CHAPTER 6

THE BUNA CAMPAIGNS

ONCE the Kumusi River was crossed at Wairopi, and the Japanese forces in that area were defeated it was important that the Australian 16th and 25th Brigades should reduce the Japanese defences on the coastal plains as quickly as possible, before the enemy had opportunity to reinforce the Gona-Sanananda-Buna sector.

On 18th November the advanced headquarters of the 7th Division moved on from Wairopi, leaving the 3rd Battalion as a rearguard to search the Kumusi Valley, and with a party from the 2/4th Field Ambulance, stayed overnight at the Sangara Mission, where there were patients to be cared for. Six of these were unable to travel and were left with two orderlies to look after them while the divisional headquarters moved on to Popondetta. McDonald's party of the field ambulance had gone on to Popondetta where sixty patients were collected. This number swelled rapidly to 100, and a like number were at Jumbora with Captain J. W. Follent and a team.

The urgency of the medical position which thus developed within a few days was due to several important factors. The change from the cold wet mountains to the steamy foothills was trying, but much more exhausting and difficult were the swampy plains of the north Papuan coast stretching inland from the haze of the sea. Only a narrow fringe of sandy higher ground separated the settlements of Gona and Buna from mangrove swamps near the sea and sago palm swamps farther inland, and the wide Girua River fanned out into a marshy delta between the inland approaches to Buna and Sanananda, in itself a formidable obstacle. Gona and Buna, two settlements on an arc of sea roughly bisected by Sanananda Point, were the two focal points of the initial attack. The tracks connecting the more settled areas ran as far as possible on higher ground, but all were muddy and difficult for wheeled transport, and after the frequent downpours of rain were boggy and treacherous. The water table was not far below the surface; this made sanitation difficult.

The contrast between the mountains and these plains as seen from the air was striking. Areas of dense forest alternated with deceptively smooth green patches of swamp, and other stretches of tall kunai grass. The grassed areas were dry and offered good sites for airfields. Twisted tracks led through the kunai, baking hot and airless, and elsewhere dense undergrowth and jungle impeded progress. More important was the prevalence of the vectors of tropical diseases, dengue, scrub typhus, and above all malaria. Already the impact of pyrexial diseases was weakening and thinning the force.

There were four sectors where the Japanese had prepared positions and from which they had to be expelled; Gona and Sanananda, opposed by the Australian 16th and 25th Brigades, and Buna and Cape Endaiadere,

where the American 32nd Division was concentrated. Most of this part of the American force had been flown into the area; only a small force had come overland on foot by the Rigo track over the mountains.

MEDICAL ARRANGEMENTS

Work was proceeding on the airfields under construction at Popondetta and Dobodura, and on 22nd November, the day after the Australian divisional headquarters had moved to Soputa, there were strips in use at Popondetta and Dobodura. At this time the medical force available for care of the assembling troops was slender in the extreme. The two Australian brigades were in contact with the Japanese, and the immediate medical strength amounted to three officers and nineteen O.Rs. Some members of the field ambulances who might have been usefully employed had been left at the base; for example, the Army Service Corps drivers could not be used as drivers, but might have been otherwise useful. Only two field ambulances had been available to the force on the range, the 2/4th and 2/6th, with assisting detachments of the 14th Field Ambulance which was stationed in the upper Moresby area. The 2/6th Field Ambulance was still at Myola, and for the past three months all the ambulance staffs had been working without remission. The 2/4th was nearly exhausted, and Colonel Norris had asked that this unit should be relieved: the medical divisional diarist commented "every time they stopped they were over-taxed with patients, then they would pack up at short notice, dash ahead, collect patients *en route,* set up, and by nightfall, be functioning fully".

The 14th Field Ambulance had the greater part of one company working at Ilolo with small detachments strung out along the Kokoda Trail. When Myola was evacuated these parts of the unit were concentrated in Moresby, and did not cross over to the northern coastal plains. The Kokoda detachments rejoined the parent body on foot; some of them were later flown from Moresby to Popondetta, the equivalent of a company reaching there on the 23rd, and the remainder of the unit going forward as air transport became available.

