CHAPTER 2

OWEN STANLEY CAMPAIGN KOKODA TO IMITA

LATE in June Major-General Morris, commander of New Guinea Force, assigned to the Papuan Infantry Battalion and the 39th Australian Infantry Battalion the task of preventing any movement of the Japanese across the Owen Stanley Range through the Kokoda Gap. The Japanese had not yet landed in Papua, but for months their aircraft had been regularly bombing Port Moresby. Early in July General MacArthur ordered the assembly of a force of some 3,200 men to construct and defend an airfield in the Buna area. It was to begin operations early the following month.

Kokoda was easily accessible from the north coast of Papua by tracks which led gradually up to an elevation of a mere 1,500 feet, where there was a most useful airstrip. From the Moresby end, however, the line of communication by land route ran over the arduous Kokoda Trail, rising and falling steeply and incessantly over a range whose highest peak rose to 13,000 feet, and to cross which a climb of 7,000 feet was necessary.

THE KOKODA TRAIL

This trail was in reality a native road, no doubt of ancient origin, and followed the primitive idea of dropping into deep valleys only to clamber up forbidding heights, instead of the more modern notions of surveying in terms of levels. Even the road from Moresby to Koitaki, some twenty-five miles from the port, was not really practicable for motor traffic until engineers blasted a wider path, and the journey from the upper reaches of the Laloki River to Ilolo, always difficult, became impossible after heavy rain. In the early stages of the campaign only jeeps could venture past Owers' Corner in wet weather, but later, heavier vehicles could make this trip of seven miles along the Imita Ridge. At this point the track rose to over 2,000 feet, and then dropped steeply into the valley down the four miles of the "golden stairs".

In following the vicissitudes of the troops engaged in this remarkable campaign we shall see how the rigours of this formidable trail had a constant bearing on the medical aspects of the fighting. The work at each post, dressing station or resting place was done under difficulties intensified by relentless nature, though even to tired men the scene was often beautiful and always impressive. Colonel F. Kingsley Norris has embodied in a report on the medical services a description which has become so well known that it is part of the history of the action:

> There was but one axis of withdrawal—a mountain track which defies adequate description. Before the campaign, this route had been considered passable only to native or trained district officers. Imagine an area of approximately 100 miles long —crumple and fold this into a series of ridges, each rising higher and higher until 7,000 feet is reached, then declining in ridges to 3,000 feet—cover this thickly with jungle, short trees and tall trees tangled with great entwining savage vines—

through the oppression of this density cut a little native track two to three feet wide, up the ridges, over the spurs, around gorges and down across swiftly flowing happy mountain streams. Where the track clambers up the mountain sides, cut steps —big steps, little steps, steep steps—or clear the soil from the tree roots. Every few miles bring the track through a small patch of sunlit kunai grass, or an old deserted native garden, and every seven or ten miles build a group of dilapidated grass huts—as staging shelters—generally set in a foul offensive clearing. Every now and then leave beside the track dumps of discarded putrefying food, occasional dead bodies, and human foulings. In the morning flicker the sunlight through the tall trees, flutter green and blue and purple and white butterflies lazily through the air, and hide birds of deep throated song or harsh cockatoos in the foliage. About midday and through the night, pour water over the forest, so that the steps become broken and a continual yellow stream flows downwards, and the few level areas become pools and puddles of putrid black mud. In the high ridges about Myola, drip this water day and night over the track through a foetid forest grotesque with moss and glowing phosphorescent fungi.

Through this mountainous country the track wound, in places opening into more or less extensive clearings or areas that would accommodate a body of troops, in others narrowly clinging to a cliff's edge or passing along or through fast running streams. The trail led through Ilolo, over Imita Ridge and Ioribaiwa, through Menari, to Efogi, with its tiring last steep scramble to the village, past Kagi, where the giant shadows of 13,000-foot Mount Victoria fell on the lower peaks of the range, past Myola, with large flat areas of great use to the medical services but not as dry as they looked, and so up to Templeton's Crossing, its highest point rising to 7,500 feet. Then came the precipitate drop to Eora Creek, and so on through Alola, Isurava and Deniki to Kokoda. Kokoda was on a plateau where a grove of rubber trees led from the approaches to the range, and on the other side merged into the station gardens with its deserted house.

Late in June the patrol force of the Papuan Infantry Battalion was well on the coastal side of the range, in the Awala area; as yet the 39th Battalion had not left Moresby and still had before it the task of traversing the trail from Ilolo over the southern side of the range to Kokoda. It was evident that there were difficult and urgent problems of supply to be solved. At this stage little or no help could be looked for from aircraft, for transport planes were scarce, and there were none based on Moresby. The Territories of New Guinea and Papua had produced, before the war, a remarkably air-minded class of white inhabitants, but military transport in the island was not so advanced. The importance of Kokoda in the coming land struggle for Moresby was obvious.

Sea transport to and from the plains below Kokoda was possible only if the necessary bases could be established and held; already it was evident that this was not practicable. An instruction was issued on 15th July to "Maroubra Force", as the composite body north of Kokoda was called, to take and hold Buna, but this was promptly withdrawn. The only practical alternative was to employ native carrier lines over the mountains from Moresby, and Angau had already, during June, undertaken the necessary organisation. On 7th July the first elements of the 39th

New Guinea—General

Battalion began the journey from Moresby to Kokoda. They had no medical officer at this time, but Sergeant J. D. Wilkinson was attached as regimental medical N.C.O. The position in Moresby was difficult with regard to medical assistance. The A.D.M.S., Lieut-Colonel Brennan, was ill, and working under difficulties; medical officers were in increasing demand and the militia troops in Moresby had not had the benefit of thorough training under experienced leaders. The ground forces in Moresby included 1,098 A.I.F., 12,273 militia, and 2,208 Americans. The 39th Battalion was rated as the best of the militia troops.

The organisation and experience of Angau in the work with native bearers was invaluable from the beginning, but the outstanding work and influence of Captain G. H. Vernon demand special mention. Vernon had outrun by age his term as a government medical officer, and left a rubber plantation near Kokoda to offer his services to the army, and was able to rejoin the forces to work with Angau in spite of being obviously much over-age. In a native hospital at Sapphire Creek he found that many of the native carriers then being used along the Owen Stanley track were sick and in poor physical condition. He was sent to Ilolo and there set up a medical base and hospital for carriers and with the help of Sergeant H. P. Ferguson supervised the provision of safe sanitation. His sphere of work was extended to the whole line to Kokoda, and this gaunt old man ranged up and down the track with an activity that disarmed men half his age. He understood the natives, regulated their loads, which were standardised at 40 pounds (previously 50 pounds or more), secured them adequate rest and rations, refused to let them work if truly unable, though he often reluctantly sent tired men out on essential tasks, and looked after them when sick. He understood the reluctance of native medical orderlies to leave base areas for work on ranges, but would not allow them to escape service by subterfuge, and raised their corporate spirit to a higher level. Vernon had a correct appreciation of the physique of many of the native workers, especially orderlies, who had softened in easy work at the base, but later these men became adept at hill climbing. He admitted in his diary that the first of the Owen Stanley hills was a great deal worse than he had expected, but he surprised experienced Angau warrant officers in his ability to withstand the incessant ups and downs of the rough slippery trail.

THE JAPANESE ATTACK

While Vernon was making his reconnaissance of the trail with his native carriers an important event occurred which radically changed the position. On the evening of 21st July the Japanese attacked Buna and Gona from the sea; they shelled Gona and bombed Buna, and made successful landings through the night and on the following day. They lost little time in moving on, and were sighted by a patrol at Sangara on the evening of the 22nd. Next day the first part of the 39th Battalion, which had advanced as far as Awala, was involved in a clash with the advance elements of the Japanese force. Additional medical aid was imperative.

