan 45; TNA WO 203/1865, ALFSEA Administrative Appreciation, Mar 45; SEAC Report, p. 150.
- <sup>84</sup> Army Transportation, p. 206

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<sup>85</sup> TNA WO 203/1865, ALFSEA Administrative Appreciation Mar 45; Woodburn Kirby, *The War Against Japan, Volume IV*, pp. 322-323. The divisions then in the 14<sup>th</sup> Army were the 2<sup>nd</sup> and 36<sup>th</sup> British; and the 5<sup>th</sup>, 7<sup>th</sup>, 17<sup>th</sup>, 19<sup>th</sup> and 20<sup>th</sup> Indian.

<sup>86</sup> TNA WO 203/1552, DQMG (Mov & Tn) ALFSEA letter to MGA, 91622 Q(Mov)A, 21 Mar 45.

<sup>87</sup> TNA WO 172/6863, 14<sup>th</sup> Army-221 Group Planning Paper No 10, 7 Feb 45.

<sup>88</sup> SEAC Report, p. 151.

<sup>89</sup> Woodburn Kirby, *The War Against Japan, Volume IV*, Appendix 21, pp. 506-507.

<sup>90</sup> SEAC Report, pp. 145-147.

<sup>91</sup> Army Supplies and Transport, Volume II, p. 100.

<sup>92</sup> SEAC Report, pp. 152-157.

<sup>93</sup> Army Supplies and Transport, p. 93.

<sup>94</sup> *Ibid*, p. 101.

## CONCLUSIONS

The aim of this thesis was to examine the logistic influences on the design, conduct and outcome of British operations in the Burma campaign between 1942 and 1945 in order to demonstrate the relative importance of the logistic contribution to victory. It set out to achieve this aim by identifying the principal logistic problems at the strategic, operational and tactical levels of warfare; examining how these problems were addressed and assessing the impact on operations of the measures taken to address them. The first part of the thesis established that, in May 1942, following the fall of Singapore and Burma, the main logistic challenges were the suitability of India as the strategic base of operations; the capacity of the operational L of C; and, at the tactical level, the lack of effective means to sustain forces cut off or manoeuvring away from roads in the jungle. All these problems were aggravated by lack of resources. The second part examined developments between May 1942 and early 1944. At the strategic level, it showed how India was developed from a weak economic base sustaining an army of 180,000, employed principally on home defence duties, into one of the leading producers of warlike stores in the British Empire, providing an army of two million people, and able to sustain on her soil an allied ground force equivalent to sixteen divisions, as well as eighty six air squadrons. The strain of achieving that brought her domestic economy to the point of collapse. India had not been prepared at all for the roles she had to assume after the fall of Singapore and Burma. Her defence posture faced west and, until the start of the Second World War, had been established only for internal security and to repel minor external aggression. She had not been expected to be a strategic base, that role in south east Asia having been given to Singapore. India's ability to sustain and conduct operations on her eastern border had to be built up from almost nothing, and she was near the bottom of the list of allied war priorities, for Burma was a subsidiary front in the second priority war.

At the operational level, part two then showed how the capacity of the L of C in Assam was improved from a peacetime level of 600 tons per day in May 1942 to over 4,900 tons per day in May 1944. The environment in which this was achieved was fraught with difficulty, the front being over 700 miles from its reserve base, along tenuous road, rail and river links designed only for peacetime purposes. There was

no direct link between the base and the front that did not require several changes of transport means. At the beginning of the period, it had been possible to sustain only two light divisions on the Assam front, and those at a very limited pace of operations. By mid-1944, the L of C were supporting six divisions and a tank brigade on the British Assam front, three divisions on the American-Chinese Assam front, three divisions on the Arakan front and the American airlift to China of 10,000 tons per month from airfields in Assam.

Finally, at the tactical level, part two explored the development of air, water and animal-borne maintenance, as well as the difficulties and achievements of building roads, which still remained important, in the forward areas. In 1942, British forces were unable to sustain a position once it was surrounded by the standard Japanese offensive tactic of encircling enemy defences and cutting their L of C. Nor were they able to operate any great distance from roads in order to out-manoeuve the Japanese or to engage them in the jungle. By the beginning of 1944, they could do both, sustained by air, water or animal transport. The capacity of air maintenance, in particular, was raised from an almost negligible level in May 1942 to one which was capable of sustaining a whole corps in action by May 1944.

Part three of the thesis then demonstrated how all those developments, along with continuing logistic problems, helped determine the course of the defensive battles of 1944 and the re-invasion of Burma in 1945. This conclusion summarises the influence of those logistic problems and developments on the design, conduct and outcome of operations throughout the campaign, from May 1942 onwards, in order to show how they contributed to ultimate victory.

After May 1942, the time and effort needed to assemble the necessary resources and find initial solutions to the various logistic problems identified at every level of warfare forced the allies onto the defensive in south east Asia for the best part of two years. Despite considerable pressure from London, Washington and Chungking for an offensive in Burma, it could not be achieved in any significant strength. Fortunately, for most of that time, the Japanese were content to consolidate their gains in Burma while they focused their efforts on the Pacific and China theatres. The time needed to bring the logistic position up to a level at which it could sustain taking the war back

to the enemy provided the opportunity for the development of tactics and training that was equally required. It also enabled the evolution of those tactics to go hand in glove with that in methods of logistic support at the tactical level, ensuring that the two strands were complementary and sustainable. The abortive first Arakan offensive over the winter of 1942-1943, however, demonstrated the folly of going back onto the offensive before either the necessary tactics and training or the means of operational and tactical logistic maintenance had been properly developed.

The enormity of the task of surmounting the various logistic hurdles at the same time as attempting to raise the necessary forces and conduct operations proved to be beyond India's capacity, given the weakness of her economic base, the resources available to her and the wider war production demands made upon her. It was only after SEAC was established in late 1943 to take on responsibility for operations, and additional American resources committed, that India was able to devote sufficient attention to improving the logistic infrastructure to get it ready for major operations in early 1944. By that time, also, adequate forces had been trained and equipped to defeat the forthcoming Japanese offensive. Thus the strategic and operational timetable for the two years following May 1942 was dictated in at least half measure by logistic influences, the other half being the time needed to develop successful tactics and training.

The first round of decisive battles, in 1944, put the new-found tactics and training to the test in the most exacting circumstances and, on the whole, they were not found wanting. At Sinzweya, Imphal and Kohima, the British demonstrated that they finally had the confidence and ability to fight on when their L of C had been cut by Japanese outflanking moves, while reserves counter attacked to break the encirclement and destroy the enemy. In the counter attacks and the subsequent pursuit to the Chindwin, and, indeed, during the defensive battles themselves, the British proved that they were no longer reluctant to get off the roads and out into the jungle in order to out-manoeuvre the Japanese. They proved also that, man to man, they could get the better of the Japanese in battle. These tactical capabilities were, of course, only made possible by improved the logistic methods, principally air, water and animal-borne maintenance, that had been developed since May 1942. In addition

to their effect on tactics, however, logistics had a prominent defining influence on the operational design of the battles as well.