As soon as the divisional headquarters was established at Soputa Hobson set up an M.D.S. there, leaving Follent's team to run an A.D.S. at Popondetta and Captain R. H. L. Dunn to maintain another at Jumbora west of Soputa. Each of these stations held at least 100 sick, for pyrexial diseases were prevalent and left an aftermath of debility in the already tired men. The staffs at these posts had difficulty in coping with the patients who were pouring in. The M.D.S. was holding 300 patients on the night of the 22nd, including two Americans. Additional strain was to be expected from this source too, as the American regiment which had just arrived had as yet no functioning medical establishments.

It was at this stage that Major E. H. Hipsley arrived by air at Popondetta with a party from the 14th Field Ambulance, and set up a plane loading post to hold up to 200 men: casualties started to arrive practically as Hipsley landed. Natives cleared areas for tents and made tracks, while

the A.A.M.C. men pitched tents. Many casualties arrived throughout the day, and though some were sent on by plane many remained through the night, often on parachutes in jeeps, or lying in the open, as there was an acute shortage of stretchers. Late next day fifty stretcher cases were brought in from Soputa by a force of 300 native carriers with eighty walking casualties, but only a few could be sent away. The commander of the Popondetta station asked the post to move under cover, and most of the next day was occupied by this movement, with patients steadily arriving throughout. Some patients were housed in a local building. The work carried out at the plane post was an indication of the numbers of sick, but to these were also being added battle casualties.

Contact with the enemy had been made promptly by the two Australian brigades on their arrival in the coastal area. The 25th Brigade pressed on from Wairopi to the Amboga crossing and thence to Jumbora, and on 19th November encountered Japanese forces a little south of Gona. The 2/31st Battalion made some advance into the Gona area, but later withdrew after sustaining many casualties. Meanwhile, the 16th Brigade advanced towards Soputa, but after encountering the enemy near there, was held up by strong defences and halted across the Sanananda track. Personnel for new medical posts were placed with the rear headquarters of the 25th Brigade. The men of the 16th and 25th Brigades were very tired, and a disconcerting wave of malaria was sweeping over the force. On the 22nd a further determined attack was launched on Gona, but again the Australians sustained heavy losses, both on this day and on the next when the 2/25th Battalion attacked. With the help of the 3rd Battalion, and field guns brought in by air, some advance was made on the 25th, but the force later withdrew. The 25th Brigade now had only 736 men, and was overdue for relief, but this was expected shortly.