At the Moresby end the remainder of the 39th Battalion was now ordered to move to Kokoda. The R.M.O., Captain J. A. M. Shera, accompanied "C" Company on 23rd July, and the next day Captain W. W. McLaren and five O.Rs. detached from the 14th Field Ambulance, were sent from Moresby to establish a dressing station in the Kagi area on the Owen Stanley Range. Each member of his party took a load of 47 pounds, 17 pounds of which was carried by natives, who also transported medical and surgical equipment and stores, and ordnance stores. A further party from the battalion left Moresby on the 25th. The remainder was to move by air to Kokoda, beginning on the following day, but only two plane loads could be landed by the sole available transport plane.

On the 25th Brennan was forced to relinquish the position of A.D.M.S. of New Guinea Force through illness, and returned to the mainland. Lieut-Colonel N. S. Gunning was appointed Acting A.D.M.S. in his stead.

At the other end of the long tortuous line of communications the 39th Battalion was now being withdrawn to Kokoda. Vernon reached Deniki on the 27th through the rough gorges from Eora, and reported to the commander of the 39th Battalion. As medical officer to the carriers he had come forward to give them medical care, and he placed himself at the disposal of the troops if he was needed. The battalion was still without a medical officer as the R.M.O. had not yet arrived, and Vernon, on being told to stand by for orders, lost no time in joining Wilkinson and one of the Angau medical assistants, Warrant Officer D. S. Barnes, who had joined this part of the force after retirement from Awala was ordered. He found them busy attending to many men with painful and damaged feet, and others with malaria, no doubt relapsing attacks. Some were seriously ill from the combined effects of malaria and exposure to the cold and wet of the higher levels. Next morning after a cheerless night in the cold windy extemporised hospital, Vernon was ordered to join the main body of the battalion with Barnes at Kokoda.

The opposing forces facing each other in the Kokoda area had terrain of a very different kind behind them. The Japanese were pressing forward from their recently acquired bases at Gona and Buna with but a short distance for their troops to cover over gradually rising slopes leading to the heavy toil of the mountain trail. The incomplete and meagre 39th Battalion had behind them the incredible line of communication of this trail, which was, unless they could deny the Kokoda airstrip to the enemy, their sole link with Moresby. Over this trail had passed some of the defenders, and Vernon with his band of native carriers from Ilolo on the southward slopes. Over it was approaching the remainder of the 39th Battalion with the R.M.O. and McLaren's medical party, which caught up with the battalion at the fertile valley of Nauro.

ACTION AT KOKODA

The last air trip to Kokoda brought in another platoon from Moresby on the 26th, but "A" and "C" Companies of the 39th Battalion had not yet arrived. Next day walking wounded were sent back from the Kokoda

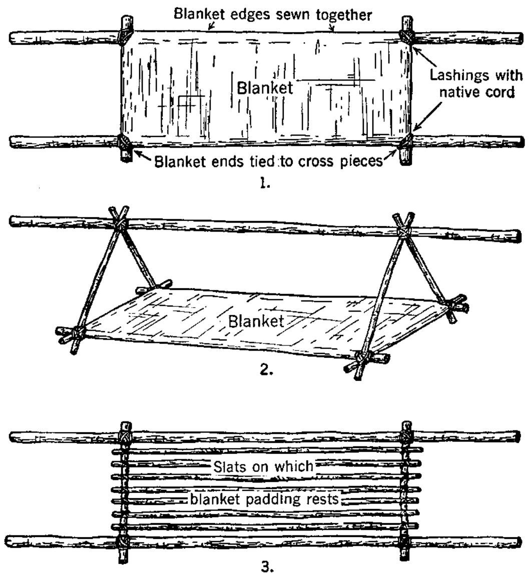
area, and as Oivi was found untenable the battalion began to withdraw. An R.A.P. was set up in the police house at Kokoda, and was prepared for casualties. Early on a cold evening with the light of a full moon shining through the mist on the heavily shadowed rubber trees, the Japanese attacked. The first casualty was the commander, Lieut-Colonel W. T. Owen. Vernon moved him to the R.A.P., but he was mortally wounded by gunshot fire. There were only a few other casualties and these were not serious, and after their wounds had been dressed they retired to Deniki with the troops. Major W. T. Watson, commanding the Papuan Infantry Battalion, was now in charge; he and Vernon were the last to leave, and ensured that no one needing help was left behind before they made their way out through the gathering mist. By dawn they were in the foothills, and the wounded were tended, including some who had not gone through the aid post. Retreat was inevitable with some ninety men facing a force much superior in numbers, and most of the medical equipment except the instruments had perforce to be left behind. So Kokoda was left in its misty silence, with the high peaks of the ranges and the stream-cleft valleys between the little Australian force and its base.

Early on the 29th all but the rearguard reached Deniki in drizzling rain where the wounded were seen and further treated. McLaren's field ambulance party had meanwhile caught up with "C" Company of the battalion, and learned that "B" Company had clashed with Japanese patrols at Awala. Pressing on to Eora Creek they learnt the disquieting news of the loss of their commander, and of the forced retreat of "B" Company after heavy fighting. Next day McLaren's detachment arrived at Eora Creek and on the advice of Watson set up an aid post there. The Eora Creek post was in Vernon's opinion badly sited, as it was too far from Kagi for the carriers and would have been better to be nearer Templeton's Crossing on level ground. The camp "was a little side knoll, high above the streaming white creek below—a dreary windswept sunless perch with great mountain walls towering on each side". Shortly afterwards the first casualties arrived and were treated in native huts made available by Angau. "A" Company of the battalion arrived there the same day, and the next day further casualties were brought in on stretchers by native carriers. Their wounds had been dressed by Vernon and Wilkinson at Kokoda or Deniki before they left; they were now redressed with sulphanilamide, and dosage by mouth was administered.

Shera came forward on the 30th with the first reinforcements to the battalion, and relieved Vernon, who returned over the trail to Isurava. Here he met McLaren, who asked him to look after the wounded at Eora Creek until further relief arrived. At Isurava, about 4,500 feet above sea level, as at other relatively high elevations, the climate presented a contrast to the humid heat of the coastal areas. Not only the sick and wounded needed protection from the cold, especially on damp misty nights; the soldiers and carriers also suffered considerable discomfort, often much accentuated by exhaustion. The rest hut was clammy in the misty air; its best part was described as the kitchen, with its fire and its cheerful cooks,

including one volunteer with a badly inflamed leg. Vernon returned to Eora Creek and there looked after all the sick with the help of an inexperienced orderly.

Most of the gunshot wounds were caused by the small calibre Japanese bullets which produced less injury and pain than those caused by other weapons. At this time and place it was fortunate that more difficult problems did not arise. It was found better not to interfere with wound dressings except for good reason. Even the wounded themselves did not always understand that care for their bodily needs was more important than re-dressing a wound which had been dressed a few hours earlier, though most of them were stoical of discomfort. On such terrain it was obvious that the walking sick and wounded needed fortitude, and the medical officers had to exercise firmness and discrimination. It was in the interests of some of the men to keep them at Eora Creek to allow them to improve before they faced the journey to Moresby. Indigestion was a common complaint; bicarbonate of soda gave relief but the supply was scanty.