The objective of the main Japanese offensive, starting in March 1944, was the seizure of IV Corps' administrative base at Imphal. By achieving that, the Japanese aimed to forestall any planned British offensive into Burma. The allies perceived that, if the Japanese managed to capture Imphal, they would try to advance further to cut the Assam L of C, using captured British supplies and equipment. With that, they would be able to stop the American airlift to China, which would have been a major strategic achievement. Whatever the actual extent of its objectives, the Japanese attack played straight into Slim's plans to inflict a substantial defeat over the enemy on ground of his own choosing before attempting an offensive on the far side of the Chin hills, with a tenuous L of C behind him. Indications of an imminent Japanese advance against Imphal enabled Slim to concentrate his forces there, where he could bring to bear his material superiority in armour, artillery and air power, fighting with his back to his own logistic base, itself capable of being maintained by air when the overland L of C were cut. In advance of the decisive action at Imphal, the battle of Sinzweya, on the Arakan coast, provided an unplanned opportunity to prove the ability of air supply to sustain a substantial force in battle. Consequently, it boosted the confidence of the whole 14<sup>th</sup> Army before the main engagement at Imphal.

The preliminary Japanese attack in Arakan failed in its purpose of diverting the 14<sup>th</sup> Army's reserves away from Imphal ahead of the main offensive there because of the allied ability to re-deploy divisions by air between the widely separated corps fronts. In that way, the British were able to concentrate overwhelming force at the crucial time and place to meet the Japanese attacks. At the same time, India Command was able to transport the 2<sup>nd</sup> British Division right across the sub-continent by rail in time to secure Dimapur and the Assam L of C before starting the counter attack to relieve Imphal. That counter attack was made sustainable by the switching of IV Corps' supply chain from the northern line of the Assam L of C to the southern, east Bengal line, when that corps went onto air maintenance after the Dimapur-Imphal road had been cut. The northern line's capacity was then available to XXXIII Corps, and every bit of it was needed to sustain the protracted, attritional battle to re-open the Imphal road.



If the new tactical and logistic capabilities of the British were crucial to winning these battles, of almost equal importance were equivalent Japanese mistakes. Having failed to observe, or to recognise the significance of, the growth in allied air transport capacity, the Japanese assumed that the British would retreat when surrounded, as they had done in every major action up to early 1943. They failed to anticipate the possibility that air maintenance would enable British forces to fight on when isolated. For this reason, the Japanese launched all three of their attacks, on Sinzweya, Kohima and Imphal, with inadequate administrative support, planning to use the supplies abandoned in the expected British collapse. Even the Japanese defeat at Sinzweya, over a month before battle was joined at Imphal and Kohima, failed to trigger a re-appraisal of their logistic plans for the main attack. In the same vein, the Japanese ignored the possibility that allied forces might be re-deployed by air between the two fronts. They left far too long between their diversionary attack on Sinzweya and the main assault on Imphal, allowing Slim to move his divisions as and when required. Consequently, instead of attacking the British areas of weakness, as their outflanking tactics were intended to do, the Japanese found themselves up against the strong points of British defence and severely under-resourced for attritional battle.

Very considerable skill was demonstrated by the British at every level of warfare in moving and using this force in battle and that was crucial to the victories of 1944. However, it must also be recognised that the material strength by then available to the British was equally important. On the Arakan front, the odds in favour of the British were some five to one, so a defeat would have been nothing short of disgraceful. In Assam, the British eventually committed the numerical equivalent of seven divisions and a tank brigade, most of them fighting close to their logistic base, against three Japanese divisions and a tank regiment with minimal administrative support. On both fronts, the allies enjoyed substantial air superiority. The outcome should not have been in doubt, but the battles turned out to be protracted and ferocious before the enemy was finally defeated. Without decrying the new-found tactical skill, endurance and courage demonstrated by the troops in those battles, it is safe to conclude, therefore, that the decisive factor in the achievement of victory in this round of battles was the material and logistic superiority of the allies. That, however, was

exactly what Slim intended to achieve at that stage of the campaign in order to cement the confidence of his army and weaken the enemy before going onto the offensive.

Following the relief of Imphal, the ability of the air forces to maintain the pursuit of the withdrawing Japanese through the monsoon put the 14<sup>th</sup> Army in a position to re-invade Burma as soon as the ground dried out in the autumn of 1944. Thus, the whole following dry season was made available for subsequent operations, and that turned out to be crucial to their success, for they were only just completed before the 1945 monsoon broke in May. As in the battles of 1944, the design and outcome of the re-invasion of Burma were determined very largely by logistic considerations, both pre-planned and in reaction to changed circumstances. At the outset of the 1945 offensive, it had not been the allied intention to re-capture Burma in its entirety. Slim was directed only to seize sufficient territory in the central part of the country to permit the building of the required new road to China. However, he concluded that, in order to achieve that, and to provide adequate security to the road thereafter, he had to inflict a second decisive defeat on the Japanese before the onset of the 1945 monsoon. After that, he would be unable to sustain sufficient force in central Burma over a long L of C through the Chin hills. Even in the dry weather, the capacity of the tactical L of C, along with the limited air transport available, constrained the force he could deploy to a level numerically rather less than the estimated strength of the Japanese opposing him. Hence, his initial plan to bring the enemy to battle on the Shwebo plain, where, once again, he could deploy his superiority in armour, artillery and air power.

When the enemy then withdrew across the Irrawaddy, Slim had to make an assault crossing before he could bring them to battle. Then it was largely the limitations on the size and strength of the 14<sup>th</sup> Army, dictated by logistic constraints, that determined how he framed his plans. Unable to sustain sufficient forces for a direct assault, followed by a protracted attritional battle, he had to send half his force on the wide encircling move to capture Meiktila, behind the Japanese front, taking advantage of the enemy's weak flank. In that way, he could cut the enemy's L of C and prevent his conducting a long, drawn-out, fighting withdrawal, dragging the British ever further from their base. This change having been forced upon him partly by logistic constraints and partly by the enemy's actions, Slim then had to put operational

imperatives ahead of logistic concerns for the duration of the battle. He had to accept and overcome very substantial administrative risks in order to seize and hold Meiktila with a division and a tank brigade maintained entirely by air at the outside limits of the economic operating radii of the supporting aircraft.

Once the Japanese front on the Irrawaddy had been defeated, however, logistic considerations once again came to the fore in determining the design of further operations. The 14<sup>th</sup> Army's onward advance to Rangoon was forced upon Slim by the need to open the port in order to sustain the army during the forthcoming monsoon. Once that broke in May, the overland and air L of C from India would have been unable to maintain the army by themselves once the forty five day central Burma stockpile had been exhausted. The re-capture of Rangoon had, by that time, actually been accepted as an allied strategic aim, but one which was to be achieved by an amphibious assault in the autumn of 1945, after the monsoon. Whilst it may have been in the back of Slim's mind, it was certainly not part of the direction given to him for the re-invasion of Burma.