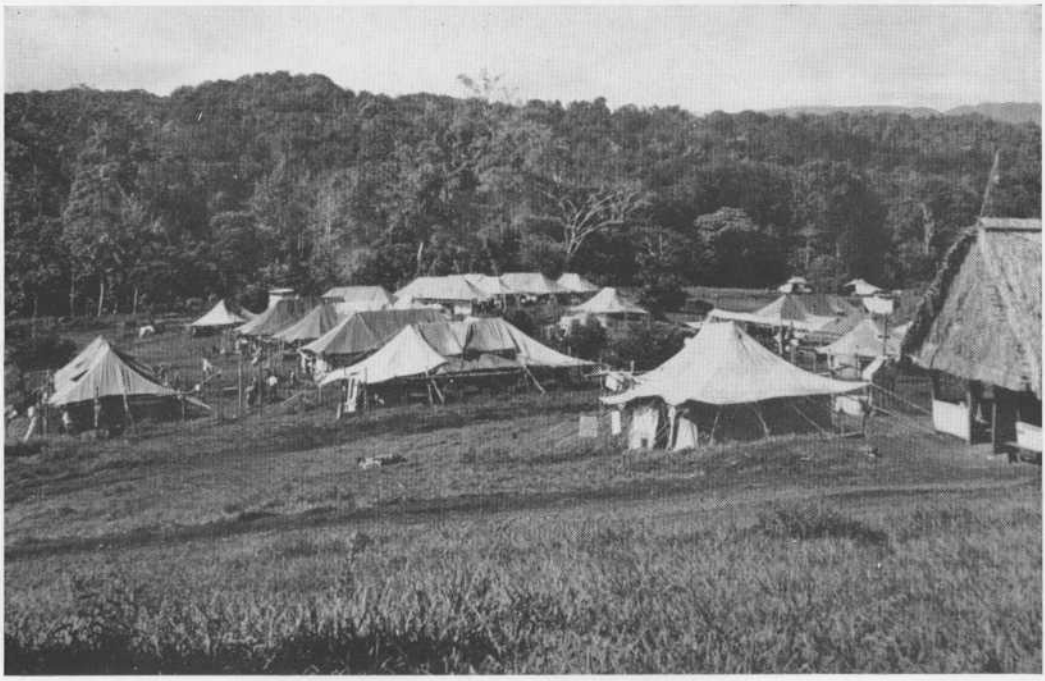
FORWARD SURGICAL WORK

These actions made it imperative to have adequate surgical assistance in the forward area. The position was in some ways much easier than it had been with regard to evacuation to base hospitals, for there was now good plane transport coming in to the airfields, but this was conditional on weather and the needs for other purposes. Also a very fluid organisation was needed at the airstrip A.D.S. which might be called upon to handle, and if necessary to hold, a large number of men, many of whom were seriously ill or who had been severely wounded. Even while the rear elements of the force were making their way down from Wairopi, a call had come on the 20th for surgical assistance for seventeen battle casualties at Sangara Mission. Fortunately an old utility truck found in a Japanese workshop had been discovered and reconditioned, and this enabled Gatenby and a team to be despatched without delay.

As we know, a party had been sent on to Soputa as soon as possible to set up an M.D.S., and when the main party of the 2/4th Field Ambulance arrived they found McDonald in a post holding sixty patients, mostly battle casualties, in a pleasant clearing on the west bank of the Girua

(Lieut-Colonel M. S. S. Earlam)

Plane evacuation from Popondetta.



(A.A.N.S.)

The 47th Camp Hospital, Koitaki.

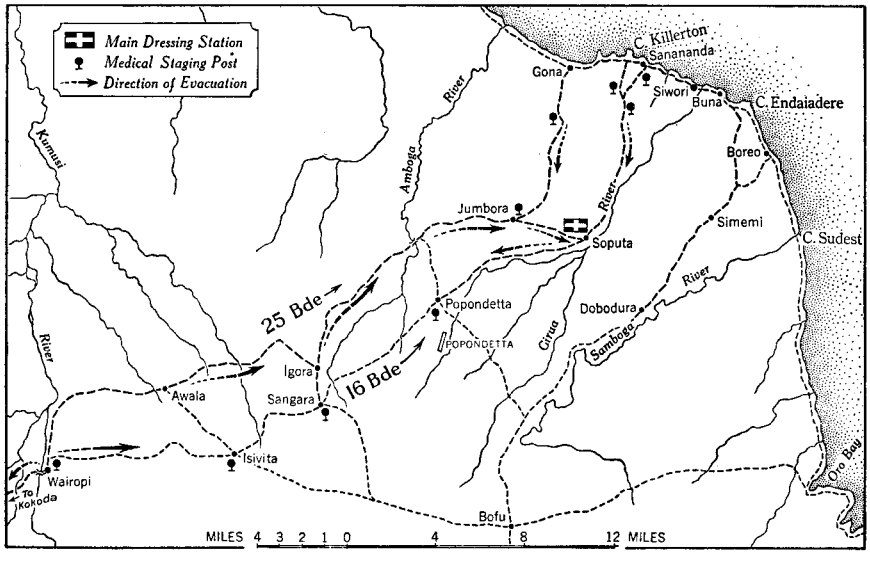
(Colonel F. L. Wall)

Kalobi Creek, Milne Bay normal.

(Colonel F. L. Wall)

Kalobi Creek in flood. The first site of the 110th C.C.S. was less than 100 yards downstream from here.