Stretchers as used during Owen Stanley campaign

The condition of the native carriers caused some concern; for two weeks they had had only rice to eat, though they carried tinned meat for the troops, and they suffered from cold at night owing to the shortage of blankets. Vernon strove to save the carriers from being overloaded, and from undue discrimination in their treatment, and conserved his labour force as best he could. At least eight bearers were needed for each stretcher case; no less number could carry a sick or wounded man over the track in safety or comfort. The hardest work allotted to the natives was that of carrying wounded on stretchers. The start of the homeward trail from Eora was particularly difficult, it led up one of the steepest and roughest hills on the whole track: physical effort was needed to keep foothold on the stones and roots on its almost vertical slopes; for the barefoot stretcher bearers it was a severe trial. Keeping wounded men at Eora a few days sometimes enabled them to walk, thus saving unnecessary strain on the bearers. Norris has described the work of the native carriers as follows:

With improvised stretchers—one or two blankets lashed with native string to two long poles spread by stout traverse bars—as many as eight or ten native bearers would carry day after day. To watch them descend steep slippery spurs into a mountain stream, along the bed and up the steep ascent, was an object lesson in stretcher bearing. They carry stretchers over seemingly impassable barriers, with the patient reasonably comfortable. The care which they show to the patient is magnificent. Every need which they can fulfil is tended. If night finds the stretcher still on the track, they will find a level spot and build a shelter over the patient. They will make him as comfortable as possible, fetch him water and feed him if food is available—regardless of their own needs. They sleep four each side of the stretcher and if the patient moves or requires any attention during the night, this is given instantly.

The problem of dialects was difficult among these boys; bearers were sometimes assembled in groups who could not talk to each other. The Angau representatives were very helpful here and were able to group together the boys with a common tongue.

RETREAT FROM KOKODA

During the last two days of July the remainder of the 39th Battalion arrived at Eora Creek from Moresby. Here also casualties from the forward areas had collected, most of them suffering from exposure. The forward troops were still in contact with the Japanese, but only with patrols. At this time rations were scarce, and in order to avoid difficulties all sick and wounded who were able to proceed on foot were sent back along the trail, while stretcher cases were brought up by carriers and held for the time being. It was obvious that the slender Australian forces would need substantial strengthening in all ways and this would probably depend in the main on the use of one land route over which would come reinforcements, food, ordnance, and medical supplies. Medical care would certainly create an increasing problem likely to extend the capacity and ingenuity of the services concerned.

On 1st August the detachment of the 14th Field Ambulance took its equipment up to Isurava and there set up a post in a native rest hut. Sick and wounded men continued to come in over the next few days, but those unable to walk had to be held at Isurava owing to the limited numbers of native carriers. Therefore the possibilities of Deniki as a medical centre were considered, and McLaren was prepared to move his party on if the force took Kokoda. On the 7th the detachment buried excess equipment, and leaving an orderly at Isurava, went on to Deniki. Little was gained by this movement, as the situation in the forward areas was still fluid, and pressure from the Japanese made it necessary for McLaren to return to Isurava two days later. His party brought several patients on stretchers and asked by signal that further medical help should be sent up from the base.

Meanwhile the A.D.M.S. of New Guinea Force had strengthened the resources of the medical parties at the Moresby end of the track, and sent another detachment to Ilolo under Lieutenant W. R. Adam, comprising A.A.M.C. orderlies and motor transport, so as to have a post established

there accessible to Moresby. In accordance with McLaren's request Captain D. R. Wallman and nine other ranks of the 14th Field Ambulance left Ilolo equipped to deal with surgical work.

Before this detachment arrived to help fill the gap in medical and surgical aid between the roadhead at Ilolo and the forward areas, casualties began to increase in numbers, as the result of attacks and counter-attacks at Kokoda. Diarrhoea had begun to be troublesome among the men too, and by the 12th was so prevalent that preliminary arrangements were made to establish a diarrhoea hospital at Alola village forty minutes farther back from Isurava. Heavy fighting was now taking place at Deniki, and on the 13th the 39th Battalion withdrew from the Deniki area to positions at Isurava, over some of the steep declivities leading to the higher elevations of the range. Unfortunately the battalion lost all its medical equipment during this movement, and arrived at Isurava short of rations and with no supplies of blankets or clothing. The medical detachment took its patients and equipment back to Alola, and next day withdrew its main medical post to Eora Creek. Shera was ill but took over the work of the field ambulance detachment temporarily, while McLaren relieved him of the battalion duties. A staging post was also set up in charge of two orderlies at Templeton's Crossing. The pressure of the Japanese was lessening after their strong attacks, and on the 16th a brief period of relative respite began.

On that day the dispositions were as follows: Headquarters 30th Brigade (Brigadier S. H. Porter) at Alola, 39th Battalion (Lieut-Colonel R. Honner) near Isurava, and two companies of the 53rd Battalion, which had just arrived from Moresby, with a detachment of the P.I.B. also at Alola. Patrols were out along the two alternative tracks forward of Alola, both of which were likely to be used by the enemy moving from Kokoda and the Kokoda-Oivi track.

ARRIVAL OF 7TH DIVISION TROOPS

The most important event at this time was the arrival of the 7th Division A.I.F. Mid-August found the headquarters of this experienced division in Moresby, and on 12th August the Headquarters of the I Australian Corps arrived with Lieut-General S. F. Rowell in command. The medical services welcomed the help of the seasoned 2/6th and later the 2/4th Field Ambulances, though both units when they arrived were 20 per cent under strength. The increase in trained medical staff made possible the establishment of a series of relay posts down the track at Deniki, Alola, Eora Creek, Kagi, Efogi, Nauro and Uberi. Plans were made for casualties to be treated and held in these posts, and evacuation would be by native carriers, using native stretchers to the lower levels beyond Imita Ridge to a point where patients could be transferred to hospitals in the Moresby area by motor transport.

On the 19th and 20th a detachment of the 2/6th Field Ambulance, comprising two officers and thirty-one O.Rs., went forward under command of Major J. R. Magarey, senior medical officer of the forces in

the forward areas. A party of twelve O.Rs. of the 2/6th Ambulance supervised native bearer squads in the transport of patients from the R.A.P. to the advanced dressing station at Isurava, and the rear dressing station of the 14th Ambulance at Eora Creek where Wallman and his party had set up a main post and were able to take patients from the advanced post at Isurava.

The force now came under command of the 7th Division, and on the 23rd two battalions of the 21st Brigade, the 2/14th and 2/16th, were coming along the track. Supplies presented an even greater problem with the increasing numbers of troops: even the 600 native bearers who were working on the ranges could not supply all needs. The most useful adjunct to ground porterage was dropping supplies from the air, a manoeuvre demanding skill in packing, in choosing accessible spots for dropping, and in retrieving. Wastage was inevitable, but by using a "dry" lake at Myola near Kagi the "biscuit-bombers" could drop supplies with a reasonable percentage of successful recovery, and a fair reserve of supplies was thus collected. Unfortunately Japanese raids during the third week of August caught the transport planes on the Seven-mile airfield at Moresby, inflicting a loss which was perhaps the most serious of the many air raids in Moresby over the previous six months of frequent attacks. More aircraft were at length obtained, but the position was still insecure. The 39th Battalion was withdrawn to rest, but the 53rd was still in position; the 2/14th Battalion relieved the 39th, and was accompanied at Myola by the 2/16th.

Brigadier A. W. Potts of the 21st Brigade took over the command, on 22nd August. The existing posts at Isurava, Eora Creek and Templeton's Crossing were stabilised, and McLaren resumed control of the 14th Ambulance detachment.

WITHDRAWAL OVER THE RANGES

Other posts were rapidly being opened along the track with the additional personnel and equipment now available. Magarey had orderlies sent to Uberi, Ioribaiwa, Nauro, Menari and Efogi and reached Myola himself on the 22nd. At Myola he left Captain J. M. Oldham and orderlies and went to Templeton's Crossing, where a staging post was established. The scope of medical attention along the trail was thus considerably extended, and the post at Templeton's Crossing was meant to be used as a convalescent camp. Here, as at Myola, walking casualties were to be kept only until they were able to return to the base areas. The condition of most of these men was satisfactory, and thanks to care and the use of sulphanilamide, wounds were clean. Additional hospital facilities were now available for men reaching the Moresby area after the establishment and rapid expansion of the 2/9th A.G.H.