Despite the superiority enjoyed by the allies in armour, artillery and air power during the 1945 offensive, it would not be fair to suggest that its success was due to brute force, as might be said about the battles of 1944. Numerically, the enemy was superior, and he held a strong position behind a formidable obstacle with good L of C back to his base in Rangoon. The 14<sup>th</sup> Army's overall combat power was significantly constrained by the capacity of its logistic support. There was just one usable overland route available from Imphal to Mandalay, and there was not an all-weather road all the way along it, even at the end of the war. The transport aircraft available were barely sufficient for the task of maintaining the 14<sup>th</sup> Army, and they had to operate at extreme economic range. Unlike the campaigns in north Africa, Italy and north west Europe, the 14<sup>th</sup> Army did not have direct access to the sea on the flank of its advance, with all the logistic advantages that confers. Slim had to create his own access at the end of the battle by seizing Rangoon. Victory was achieved by bold and successful movements to concentrate locally decisive levels of combat power where the enemy was vulnerable, but those moves depended, in turn, on the success of the supporting operations in Arakan. The 1945 offensive there had to be mounted specifically to seize the airfields on the coast that would enable that final

advance to Rangoon to be sustained by air. The Arakan offensive was, itself, only enabled by the arrival, at last, of SEAC's assigned amphibious force, which had been withheld for over a year. Overall, the crossing of the Irrawaddy, the re-capture of Rangoon and the supporting offensive in Arakan were, and remain, a remarkable example of joint service manoeuvre warfare at the army group level. Slim had the space and – just – the means to undertake it, and his army executed it brilliantly. Logistic considerations were, however, a central pillar in the shaping and execution of EXTENDED CAPITAL. The operation instruction that set it in motion is confined to just four pages of foolscap, but the combined administrative appreciations that supported that instruction run to nearly twenty times that length.<sup>1</sup>

It is clear from the above, and all that has gone before in this thesis, that logistic concerns had a very substantial, usually definitive, influence on the design, conduct and outcome of operations in Burma. It has been shown how, following a period of defeat and enforced defence due largely to lack of resources, the British eventually developed the means to deploy and sustain locally decisive strength at the critical time and place, even when they did not enjoy overall superiority on a particular front. They were able to fight on when cut off and to out-manoeuve the enemy without having to rely always on overland L of C. They had actually developed the necessary tactical ideas to achieve this very early on in the period of defeat and defence but could only put them into practice when the necessary logistic infrastructure and means, as well as the necessary training, were in place. Those factors may have been decisive in securing victory, but they were achieved only in the face of consistent resource constraints and immense environmental difficulties by skill and the taking of calculated risks. Throughout the Burma campaign, operations had to be planned and conducted within very tight parameters of the logistically possible, rather than with the fulsome administrative backing that became increasingly available in other theatres. As the War Office account of British Army administrative planning throughout the war concluded of the Burma campaign: 'Topography very largely governed the strategy, which was governed to no small extent by the logistics of the situation'.<sup>2</sup> By contrast, Montgomery wrote, after the north African campaign, in mid-1943:

in subsequent campaigns, when conditions were entirely different, we were able to be more lavish and our troops became accustomed to having everything of which they felt a need. If the British Army has to fight another war, I feel that at the outset it will have to operate under an austere regime of administration and not under the relatively comfortable conditions that obtained during the latter phase of this War.<sup>3</sup>

‘Comfortable conditions’ were never the case in Burma. Austerity was the norm. It is reasonable to conclude, therefore, that, in comparison with other theatres, logistics had a higher than average level of influence on the shaping, execution and result of the Burma campaign.

The above demonstrates the commanding influence of logistics on the design and conduct of operations, and answers the specific questions: what were the principal logistic problems; how were they addressed; and how did the measures taken influence the design, conduct and outcome of operations? There remains, however, one further consideration that needs to be examined before the relative importance of logistics overall to the final achievement of victory can be assessed fully. That is the logistic influence on the very strategic purpose of the Burma campaign. In the immediate aftermath of the fall of Singapore, on 15 February 1942, it was clearly the British long term intention to regain her lost far east empire. Churchill would have preferred to by-pass Burma in any counter offensive and re-capture Malaya by amphibious means. The Americans never shared that aspiration and were, indeed, hostile to it. Their involvement in Burma was aimed purely at maintaining and expanding the supply line to China, in order to keep that country in the war. Once the road through Rangoon had been cut in 1942, their only interest was in holding or re-capturing sufficient territory in north Burma to enable that link to be re-established. Their dominant position in setting war aims and priorities, however, enabled them to impose that interest increasingly on the British as the foremost - for a time the only - strategic aim in Burma until late in 1944. This influence featured even in Wavell’s directive to Alexander for the defence of Burma at the beginning of March 1942, a few days before the supply line through Rangoon was cut. It was repeated with increasing emphasis at the Casablanca conference, the Trident conference, the Quadrant conference and the first two directives issued to Mountbatten as Supreme Allied Commander. Only in September 1944, after sustained pressure from Mountbatten, who saw the seizure of Rangoon as the best way of re-opening the link

to China, did the Americans reluctantly accept the re-capture of the whole of Burma as a long term strategic aim. Even then, it was for the purpose of sustaining China and was to be achieved by an amphibious assault, for which the resources were not yet available. The Americans specifically rejected any idea of weakening the 14<sup>th</sup> Army's overland invasion of Burma in order to find forces for the recapture of Rangoon because that might have jeopardised their current operations to re-open the road to China through north Burma. The fact that the 14<sup>th</sup> Army then found itself forced by logistic imperatives to extend its advance from the north all the way to Rangoon was, in a way, fortuitous for the British. Ironically, of course, in the event, Rangoon was re-captured by an amphibious assault, albeit one much reduced from Mountbatten's original concept. But that assault was itself an emergency measure, mounted as the result of logistic necessity when it became clear that the 14<sup>th</sup> Army might not reach the port before the monsoon.

If the American imperative of maintaining and expanding the link to China was instrumental in shaping the strategic design of the Burma campaign, it was assisted immensely by the lack of amphibious resources available to the theatre until right at the end of 1944. The British may have aspired to by-pass the jungle on the Indo-Burmese border, or even to go straight back to Malaya, but, without amphibious shipping, they could neither. Thus, they were forced to toe the American line and focus their attention on re-capturing the northern part of Burma. Only in the very latter part of the campaign were the British able to expand their horizons a bit. By that stage, however, it had become clear that the Burmese rice supply would have to be secured before the British could sustain the civil population of Malaya once they had re-captured that country. Thus, the strategic aims and shape of the campaign in Burma, from March 1942 onwards, were dominated by three logistic considerations: the sustainment of China, the lack of amphibious resources and, latterly, the need to secure the Burmese rice supply. Good tactics, training, endurance and courage were essential ingredients of victory. However, due to the particular resourcing and environmental problems that had to be overcome in that theatre, it is safe to conclude that logistics were, overall, the foremost determinant in the design, conduct and outcome of operations in Burma, and, hence, the achievement of victory.