River. Equipment and cover were short, and no further supplies arrived for another twenty-four hours, during which the numbers mounted disconcertingly. A surgical team began work from early morning, Hobson and Vickery doing the surgery, and all urgent cases had received attention by dawn on the following day. Natives under the direction of Angau constructed a large hut and began to build another theatre, so that two theatres could work simultaneously. On the 23rd, casualties continued to pour in, and the more acute conditions were dealt with, though the



surgeons were in desperate need of supplies until five packages were dropped at Soputa. The United States Task Force hospital was not yet functioning, but medical officers of the 126th Combat Clearing Station offered their services, and some supplies such as ether, dressings and pentothal. This assistance was most welcome and valuable, and enabled the work to be carried out with care and expedition. By dusk on the 23rd, 130 wounded and 229 sick were in the dressing station. Members of the unit had by this time given medical and surgical care to some 750 to 800 men in their posts from Wairopi to Soputa. The surgical teams were again working all the following day. The divisional headquarters arranged for twenty-five natives to be employed for general duties under Warrant Officer K. Williams.

As Hipsley's party was now running the Popondetta plane post Hobson was able to recall Follent and his six O.Rs. to the M.D.S., and the following day an additional medical officer arrived. On the 26th Major T. H. Ackland, Captain A. R. Wakefield and three O.Rs. from the 5th C.C.S. reached Soputa, and some O.Rs. from the 2/6th Field Ambulance also arrived. These accessions gave great relief, and with Ackland's team

in charge of the surgery, Gatenby and his surgical team could be given much needed rest. Follent was sent back to Popondetta to ease the strain at the post there. Evacuation by jeep was now going on day and night: these invaluable little vehicles carried stores and ammunition from Popondetta airstrip to forward areas, and took patients on the return journey. From all sources and various units the 2/4th Field Ambulance could call on the services of twelve officers and eighty-eight O.Rs., but in times of stress an alternative unit was badly needed. This depleted strength is more pointed when it is realised that the original War Establishment of a field ambulance included twelve officers, 225 O.Rs., including one officer with 56 O.Rs. A.A.S.C. personnel. It may be remarked here that the M.D.S. in jungle fighting was a much more attenuated organisation than that well-equipped and staffed set-up which rightly often constitutes the pride of a field ambulance.

AIR ATTACK ON 2/4TH M.D.S.

A further attack on the Japanese was planned, and on the 27th the A.D.M.S. held a conference at the Soputa M.D.S. to discuss methods of dealing with the situation. Hardly had this concluded when enemy planes appeared and bombed and machine-gunned the 2/4th M.D.S., the 7th Divisional Headquarters and the 126th United States Combat Clearing Station. The raid lasted ten minutes and did great damage in the M.D.S. where of necessity the tents were not dispersed or camouflaged. Twenty-two men were found to be dead, including Majors Vickery and McDonald and five other members of the unit, and more than fifty were wounded. An eye witness pointed out that the only real shelter was a narrow ditch on one side of the road and, across the road, the sloping banks of the Girua River. The attack was so sudden that no patients save those moving about had any warning.

> It was a scene of utter devastation; tents holed, huts keeling over, the quartermaster's-cum-dispensary store burning. Dead and wounded included patients, members of the field ambulance, natives and visitors to the hospital. In a few minutes a busy hospital was transformed into a miniature battlefield.

The conduct of staff and patients was irreproachable. The M.D.S. was close to the track, and within 100 yards of the divisional headquarters, but the Geneva cross and Australian flag were clearly displayed, and one ground emblem was placed at the end of the unit lines. The American combat clearing station had removed its red cross on the previous day since planes were dropping stores on it. It seems certain that the Geneva emblems were plainly visible since planes had carried out a low-level reconnaissance a few days earlier.

On the following day, the 28th, the M.D.S. was moved back along the track a quarter of a mile, and re-sited in dense jungle. Natives cleared tracks through the area, and by the 29th the whole establishment and the patients had been moved. At the time of the raid there were about 200 patients in the M.D.S. Most of these were sent to Popondetta; even

so, the staff had to cope with fresh patients, as well as the burial of the dead and the clearance of wreckage while evacuation was going on. Gatenby's surgical team was sent to the post held by Mutton at Jumbora, and extra O.Rs. went also to Dunn's post at a forward dump. Brigadier Johnston visited the unit in its new location with Colonel Norris, and was able to see the M.D.S. admit twenty-two wounded and seventy-six sick on the day after the move. The next day was described as "routine", eighty-seven were admitted wounded and seventy-five sent on to Moresby, ninety-six sick came in and ninety-two went out, while Ackland's surgical team worked all day and far into the night. The planes came in good numbers after this, and the post was soon cleared of wounded.