The brigade commander decided on the 24th that anti-malarial precautions be discontinued until further notice. This notice could have been given when the troops were north of Deniki, for at the higher elevations of the range there was no need to trouble about mosquitoes. The need

for greater attention to hygiene was stressed, and track discipline was imposed to include control of all persons passing along the trail and to prevent movement by unauthorised persons. A supply of ascorbic acid and salt tablets was laid down as being necessary with rations. Deficiencies of medical equipment were listed with the object of obtaining these from Moresby.

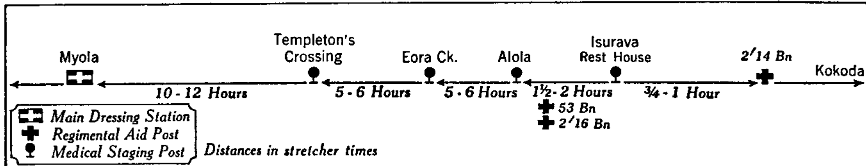
A medical plan was adopted to fit into the general tactical plan, by which the capture of Kokoda was envisaged, together with the cutting of Japanese communications between Kokoda and Oivi. Medical evacuation to suit these tactics was therefore planned on the unusual method of sending patients forward instead of rearward, so that they might be transported to base by air from Kokoda. The 2/14th and 2/16th Battalion casualties would thus be taken by regimental stretcher bearers to the forward posts, and thence by native carriers from the R.A.Ps. It will be seen that this plan could be fully implemented only if Kokoda was captured from the Japanese.

The period of remission of hard fighting on the mountains did not last long. On the 25th and 26th the rest house at Isurava was subjected to mortar fire, and the staff of this forward medical post was compelled to withdraw to Eora Creek, taking all equipment and casualties, including twenty-two stretcher cases. The 2/14th Battalion now withdrew to Isurava from more forward areas, and met intensified enemy attack from the 27th to 29th resulting in sharp losses. The 53rd Battalion began an advance towards Missima, but met heavy resistance and retired to Eora Creek. In this action the commanding officer Lieut-Colonel K. H. Ward was killed. Wallman's detachment found ample use for the surgical instruments and equipment they had brought from Moresby, and set up a surgical unit at Eora Creek. During the period from 4th to 29th August when McLaren's detachment had treated sick and wounded at Isurava, no casualties had been evacuated, but now some adequate method of disposal was imperative, though the difficulties were immense. Small groups of soldiers were passing at intervals up and down the track, native porters still carried stores, bearer squads still performed their arduous tasks, and walking sick and wounded made the best of their way back to the rearward posts. But this, the only practicable system of medical evacuation, could not be augmented except on a small scale. There was now a medical post of the 2/6th Field Ambulance at Myola, with Oldham and twenty-four men, and the same unit had staging posts at all the regular stops along the way.

The medical officers of the 2/14th and 2/16th Battalions, Captains D. G. Duffy and H. D. Steward, arrived and conferred with Captains Shera and A. B. Hogan of the 39th and 53rd Battalions: there was also discussion with the battalion and company commanders. The Japanese machine-gunned Alola village across the valley on the 27th: there were no casualties and the R.A.P. of the 2/16th Battalion at Alola was not moved. The aid posts of the 2/16th and 53rd Battalions were within fifty yards of one another, and were able to give mutual help in staging

casualties from Isurava. It would have been easier to move the surgical team forward from Eora Creek to the rest house, as this would save long carries, but movement would probably have invited further mortar fire. Duffy moved his aid post to take over from the 39th Battalion and was caring for many casualties.

The position is shown in the accompanying diagram.



Stretcher Times

On the 29th one man was killed and five wounded in a machine-gun attack on an area including the 53rd and 2/16th aid posts. Hogan, medical officer of the 53rd Battalion, was among the wounded.

Shortly afterwards, the brigade commander decided to withdraw, as the 2/14th Battalion was being outflanked and the brigade headquarters was coming under fire. There were then twelve lying patients at Alola, but by calling on all available carriers these were moved back from Alola. It was a very slow movement: there were not enough native porters, and Steward with his orderlies and others helped to carry stretchers. A message had been sent to Eora Creek to send forward all unladen carriers, but none were found in the gathering darkness. A suggestion was made to bring back carriers with lamps along the track, but the Angau officers advised against this, lest the natives so used be found missing in the morning. The brigade commander agreed by telephone that the native carriers be brought up at dawn. Warrant Officer F. A. Lord of Angau managed to find more natives and the movement of the stretcher cases began again towards Eora Creek. The superiority of the natives in this work was well in evidence: the white carriers could manage on a level track, but over the many steep and difficult places the patients had more discomfort, and the bearers became exhausted.

The mountainous jungle country in the region of Eora Creek imposed trials which were made worse by the conditions of living. Most of the infantrymen had only an anti-gas cape as poor protection from the tropical rain, which began regularly in the afternoon and continued through the night. The nights were very cold on the mountains, and it was impossible to supply warm food, owing to the closeness of the enemy. All drinking water was chlorinated in the bottles and was distasteful. The troops had to carry food and ammunition to the higher levels; these tasks occupied the day and sometimes part of the night. Food was scanty: one tin of bully beef was divided among seven men. Milk powder was found useful in feeding the wounded, who appreciated even a thin paste stirred with

the chlorinated water. The mental strain was even worse than physical fatigue. They could see little more than a few yards on either side through the dense jungle, and the risk of ambush was ever present.

Wallman and his detachment from the 14th Field Ambulance withdrew from Eora Creek to Templeton's Crossing with all their surgical equipment and supplies. All walking sick and wounded accompanied the party, and twenty patients were transported on stretchers. McLaren with three orderlies and twenty-three stretcher patients, walking wounded and such supplies as could be carried, withdrew to Eora Creek.

As the village at Eora Creek was in an exposed position it was desirable to move the stretcher patients some distance up the hill above the stream. There were not enough carriers available for this work, but after a personal appeal several men managed to walk with assistance, and at last reached the brigade headquarters, where they could be kept under cover till the morning. With the help of members of the Papuan Infantry Battalion and some carriers, all the patients were moved before dark to a high grassy area where they could be more or less protected against the cold and misty rain. Two patients had abdominal wounds, and one a sucking wound of the chest. Since they had no apparent chance of survival and no surgical measures were possible, Magarey advised a large intravenous dose of morphine, the action of which illustrated the extreme tolerance of persons with such injuries, but insured at least comfort in their last hours. Though abdominal injuries have always a high mortality, it is one of the tragic frustrations of medical services at war that some men who might have a possible chance of survival are doomed under conditions such as prevailed on the Kokoda Trail. After dark, several patients were found on stretchers some distance up the hill: the native carriers could not be found, but members of the P.I.B. brought them up safely by the light of a signals torch.

The only surgery permissible was the performance of purely life-saving measures, and Wallman's party with their equipment was sent straight on to Templeton's Crossing, where stretchers for the remainder of the journey to Myola would be brought by the supply line. McLaren's party was still at Eora Creek.

Up to this time no stretcher patients in McLaren's party had been sent back beyond Eora Creek, but it was now necessary to send them to Myola. It was hoped that aircraft could land on the "dry" lake at Myola, and take patients to Moresby, for the local position with native bearers did not then encourage the belief that a carrier force could be maintained of sufficient size to take lying casualties back to Ilolo. However, the immediate concern was to get patients back safely to Myola. This would occupy several days, during which the native carriers would not be available for transport of supplies. The only solution of this dilemma was to employ them on both outward and inward journeys, taking patients in one direction and supplies in the other. This endangered the stamina of the Papuan boys, and Angau officials were averse to it, but no other alternative could be seen.