To bring this work to an end, it might be worth exploring whether there is a logistic ‘hero’ of the campaign, as Slim is undoubtedly the operational ‘hero’. Slim, himself, of course, must be a leading contender, for a successful army commander must be as much a logistician as a tactician. Major General Snelling - ‘Grocer Alf’, as he came to be known - MGA of the 14<sup>th</sup> Army, must be a strong candidate, as must Major General Hasted, the Chief Engineer. Mountbatten’s PAO, Lieutenant General Wheeler, United States Army, was instrumental in securing American resources, which were so crucial to running the L of C. SEAC would have been crippled from the start, however, were it not for the political, managerial and leadership ability of Auchinleck, who must take prime credit for building up the India base. Or was it perhaps Lieutenant General Lindsell, his PAO, who was the unsung hero there? These are but a few of many possible contenders for the title. The fact is, it was a team effort, and, in the logistic arena it is more difficult to identify any single individual, who stands head and shoulders above the rest. Perhaps the true hero is seventeen year-old Khem Chand, a driver in 60 Animal Transport Company, Royal Indian Army Service Corps, who, like hundreds of his comrades, did not go home. They lie in – or, like Chand, are just commemorated in – the cemeteries at Kohima, Imphal and Rangoon. Their part of the victory did not attract much publicity or glory. Indeed, there were probably even other soldiers around them, who held them in some degree of contempt, for many of them were not drawn from the traditional martial classes, or perhaps they were of lower caste, but, without them, the warriors could not have fought at all. It is for them that this work has become much more than a pure academic endeavour. It has been a pilgrimage.

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Notes:

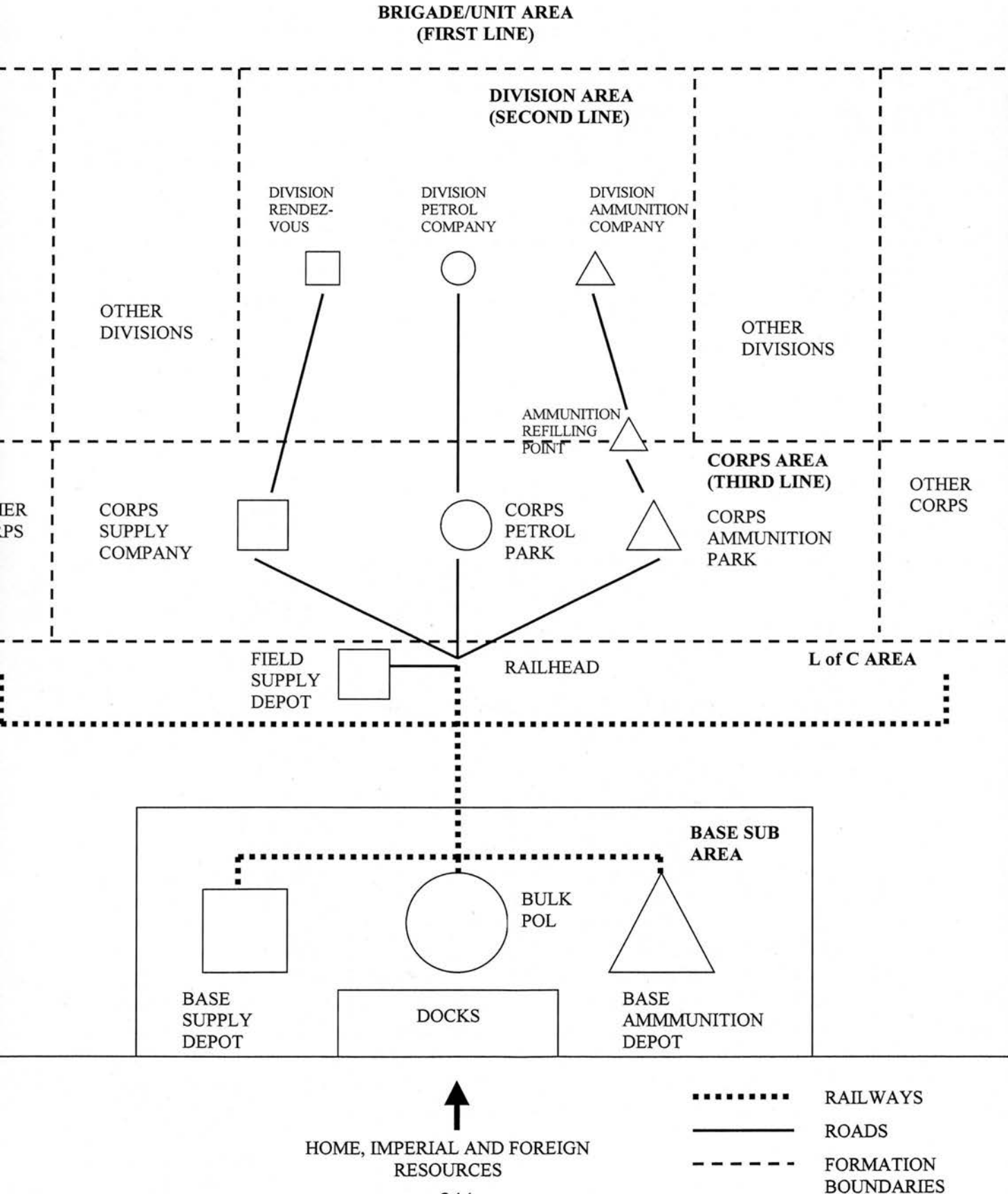
<sup>1</sup> TNA WO 172/4164, 14<sup>th</sup> Army Operation Instruction No 82, 19 Dec 44; TNA WO 172/6863, 14<sup>th</sup> Army and 3<sup>rd</sup> Tactical Air Force Joint Appreciation and First Outline Plan ‘Champion’, Administrative Appreciation, undated; TNA WO 203/1865, ALFSEA Administrative Appreciation Mar 45.

<sup>2</sup> Army Administrative Planning, p. 77.

<sup>3</sup> B. L. Montgomery, *El Alamein to the River Sangro* (London, Hutchinson, undated), p. 65.

# APPENDIX ONE

## THE BRITISH ARMY SUPPLY SYSTEM 1942





## APPENDIX TWO

### OUTLINE ORDER OF BATTLE OF THE BURMA GARRISON 20 JANUARY 1942

Headquarters Burma Army

Rangoon Garrison

1<sup>st</sup> Battalion Gloucestershire Regiment

3<sup>rd</sup> Battalion Burma Rifles

1<sup>st</sup> Burma Division

1<sup>st</sup> Burma Brigade

2<sup>nd</sup> Burma Brigade

13<sup>th</sup> Burma Brigade

17<sup>th</sup> Indian Division

16<sup>th</sup> Indian Brigade

46<sup>th</sup> Indian Brigade

48<sup>th</sup> Indian Brigade

### APPENDIX THREE

## OUTLINE ORDER OF BATTLE OF THE ALLIED BURMA ARMY 19 MARCH 1942

Headquarters Burma Army

Burma Corps

Corps troops

7<sup>th</sup> Armoured Brigade Group

1<sup>st</sup> Burma Division

1<sup>st</sup> Burma Brigade  
2<sup>nd</sup> Burma Brigade  
13<sup>th</sup> Burma Brigade