By the 30th the whole medical detachment from the 14th Field Ambulance had arrived at Templeton's Crossing, where all sick and wounded and natives were fed, stretchers were repaired and adjusted, and dry blankets provided where possible. In view of the long carry ahead to Myola, some ten to twelve hours, rations for three meals were provided, and Lord, using carriers on hand and others as they arrived from Myola, contrived to have the whole party moving along the track in time for their arrival at Myola with an hour to spare before dark. McLaren kept a few orderlies at Templeton's Crossing to look after any new arrivals, who were held overnight and despatched early next morning. Wallman's team accompanied the stretcher patients on the journey to Myola, apportioning one orderly to each two or three stretchers.

Fortunately the supply of native carriers improved at this time, and Warrant Officers R. Preece and J. B. Davies of Angau were able to carry out the necessary arrangements with great success. They were able to allot a certain number of carriers solely for transporting casualties from the battalions to the nearest medical post. The only hitch came when word was received that air evacuation from Myola would not be possible. Oldham had held all patients there in the hope of planes coming in to Myola, but now it was necessary to instruct him to send on by road as many patients as possible. However, the brigade commander still hoped to hold Myola, and the medical services therefore hoped to continue successful care and movement of casualties in that area. This was of some significance to the morale of the force, especially as casualties might be expected in the battalions covering the withdrawal. The tactical difficulties in removing aid posts were evident also to the troops, for the carrier force was scanty and the natives tired, and at the high elevation of this part of the trail the cold nights inflicted hardships on all men not under shelter or without adequate cover.

The enemy attacked strongly at Isurava on the 30th, and in spite of assistance from the 2/16th Battalion the Australian left flank was broken. During the afternoon Potts had ordered a withdrawal to Eora Creek, but later, as the movement began, Lieut-Colonel A. S. Key and a number of his officers and men were cut off from the main body. Ten men were known to have been killed, and eighteen wounded; at that time many more were at least temporarily missing. It was known that the enemy was receiving reinforcements, and that he was using these to infiltrate round the Australian flanks. At this time the 39th and 2/14th Battalions held positions at Eora Creek. The headquarters and two companies of the 2/16th Battalion had reached the track near the brigade position, and the balance came through later, when the battalion maintained a position farther back. The brigade headquarters was mid-way between Alola and Eora Creek. The 53rd Battalion had been sent out of battle.

When the brigade commander arrived at Templeton's Crossing on 1st September he decided that Myola could not be held. Though the 2/14th and 2/16th Battalions held the direct route to Myola, there was a risk in the use of the alternative track by the Japanese. The brigade commander

instructed that all patients at Templeton's Crossing were to be sent on to Efogi as rapidly as possible, though time was not so pressing that patients could not be staged at Myola for the night. The carrier system remained the same as before, with a difference, that supplies and stretchers were now moving in the same direction.

On the night of the 1st there were over forty stretcher patients at Myola, and arrangements were made with the supplies organisation to have the use of carrier teams to transport the patients right back by stages to the roadhead at Uberi. Efogi, though over 1,000 feet lower than Myola, was in the zone where cold moist nights were still experienced, and was reached by hard climbing up and down to the Brown River Valley. This post was only for staging sick and wounded as they came back along the track.

Three medical officers with an ambulance detachment set up a post at Menari. When troops first passed through Menari it was a quiet and prosperous place with scattered villages, where peaceful Papuan folk were living their traditional life untroubled by war. But now, the aid post in Menari received in one day some 60 stretcher cases and 200 walking sick and wounded. These were examined, classified and dressed or otherwise treated as required. It was evident that as retirement continued and the ever-moving stream of sick men reached the lower levels of the trail their numbers would increase.

The general plan then adopted was as follows. Major D. W. Brummitt of the 2/6th Field Ambulance ran the post at Efogi for staging only, while the main post at Menari was run by Wallman and McLaren of the 14th Field Ambulance until they moved back, when Oldham of the 2/6th Field Ambulance took charge. A kitchen was set up along the Efogi track to feed patients and their bearers without their having to come into Myola, and the last patients to leave for Efogi were accompanied by Oldham early on the 2nd. All patients who were expected to be fit to return to their units in seven to ten days were to be held at Menari or at Nauro where the 14th Field Ambulance established posts. The medical post was withdrawn from Menari the next day, and set up at Nauro with facilities for surgery. This post had three medical officers and detachments from the 14th and 2/6th Field Ambulances. The supply problem was seriously discussed at this time, particularly in relation to the damage to supplies dropped from the air. Wastage was heavy, but a certain proportion could, it was thought, be prevented by more careful packing. On the 3rd, the 2/14th and 2/16th Battalions were covering the withdrawal from Myola, the 39th Battalion had moved on to the Kagi area, the 2/27th Battalion having then reached positions around Efogi.

EVACUATION OF CASUALTIES

While the troops were making a fighting withdrawal from the highest parts of the track over the range, arrangements were being made for the care of the casualties slowly passing down the trail towards the upper base area. A detachment of the 14th Field Ambulance had established a

staging post at Ilolo on the 7th August, and had first received battle casualties on the 18th. Now the numbers of sick and wounded were increasing. The first battle casualties seen there were men who had walked from the front line, but it was not until the 3rd September that the first stretcher cases arrived. Next day stretcher parties brought thirty-six sick and wounded, and the weather being dry at the time these men were transferred by trucks and motor ambulance from Newton's Dump[1] to Ilolo. The following day, the 5th, forty-two stretcher cases, twenty-five sitting wounded, and twenty-two sick were sent to Koitaki hospital (mostly men with malaria or exhaustion) and the infectious diseases hospital (men with dysentery).

Evacuation of the sick and wounded who left Myola was proceeding in accordance with the general plan. Since more travelling lay before the patients on stretchers they were made as comfortable as possible on leaving. Dressings were changed, new stretchers were made, and every patient left on a fresh stretcher, with four new blankets, a ground-sheet and a water-bottle, thanks to an improved supply system. All equipment was packed, and haversacks were prepared for use in staging patients at Myola. On the 4th Magarey left Myola for Efogi, where the 2/14th and 2/16th Battalions were staged for the night. He found their physical condition was poor: they were active and cheerful, though they were tired, and most of the men were having trouble with their feet.

Another and much more serious problem had arisen since the beginning of September. Mild diarrhoea was becoming increasingly more common, and this was one reason why three medical teams were held at Menari and Nauro, where there were also numbers of wounded needing surgical attention. It became evident that in spite of the intrinsically mild type of this disorder, the force was experiencing an epidemic of dysentery which had reached a rate of fifty to eighty cases per day. Sulphaguanidine was badly wanted, but there were no supplies. Only small supplies of magnesium or sodium sulphate were available, and these made little impression on the condition.

Battle casualties were being sent down by stages to the base, except in cases where surgery was urgently necessary, but all patients with dysentery were still being kept on the ranges. The need for great care in disposing of excreta was realised, but the difficulties in implementing this can be easily understood. It was impossible for all bearer parties to reach a main staging post before dark, and dawn found some still on the track. But in spite of these complications, by the time the last troops arrived at Efogi all sick and wounded had received attention and were sent on. Urgent requests were made of the A.D.M.S. for foot powder and spirit, and new socks and boots, and in the meantime massage and other general measures were adopted. Some medical supplies had been dropped from the air, but owing to the difficulty of communications between the brigade headquarters and the troops, little had reached the men. Natives of the

[1] Newton's Dump, otherwise known as Potts' Tea Rooms, was a post for refreshments four miles from Ilolo: its staff established an aid post for men in the area

supply line were still carrying stretchers to the headquarters, which was then at Menari. The strain was felt by all, though a quiet day at Menari was helpful. Medical officers, like others, were not immune to illness, and McLaren was sent back with dysentery and malaria.

The Japanese had taken Efogi on the 6th, and further withdrawals were necessary. The 2/27th Battalion was south of Efogi village and maintaining contact with the enemy by patrols. The men of this unit were forced to retire, taking casualties with them, and made a wide sweep through most difficult country towards Jawarere; nothing further was heard of them until the 21st.

Meanwhile, on the 8th, the Japanese outflanked the position of the 2/16th Battalion and cut off brigade headquarters from the battalion, leaving only an unreliable radio communication. The troops fought hard to extricate themselves from this position, and the situation was such that a few patients who were kept overnight at Menari were guarded by members of the A.A.M.C. armed with rifles. Oldham was instructed to cease holding patients and to send them all on; he and Wallman prepared to move to Ioribaiwa, and sent back 50 stretchers and 100 walking casualties to Nauro. The following day brigade headquarters and the 2/14th Battalion withdrew to Nauro; the 2/16th Battalion was still at Menari.

At this time communications were so poor that nothing was known at headquarters of what was being done with casualties in the battalions. All patients were cleared from Menari, and on the arrival of Colonel Norris at Nauro a team was sent back to form a staging post south of Nauro. Before dusk on the 9th, 104 sick and wounded had been dressed and fed there by Brummitt's party.

Major R. J. Humphery had now taken over from Magarey as S.M.O., and Oldham and Wallman had arrived at Ioribaiwa. It was difficult in the prevailing circumstances for field ambulances to control their detachments in the usual way. Hence Norris instituted the system of sending an A.A.M.C. major forward with brigade headquarters to control medical arrangements. This plan worked very well.

On the 10th the 2/14th and 2/16th Battalions were only 307 strong between Nauro and Ioribaiwa, but reinforcements from other units were moving forward. The next day the force began the withdrawal to Ioribaiwa, where the 2/14th and 2/16th Battalions were organised as a composite battalion, and orders were issued that this position was to be held. The Japanese made a strong attack, but made no gains. At this time the 2/27th Battalion was still out of contact, so too was part of the 2/14th Battalion, but the remnants of the 2/14th and 2/16th had been cleared of sick and wounded, and Brummitt's team moved from Nauro to Ioribaiwa as soon as all patients had passed through.

The lines of communication with the upper Moresby area now came under the administration of the 7th Division, and opportunity was taken to improve the hygiene in these localities. At intervals along the track from the forward areas to the roadhead, deep-trench latrines were con-

structed. At Uberi the ground all round the native village was badly fouled: this was burnt off, with the old huts, and the whole area was cleansed.

The 2/6th Field Ambulance began to relieve the section of the 14th Ambulance at Ilolo on the 6th. This relief was completed in two days, and the 14th was then able to gather its detachments, and staffed a dressing station for minor illness or injury, at a site on the road to the base area. This was of great assistance in handling minor casualties, as the hospital position in Moresby was still strained. Up to the 8th September 497 men passed through this staging post; of these 179 had gunshot or similar wounds, and 18 had disturbances of the nervous system.

The 14th Field Ambulance detachment, having been freed of forward duties by the 2/6th Ambulance, was also able to establish a car post on the Laloki River, and through this sent men from the aid posts back to the unit's M.D.S. The posts at Ilolo were under the charge of Lieut-Colonel F. N. Chenhall, the commanding officer of the 2/6th Field Ambulance, and here up to 100 patients could be accommodated with extra tentage should this be necessary. There was also an alternative evacuation route for patients. The rear headquarters of the 2/6th Field Ambulance was at Itiki near Koitaki, and the advanced headquarters at Ilolo where the M.D.S. was erected on a flat clearing, "a rare combination in this country" as Chenhall remarked, and staging posts were sited north of Ilolo at Owers' Corner, Uberi and Ioribaiwa.

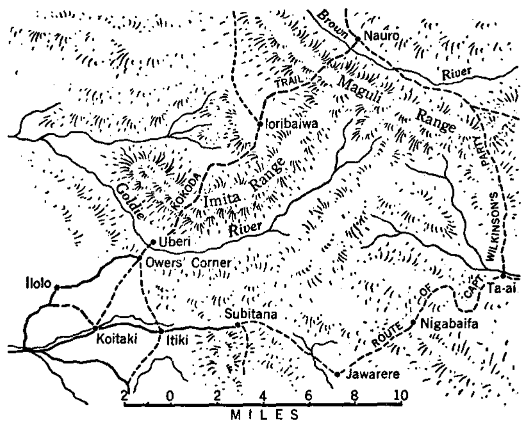
Arrival of 25th Brigade. The leading battalions of the 25th Brigade arrived in Moresby on the 9th September, and were coming up ready for action on the 14th. The whole brigade was equipped with uniforms of the new "jungle green" for the first time. Their arrival was welcome to the 21st Brigade, as the tired and depleted troops could now have some of the strain lifted. The medical services did not share so fully in these advantages, as the 25th Brigade arrived without a fully-staffed field ambulance in support. The 2/4th Field Ambulance arrived on the 17th, but, though very welcome, was not then up to full strength. This unit had detachments at Ilolo and Koitaki, and the 2/2nd Field Hygiene Section was also moving up to Koitaki. During the next week this ambulance established additional detachments in the Jawarere and Itiki areas.

Brigadier K. W. Eather concentrated the 2/31st and 2/33rd Battalions in the Ioribaiwa-Uberi area, and took over the command from Brigadier Porter. On the next day parties of the 2/14th and 2/27th Battalions, which had been cut off over a week earlier, began to arrive. By this time there were seen some of the signs of malnutrition among these soldiers, showing the risks of dietary insufficiency in this uncompromising country. This question of supplies and nutrition was of great importance at this stage in the campaign, for on this rested the ability of the troops to fight. There were definite shortages in necessary food supplies, as well as in drugs, and it is significant that medical officers have drawn repeated attention to this important factor in the conduct of operations.

WOUNDED FROM THE RANGES

The following episode is described in some detail, as it illustrates the difficulties in ensuring the return of wounded men to a rear post as close to the Moresby base as Ilolo.

Captain R. S. Wilkinson of the 2/4th Field Ambulance was sent to Subitana to establish a first aid post for the benefit of those members of the 2/14th, 2/16th and 2/27th Battalions who had been cut off, and were isolated behind the Japanese lines. Making a patrol along the Jawarere track he met a party from the 21st Brigade led by Captain J. Lee of the 2/27th Battalion, whose mission was to find and bring in isolated sick and wounded. Next day, on his own initiative, Wilkinson decided to attach himself to this party. After a night at Jawarere at an R.A.P. set up by orderlies of the 2/4th Field Ambulance, he helped them to move its site to a less malarious locality, and struggled with the orderlies up a steep and slippery mountain track to Nigabaifa. Here he left the patrol, so as not to hinder their progress, and went on towards Ta-ai next day, and spent the night wet, exhausted and alone. Lee's party had encountered a Japanese patrol and did not succeed in reaching any sick. They returned to Nigabaifa, where the natives waited for another patrol which they met after a couple of days at the foot of the mountain. Wilkinson joined one of these patrols under Captain J. C. Cuming and pressed on towards Nauro over the razorback mountains of the Maguli Range which they reached on 30th September in pouring rain.



Nigabaifa

As the location of the wounded of the 2/27th Battalion was not known, several tracks were explored unsuccessfully by various small parties whose rations were now very short. A local guide took them along a trail twice following the middle of a stream for 200-300 yards before crossing it, until finally they reached a village where the sick and wounded were waiting. Wilkinson described the meeting:

> They were naturally delighted to see us. The stench and the flies were terrific. The party had moved slightly to get away from the flies but they had followed. I was given two hours to work on them. Many of the blankets were fly-blown and I only had acriflavine to use on the wounds. The party had run out of dressings, fortunately we were carrying plenty. Altogether there were nine patients. Two of these were weak and malnourished after dysentery but could walk, the rest were on stretchers, and most of them were suffering from severe gunshot wounds.

(Australian War Memorial)

Wounded being brought in by native bearers on the Kokoda Trail.