17<sup>th</sup> Indian Division

16<sup>th</sup> Indian Brigade  
48<sup>th</sup> Indian Brigade  
63<sup>rd</sup> Indian Brigade

Chinese Expeditionary Force

5<sup>th</sup> Army

22<sup>nd</sup> Division  
96<sup>th</sup> Division  
200<sup>th</sup> Division

6<sup>th</sup> Army

49<sup>th</sup> Division  
55<sup>th</sup> Division  
93<sup>rd</sup> Division

67<sup>th</sup> Army

28<sup>th</sup> Division  
29<sup>th</sup> Division  
38<sup>th</sup> Division

## APPENDIX FOUR

### ILLUSTRATION OF ORDNANCE FACTORY OUTPUT YEARS ENDING MARCH 1940, MARCH 1942 AND MARCH 1944

The table below gives a selective illustration of the growth in the volume and sophistication of government ordnance factory output between March 1940 and March 1944. It is drawn from Appendix VII to Prasad, *Indian War Economy*. HE stands for high explosive; AP stands for armour piercing.

ITEM	UNIT	MAR 40	MAR 42	MAR 44
3.7" Howitzer HE shell	No	57,000	334,500	492,000
3.7" Anti-aircraft shell	No	Nil	Nil	43,986
25 Pdr HE shell	No	Nil	144,000	832,000
25 Pdr HE cartridge	No	Nil	111,740	479,516
25 Pdr AP shot	No	Nil	Nil	53,336
5.5" HE shell	No	Nil	Nil	3,000
18 Pdr HE shell	No	34,500	168,200	Nil
Hand grenade No 36	No	Nil	116,928	431,400
Bomb incendiary 1 ¼ lb	No	Nil	Nil	12,290
Bomb aircraft 250 lb	No	Nil	Nil	885
Primer No 12	No	Nil	2,020	352,000
Cartridge ball .303"	Million	74.8	189	158.3
Cartridge tracer .303"	Million	0.25	5.31	24.38
Cartridge signal 1 ½ "	No	14,210	104,304	440,900
Generators smoke	No	2,900	26,000	73,730
Rifle No 1 new & repair	No	17,620	109,000	133,000
Rifle No 2	No	Nil	1,620	3,600
Vickers Berthier MG	No	288	1,541	3,231
Bren gun tripod	No	30	1,525	2,180
Bayonets	No	220	84,907	224,442
3.7" Howitzer ordnance	No	15	68	159
3.7" Howitzer carriage	No	24	81	147
T.N.T	Tons	Nil	6	1,017
Toluene	Gallons	Nil	138,188	186,829
Gun cotton slabs	No	18,480	365,316	531,688
Binoculars prismatic	No	Nil	1,171	6,437
Telescope sighting	No	Nil	132	100
Compass prismatic	No	Nil	Nil	989
Respirators anti-gas	No	Nil	238,416	316,025
Instruments repaired	No	Nil	1,792	10,997
Oil cookers	No	1	15,295	35,585
Kettles camp	No	5,132	30,809	2,101
Shovels	No	12,245	32,320	61,110
Helves axe	No	26,721	133,489	75,186
Saddles pack artillery	No	116	696	1,969
Steel ingots	Tons	5,462	11,369	24,727

**APPENDIX FIVE**

**EXTRACT FROM 14<sup>TH</sup> ARMY OPERATIONAL RESEARCH REPORT No 24**

Figures are given in tons per day.

Terrain types: **A** – open country or bush with good roads; **B** – bush with poor roads; **C** – close country or jungle with poor roads.

Source: TNA WO 203/106, 14<sup>th</sup> Army operational research report No 24, Dec 44.

**BRITISH DIVISION**

ACTIVITY	RATIONS		POL			AMMO			OTHER STORES	TOTAL		
	MEN	ANIMALS	A	B	C	A & B	C	A		B	C	
In contact	41.5	7	29	22	12	35	30	17	129.5	122.5	107.5	
Slow advance (3 miles/day)	41.5	7	29	24	26.5	6.5	6	17	101	96	98	
Rapid advance (7 miles/day)	41.5	7	30	28	46	3.5	3	13	95	93	110.5	
Out of contact	40	7	11.5	13.5	Nil	Nil	Nil	18	76	78	Nil	

**INDIAN DIVISION**

ACTIVITY	RATIONS		POL			AMMO			OTHER STORES	TOTAL		
	MEN	ANIMALS	A	B	C	A & B	C	A		B	C	
In contact	41.5	7	29	22	12	35	30	14	126.5	119.5	104.5	
Slow advance (3 miles/day)	41.5	7	29	24	26.5	6.5	6	14	98	93	95	
Rapid advance (7 miles/day)	41.5	7	30	28	46	3.5	3	10	92	90	107.5	
Out of contact	38	7	11.5	13.5	Nil	Nil	Nil	12.5	69	71	Nil	

## APPENDIX SIX

### OUTLINE SEAC FORCES DECEMBER 1943

#### ARMY

##### 11 Army Group

##### 14<sup>th</sup> Army

##### IV Corps

17<sup>th</sup> Indian Division  
20<sup>th</sup> Indian Division  
23<sup>rd</sup> Indian Division

##### XV Corps

5<sup>th</sup> Indian Division  
7<sup>th</sup> Indian Division  
81<sup>st</sup> West African Division (less one brigade)

##### Army reserve

26<sup>th</sup> Indian Division  
254<sup>th</sup> Tank Brigade

##### Northern Combat Area Command

22<sup>nd</sup> Chinese Division  
30<sup>th</sup> Chinese Division  
38<sup>th</sup> Chinese Division

##### XXXIII Corps

2<sup>nd</sup> British Division  
36<sup>th</sup> British Division  
19<sup>th</sup> Indian Division  
25<sup>th</sup> Indian Division  
50<sup>th</sup> Indian Tank Brigade

##### Special Force

77<sup>th</sup> Indian Brigade  
111<sup>th</sup> Indian Brigade  
14<sup>th</sup> British Brigade  
16<sup>th</sup> British Brigade  
23<sup>rd</sup> British Brigade  
3<sup>rd</sup> West African Brigade  
5507<sup>th</sup> Composite Unit, US Army (attached for training)

3<sup>rd</sup> Special Service (Commando) Brigade

## **AIR FORCE**

Eastern Air Command

3<sup>rd</sup> Tactical Air Force

221 Group RAF – nine squadrons

224 Group RAF – fourteen squadrons

Northern Sector – seven USAAF squadrons, three RAF squadrons

Strategic Air Force

Seven USAAF squadrons

Three RAF squadrons

Troop Carrier Command

Two USAAF squadrons

Four RAF squadrons

Photographic Reconnaissance Force

Three USAAF squadrons

Two RAF squadrons

Directly under command SEAC

222 Group RAF – Ten squadrons

225 Group RAF – Three squadrons

Non operational

Six USAAF squadrons

Fourteen RAF squadrons

Notes:

1. Naval forces remained under command of the Admiralty.
2. Source: Woodburn Kirby, *The War Against Japan, Volume III*, pp. 466-471.