(Australian War Memorial)

Native stretcher bearers on the Kokoda Trail.

Evacuation from Kokoda by Stinson ambulance plane which carried one lying and one sitting patient.

(Major A. O. Watson)

(Major A. O. Watson)

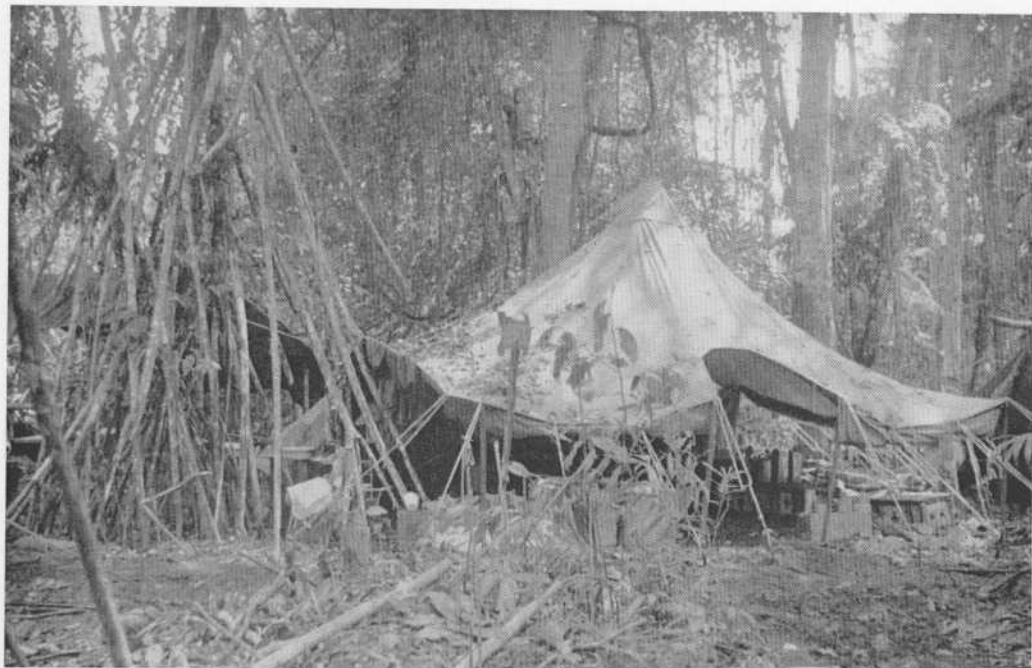
The Stinson ambulance plane which was used for evacuation of casualties from the Kokoda airstrip. A few trips were also made to Myola.

(Australian War Memorial)

Walking wounded at Oivi on their way back to the dressing station.

(Australian War Memorial)

Stretcher cases being transferred from a transport plane after evacuation from the Owen Stanleys. Compared with their trek over the Kokoda Trail which took days, the wounded have been flown back in as many minutes.



(Major A. O. Watson)

The operating theatre of the 2/4th Field Ambulance M.D.S. at Soputa.

(Australian War Memorial)

Main dressing station at Soputa.

The carriers adjusted the stretchers to their particular taste and we set off at about 1300 hours on our return journey. The going was slow but it was not long before the natives were doing their usual chattering and shouting when carrying stretchers.

Morphine was given to the stretcher patients for the first two days and dressings were changed when possible. By the fourth day of the return trip, the party was running short of food. The patients were washed and dressed. One man was not travelling well: he had an infected wound of the elbow, with a fracture which in the haste was only discovered after a day and a half on the road. Dried fern stems were used for a splint. Wilkinson sent the remainder of the party on, and stayed at the camp with the wounded man and some natives. Two days later three men of the patrol with eight carriers returned with supplies needed by the medical officer. On the seventh day the party reached Nigabaifa where they were met by two 2/4th Field Ambulance orderlies and were fed well. Spending the night here, next morning they set off along the slippery track to Jawarere and finally reached Subitana at dusk. From this point the patients were evacuated by ambulance and Wilkinson returned to his unit, the 2/4th Field Ambulance at Ilolo.

WITHDRAWAL TO IMITA

So the first phase of this campaign came to a close. During a brief period of pause the Japanese prepared strong defensive positions at Ioribaiwa, only some thirty air miles from Moresby. On 15th September they penetrated between the 2/33rd Infantry Battalion and the composite battalion, and although no real offensive action was achieved by the enemy, fighting was heavy, and there were some casualties. The commander therefore withdrew the 3rd, 2/25th and 2/31st Battalions and the 2/1st Pioneer Battalion, while the composite battalions 2/14th and 2/16th withdrew to Uberi. Spirited patrolling was maintained, and the positions of the Japanese were well explored, but otherwise the general position was static until the 26th.

The walking wounded from the Ioribaiwa area were looked after at the Salvation Army post for the night and sent on the next morning. There were posts established farther back by Captain W. Gove, and at Uberi by Captain Oldham. Through the whole of this movement back to Imita all but two of the wounded were evacuated; one of these men fell over a steep drop after a wound believed to be mortal, and the other was so badly wounded and in so inaccessible a place that he could not be removed. The native carriers brought stretchers up to wait near brigade headquarters, and went forward close to the aid posts when required. They showed great stamina and courage, even on the rare occasions when their exposure to mortar and shell fire was unavoidable. Only a few casualties resulted from the patrol activities, and access to most of the Imita posts was easy.[2] On the 26th, Humphery returned to the

[2] Australian casualties for Kokoda to Imita 22nd Jul-25th Sept: killed in action 24 officers, 307 other ranks; wounded in action 28 officers, 440 other ranks.

headquarters of the 2/6th Field Ambulance, after handing over to Major I. F. Vickery of the 2/4th Ambulance.

The proximity of the Japanese to Moresby, in spite of the drawbacks of their long and formidable lines of communication, represented a serious menace. On the highest military level this was clearly recognised, as could be seen by the arrival of considerable reinforcements of fresh troops in the defensive Australian positions on Imita Ridge. For a couple of months past Generals MacArthur and Blamey had brought their headquarters up to Brisbane, in much closer touch with the island base. The commander of New Guinea Force thought too that the nearness of Japanese troops to Moresby warranted the withdrawal of the Koitaki hospital and the convalescent depot to Murray Barracks. It is of interest that knowledge of the proximity of the Japanese in no way disturbed the equanimity of the convalescent patients. In further evidence of larger-scale operations ahead, American troops began to arrive in New Guinea in the middle of September.

MEDICAL CONDITIONS DURING THE RETIREMENT

The brief respite afforded by this gathering of forces permitted the medical services to review what had been done, and to plan for the future. On the difficult trail movement had been latterly almost continuous. From Deniki to the base, ten days' journey lay before a patient on a stretcher. Sometimes a twelve-hour day was necessary, even day after day, but the patients showed high endurance and arrived in remarkably good condition. Care had been taken to tighten up the record system, and to ensure that no unauthorised persons moved up and down the trail. Hygiene was more rigidly enforced, and measures taken to lessen promiscuous soiling of the ground. In the higher levels there were few flies, as a rule, though discarded rations attracted them, and at Myola blankets were often fly-blown. In addition there were ample opportunities for the passage of infection by hand, by food or by water. The troops became careless, and as the force grew and was more widely dispersed in small groups of men, further difficulties arose in feeding and in sanitation.

Limited accommodation for medical purposes was provided by Angau, in existing native buildings or others specially constructed with bunks in tiers when hessian could be obtained. Carriage of medical supplies caused difficulties in many ways. Large panniers were found too cumbersome for transport; small boxes, haversacks or metal ammunition cases were preferable. Only a restricted range of drugs could be carried, such as analgesics, anaesthetics, antiseptics, quinine, bismuth and sodium sulphate. Dressings and a set of surgical instruments were carried: plaster of Paris was a necessity, but like other materials used in quantity, was usually scarce. In these matters, the ready cooperation of Angau personnel with their apt control of the carrier force was invaluable.