APPENDIX SEVEN

OPERATION STAMINA – AIRLIFT OF ARMY STOCKS TO IV CORPS AT IMPHAL

The table below gives figures in tons of replenishment stores landed on the Imphal plain during Operation STAMINA. A further 1,072 tons were dropped by parachute to isolated forces. Some 13,000 casualties and 43,000 non-combatants were evacuated in returning aircraft. The figures are drawn from TNA WO 203/736, Notes on Operation STAMINA.

Period	Despatch Airfield	Rations	Amenities	Medical	POL	Kerosene	Ammo	Ordnance	Engineer	Total Stores	Personnel Inbound
18-30 Apr 44	Comilla	416	12	2	-	-	-	48	38	516	1479
	Chittagong	314	18	18	5	10	316	26	-	707	-
	Agartala	665	-	-	-	-	-	38	-	703	-
	<i>Total</i>	<i>1395</i>	<i>30</i>	<i>20</i>	<i>5</i>	<i>10</i>	<i>316</i>	<i>112</i>	<i>38</i>	<i>1926</i>	<i>1479</i>
1-31 May 44	Comilla	731	-	19	-	-	-	86	1	837	3956
	Chittagong	276	-	9	1248	41	590	3	42	2209	-
	Agartala	604	89	-	-	-	-	185	-	878	-
	Sylhet	718	-	-	-	-	-	-	-	718	-
1-30 Jun 44	Jorhat	-	-	-	-	-	-	1	325	326	1055
	<i>Total</i>	<i>2329</i>	<i>89</i>	<i>28</i>	<i>1248</i>	<i>41</i>	<i>590</i>	<i>275</i>	<i>368</i>	<i>4968</i>	<i>5011</i>
	Comilla	319	3	26	88	-	755	29	1	1221	3245
	Chittagong	-	-	-	503	25	485	1	1	1015	-
1-30 Jun 44	Agartala	2598	60	-	-	-	-	160	-	2818	53
	Sylhet	4090	-	-	181	-	-	-	-	4271	-
	Jorhat	182	70	1	107	-	8	108	57	533	2773
	Feni	-	-	-	972	28	-	-	-	1000	-
Grand total	<i>Total</i>	<i>7189</i>	<i>133</i>	<i>27</i>	<i>1851</i>	<i>53</i>	<i>1248</i>	<i>298</i>	<i>59</i>	<i>10858</i>	<i>6071</i>
	<b>Grand total</b>	<b>10913</b>	<b>252</b>	<b>75</b>	<b>3104</b>	<b>104</b>	<b>2154</b>	<b>685</b>	<b>465</b>	<b>17752</b>	<b>12561</b>

## APPENDIX EIGHT

### OUTLINE ALFSEA AND CCTF FORCES JANUARY 1945

#### ALFSEA

##### ALFSEA troops

- 5<sup>th</sup> Indian Division
- 11<sup>th</sup> East African Division
- Special Force
- 50<sup>th</sup> Parachute Brigade

##### 14<sup>th</sup> Army

##### IV Corps

- 7<sup>th</sup> Indian Division
- 17<sup>th</sup> Indian Division
- 255<sup>th</sup> Tank Brigade

##### XXXIII Corps

- 2<sup>nd</sup> British Division
- 19<sup>th</sup> Indian Division
- 20<sup>th</sup> Indian Division
- 254<sup>th</sup> Tank Brigade

##### Northern Combat Area Command

##### New Chinese 1<sup>st</sup> Army

- 30<sup>th</sup> Chinese Division
- 38<sup>th</sup> Chinese Division

##### New Chinese 6<sup>th</sup> Army

- 14<sup>th</sup> Chinese Division
- 22<sup>nd</sup> Chinese Division
- 50<sup>th</sup> Chinese Division

##### 36<sup>th</sup> British Division

##### XV Corps

- 25<sup>th</sup> Indian Division
- 26<sup>th</sup> Indian Division
- 81<sup>st</sup> West African Division
- 82<sup>nd</sup> West African Division
- 50<sup>th</sup> Tank Brigade



3<sup>rd</sup> Commando Brigade

**CCTF**

1<sup>st</sup> US Combat Cargo Group: Tulihal

Four Dakota squadrons (each 25 aircraft)

4<sup>th</sup> US Combat Cargo Group: Sylhet and Agartala

Four Dakota Squadrons (each 25 aircraft)

1<sup>st</sup> US Air Commando Group: Comilla and Ledo

One Dakota squadron (16 aircraft)

177 (Transport Wing) RAF: Comilla

Four Dakota squadrons (each 25 aircraft)

Note: 10<sup>th</sup> USAAF included the 3<sup>rd</sup> US Combat Cargo Group, comprising 100 Dakotas, and the 443<sup>rd</sup> US Troop Carrier Group, comprising 48 Dakotas. Both these groups were reserved for the support of NCAC, and were not available to the 14<sup>th</sup> Army.