Reports on the medical experiences of this phase of the Owen Stanley campaign were made by the medical officers concerned, and were of

great value, though it was evident that the after-history of the men treated could not be fully known at that stage. Of the 750 casualties successfully transported to the base area only four subsequently died in hospital. One of the chief problems was to arrange for casualties to be collected at some place where the conditions were sufficiently stable for them to be examined, classified, given treatment and rest before they were again passed on. Patients could not be held in any considerable numbers for long, and in their onward movements they were constantly handicapped by the inexorable factors of time and exhaustion. Often in fact they were reluctant to be moved on, but this could not be helped. Fortunately a high proportion of the wounded were able to walk, sometimes alone, sometimes with assistance.

McLaren reported that the high-velocity, small calibre Japanese bullet caused little fragmentation, and wounds of limbs, which were common, often did not produce serious structural damage. Compound fractures did well as a rule with conventional treatment by *débridement,* local sulphanilamide application to the wound, and fixation in plaster. The Thomas knee splint in a plaster gave good control of the lower limb, and firm bandaging of the cast to the trunk was satisfactory in the upper limb.

Injuries of the brachial plexus were common, and so also was suppuration due to retention of bullets, in spite of their high muzzle velocity. A few chest wounds were seen, and treated by aspiration with relief. It was thought likely that men with severe chest wounds did not reach medical attention: the same applied to those with abdominal wounds. Wounds of the face were usually superficial; few penetrating head wounds were seen. Wounds believed to be self-inflicted were reported; wounds of the great toe and left hand were said to be more common than other wounds of the extremities. In one battalion wounds believed to be self-inflicted fell from one per day to nil after all men so affected were sent back to the line. Yet, the other side of the picture should be stated, for other experienced medical officers believed true self-inflicted wounds were rare, or practically non-existent. In theory boards of enquiry should be held as promptly as possible; in practice this was always difficult and often impossible. Norris sent out written instructions that a wound was not to be labelled as self-inflicted unless the medical officer had actually seen the shot fired. There can be no question that some men were unjustly blamed, and as the experience of individual medical officers was often limited by circumstances, there can be no true statistical measure of frequency and general statements must be misleading.

The effect of malaria on the troops on the range was an important factor in wastage in the early stages, because the attacks were recurrent and not primary, except in troops who had been in the Kokoda-Oivi area. This was a handicap to the A.M.F. battalions which had previously had a high infection rate in Moresby. Anti-malarial measures were only possible in base areas behind Owers' Corner, but protective clothing and quinine were available elsewhere.

Respiratory disease was not uncommon in some areas in association with cold and wet weather: it appears to have been of the nature of a patchy bronchiolitis. On the northern side of the range the nights were always wet and bitterly cold, and warm and water-proof clothing was most desirable. Notwithstanding the hard conditions the men kept a good standard of general health, although nervous exhaustion was common, and was often associated with symptoms of functional type. Contributory factors were lack of sleep and sufficiently varied and satisfying food.

Exhaustion due to physical strain and exposure was significant, particularly during the withdrawal. While the force was advancing tired men could be kept and rested and then sent on to their units, but during the retirement the men had to be sent back. The policy was laid down that holding and treatment centres could only be considered at points two days' travel behind the troops in contact with the enemy. It was really only when the force was stabilised at Imita Ridge that holding posts forward of Ilolo became practicable.

In the early stages of this part of the campaign diarrhoea was almost universal, and was thought to be due to a mainly carbohydrate diet. It caused considerable loss of sleep but was otherwise benign. When more troops came up true dysentery appeared, with passage of blood and mucus and considerable prostration. Lack of hygiene was most evident along the lines of communication, where the lack of training in the troops in this important matter became evident. Anti-dysentery measures became fully possible when the force was concentrated at Imita. Such routines as water chlorination, the use of deep-trench latrines, incineration, fly-traps and fly-sprays were used in the concentration areas, but full facilities were not available. Supplies of sulphaguanidine became available at this time, and largely through the advice of Lieut-Colonel E. Ford the supplies held on the Australian mainland were gathered and sent to New Guinea. By the end of September it was in use at aid posts, and medical officers gave it to all men with signs of clinical dysentery. Six grammes were given as a first dose, and 3 grammes repeated at four-hourly intervals along the route, with the dual purpose of reducing infectivity of the stools and hastening recovery. The experiment of distributing a relatively scarce drug, as it was at that time, in so wide-spread a manner was bold and fully justified. It was packed in water-tight containers and later, for simplicity, was sent in powder form with a measure. Afterwards on the advice of Major R. R. Andrew, the dosage was lowered to 4 grammes as the initial dose and 2 grammes four-hourly as the clinical aspects remained mild. The most obvious results were the rapid relief of symptoms thus enabling exhausted men to travel, and even making it possible for officers to keep on duty. Captain L. H. Joseph who was in charge of the 2/6th Field Ambulance A.D.S. at Ilolo, reported that during the first three weeks of September, when the withdrawal to Ioribaiwa was in progress, some 1,200 casualties passed through, and that the majority of these men had dysentery. At this time the conditions were bad; refuse abounded

and flies were in myriads. Further, the only drugs then available were magnesium sulphate and chlorodyne.

Skin lesions were common, and were often due to the irritation of mite bites, with consequent scratching and infection causing ulceration. *Miliaria rubra,* the familiar "prickly heat", was troublesome also, particularly in the steamy lower elevations of the ranges.

Carriage and distribution of food were difficult, and intercurrent infections, particularly dysentery, also interfered with adequate nutrition. Most of the sick and wounded looked gaunt and thin on their arrival at base medical units. The risk of avitaminosis was increased when men were cut off from their base of supplies. Men of the 2/27th Battalion suffered from oedema for some six weeks after their return from a hard trek when separated from their fellows by enemy action. They also showed evidence of deficiency of vitamin *B* complex, and had diarrhoea which did not respond to sulphaguanidine. Men of the 2/14th, 2/16th and 39th Battalians also had symptoms of *B*1 and *B*2 deficiencies, which yielded to appropriate treatment.

The medical care of the native carrier force was controlled by Captain Vernon with the help of an experienced N.C.O. Brigadier W. W. S. Johnston, D.D.M.S. of New Guinea Force, was most anxious that every consideration should be given to the bearers, particularly in relation to their diet. In the early stages this was frankly deficient in vitamins, especially thiamin, as they had been eating polished rice. He recognised, too, the efforts of Vernon to secure for them adequate rest and blankets for cover at night. Vernon presented a consolidated report on the carrier force from July to October 1942. In this he pointed out that early in July he found the native carriers were in poor condition. After his appointment in charge of them, he at once instituted a service maintained by several Europeans and eight to ten native medical assistants. By the middle of August the service was more comprehensive, and the staging posts were adequately manned. He emphasised that the native carrier had a physique and constitution inferior to that of the soldier, and that medical selection was much less careful. On the other hand he knew the country and was inured to the physical discomforts of the terrain and the weather. There were three war casualties among them, one a death due to accident. Their chief medical disorders were malaria, diarrhoeal disorders and respiratory disease. Deficiency disease was apt to occur and demanded constant watchfulness. Malingering he described as widespread and subtle, and usually due to dissatisfaction with conditions. In this connection he pointed out that in the early stages their diet was deficient in meat, loads carried were often too heavy, and circumstances forced them to work too hard. Direct orders from New Guinea Force assured the carriers full feeding, tobacco, and regulation of loads and distances. Vernon was himself an admirable exponent of maintaining what he called "harmonious and almost fraternal" relations between carriers and soldiers. Soldiers did show selfishness especially in the early stages, but they owed much to the carrier force and freely recognised it.