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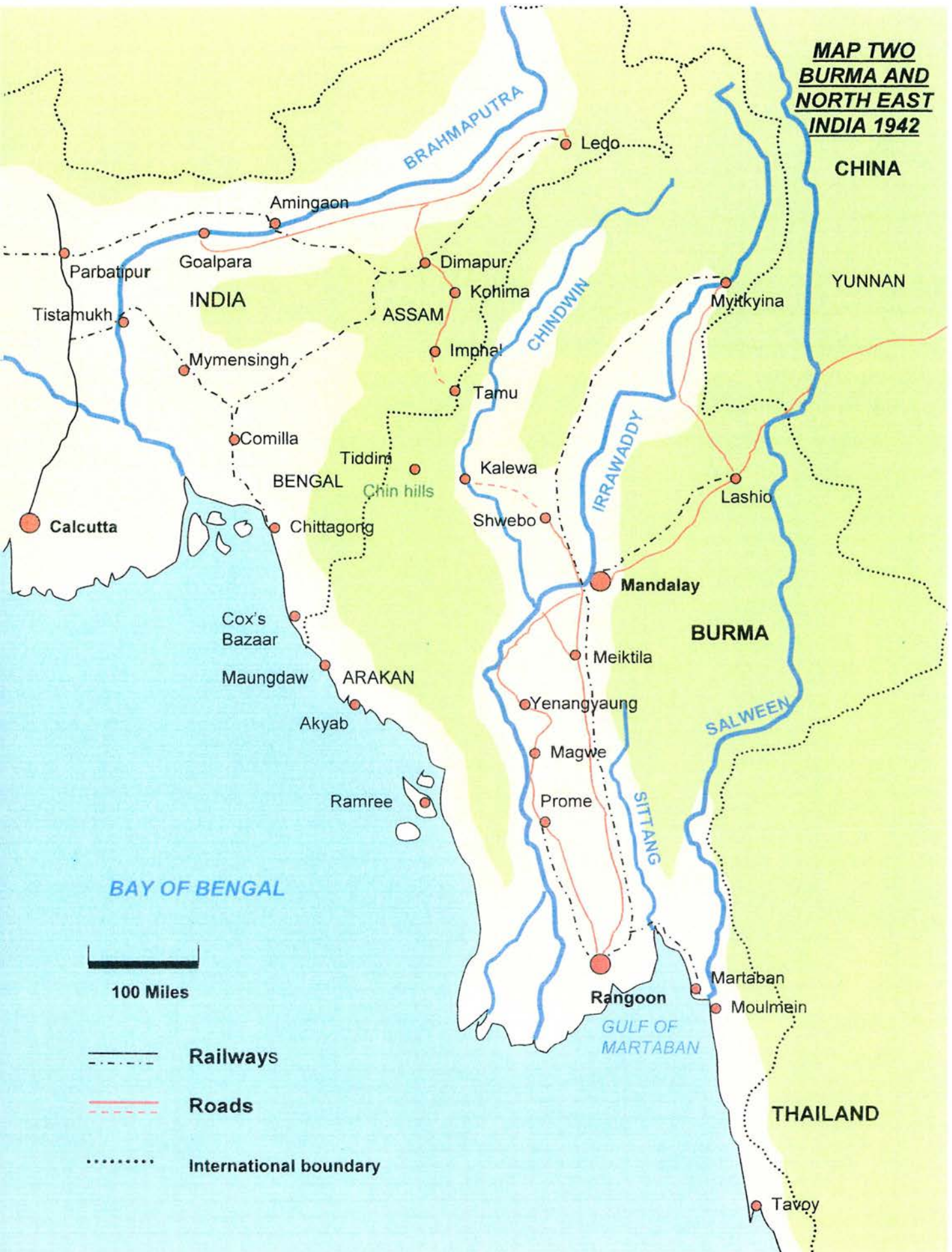
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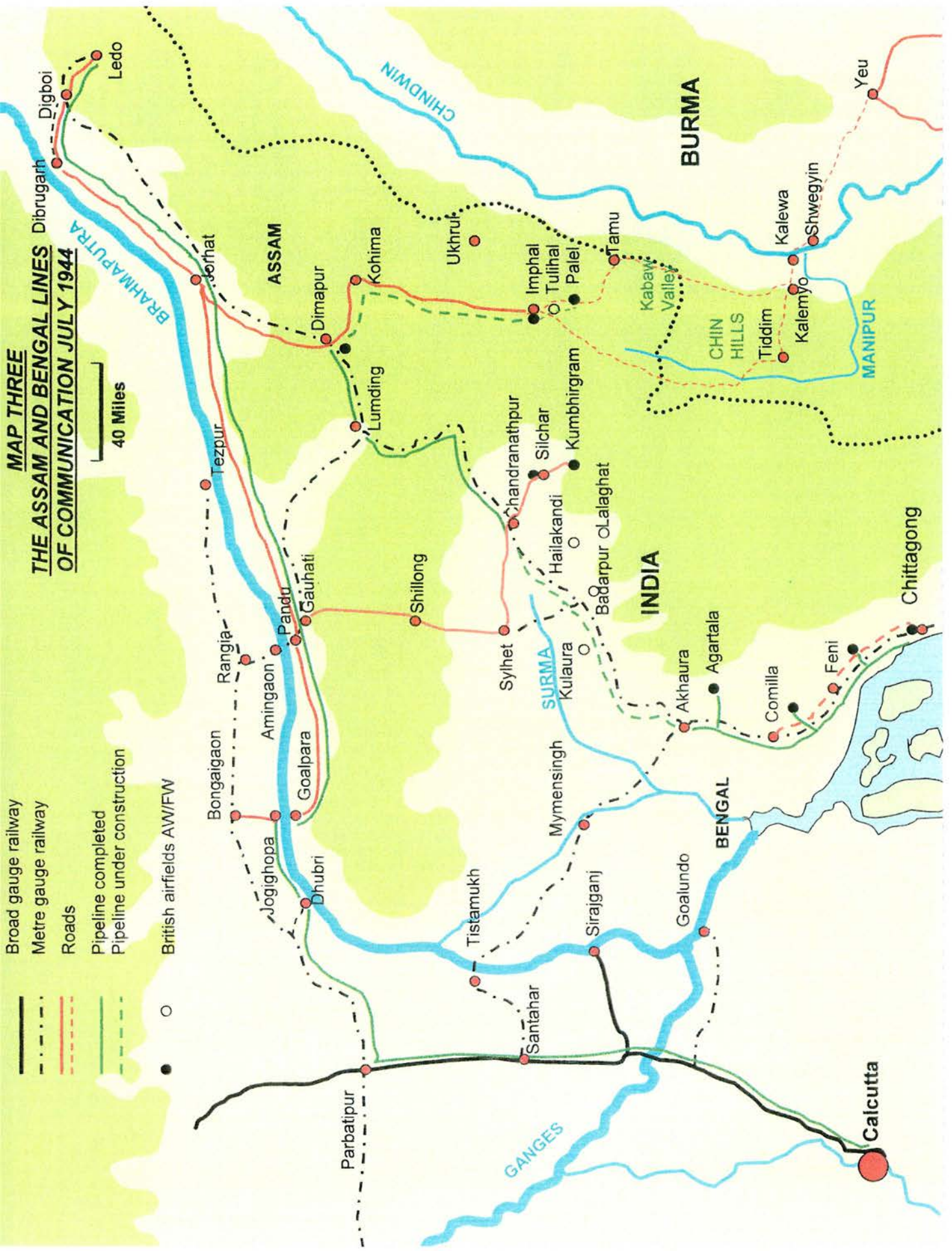
**MAP TWO  
BURMA AND  
NORTH EAST  
INDIA 1942**



**MAP THREE**  
**THE ASSAM AND BENGAL LINES**  
**OF COMMUNICATION JULY 1944**

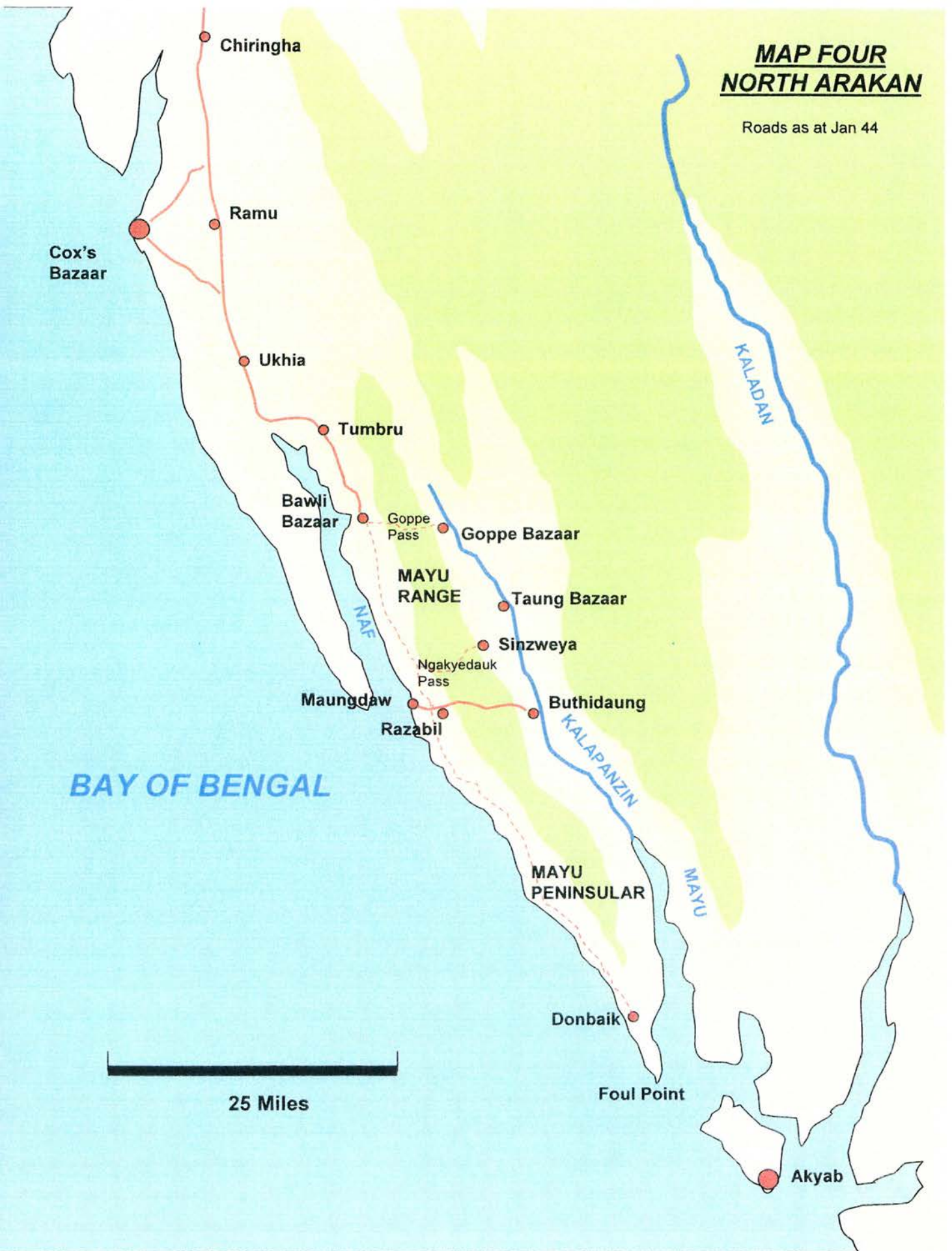
- Broad gauge railway
- - - Metre gauge railway
- Roads
- Pipeline completed
- - - Pipeline under construction
- British airfields AW/FW

40 Miles



**MAP FOUR**  
**NORTH ARAKAN**

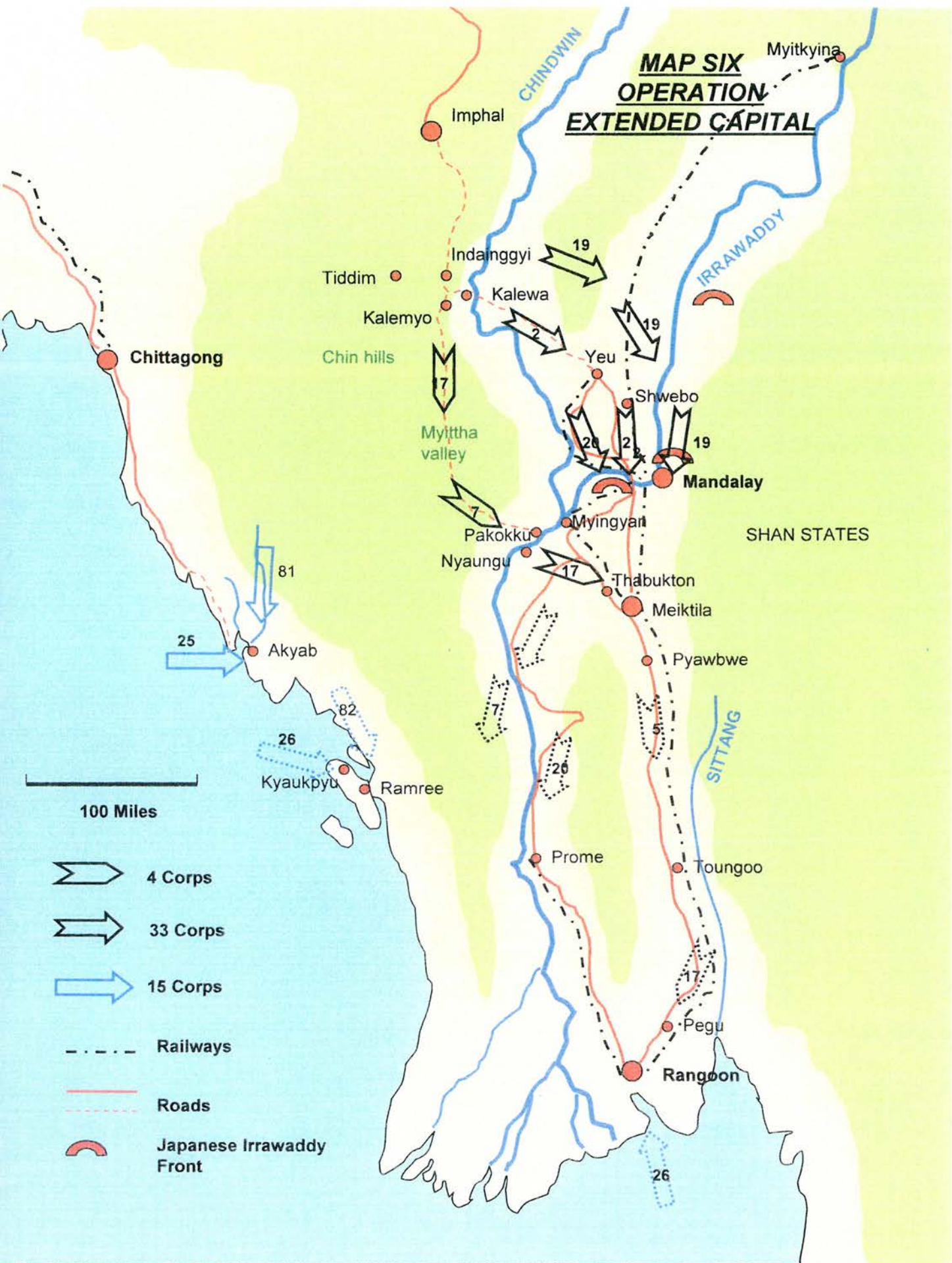
Roads as at Jan 44



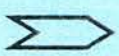
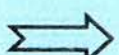








# MAP SIX OPERATION EXTENDED CAPITAL



100 Miles

-  4 Corps
-  33 Corps
-  15 Corps
-  Railways
-  Roads
-  Japanese Irrawaddy Front