On the 28th the 21st Brigade was flown from Moresby to reinforce the 25th Brigade, and by the 30th was heavily engaged. During the first week of December Vasey made strong attacks on the Japanese strongholds. The 30th Brigade now came under the 7th Divisional Command and the 2/16th and 2/27th Battalions attacked Gona. The 25th and 21st Brigades, both much depleted, were now before Gona, while the 39th and 2/14th Battalions moved eastward towards Sanananda.

Disposition of United States Force

The United States front faced the Japanese at Buna and in the region of Cape Endaiadere. Only a detachment of a battalion group of the 126th United States Regiment had been associated with the Australian forces, and then only since its path crossed that of the 7th Division at Wairopi. The remainder of the group halted at Bofu, before taking up battle stations, and the remainder of the regiment, with the headquarters of the 32nd United States Division with the 128th United States Regiment was flown over from Moresby to Wanigela and to Pongani and Abel's Field where airfields had been constructed. The move also involved transport by small ships to Pongani. By the middle of November the division began to move north, and the 126th Regiment with its III Battalion was moved to Soputa, under command of the 7th Australian Division. The remainder of the division was reorganised into two groups, Warren Force on the right flank of the Buna position and Urbana Force on the left. Contact with the Japanese was made on 20th November.

Urbana Force began attacks on Buna on the 22nd, but it was early in December before these movements attained any degree of force. On 5th December Urbana Force advanced on Buna village and Warren Force also launched a large-scale attack.

On the 4th the 126th Combat Clearing Station had moved to Dobodura, and the 107th Task Force Hospital was moving back to take over its site. Next day when the American forces were heavily engaged, the admission of American casualties to the Australian M.D.S. at Soputa increased the work considerably. The bed state at Soputa showed on the 5th the following admissions: Australians, battle casualties 2, sick 104; Americans, battle casualties 54, sick 28. The strain was eased on the next day when the Task Force hospital was able to take casualties.

MEDICAL CONDITIONS

During the afternoon of the 6th twenty-five enemy bombers, escorted by fighters, attacked the Popondetta post by pattern bombing. Fortunately the bombs fell wide and there was only one casualty, a native, who was killed. No patients had been flown back to Moresby for forty-eight hours owing to the obstruction of the airstrip by an aircraft with a collapsed undercarriage. As there were over 400 patients at the airstrip post and the post was only several hundred yards from the target, the damaged plane, it was fortunate that more damage was not done. The 25th Brigade was withdrawn the following day, and the 21st, again attacking Gona, was able to capture it from the Japanese.

This week of pressure coincided with some changes in the Australian medical arrangements. Malaria was still reducing the efficiency of the medical services: so many men were running temperatures, owing to partly suppressed malaria, that it was at times difficult to supply men for general duties. No accurate survey of malaria could be made at that time, but inspection of the battalion medical officers' aid posts showed a very high incidence of pyrexia among the troops. Hobson was obliged to give his own A.A.M.C. men courses of treatment so as to keep them on duty and thus cope with the work. Though men with malaria were not supposed to be sent back to the base area unless their condition warranted it, those ill enough to be evacuated from the fighting line were passed straight through the M.D.S. at Soputa to Popondetta and thence to Moresby, because simply, they could not be held. The addition of a forward pathological section made diagnosis conclusive, and the issue of fresh clothing for the first time since leaving Moresby gave the men added physical comfort, even though torrential rain reduced the area to a mass of mud.

New Guinea Force took over the administration of the Popondetta area, and Brigadier H. C. Disher, who had arrived at Moresby on 28th November, took charge of the medical arrangements of the force. The relief of the 2/4th Field Ambulance began early in December and McLaren moved with a party to Jumbora, while other men from the 14th Field Ambulance prepared to take over Jumbora and Dunn's post in the forward area. An additional help to the work at Soputa was obtained by the acquisition of a motor ambulance: this was a captured converted car which could take one sitting and four lying patients with satisfaction to all concerned.

Major S. A. McDonnell, D.A.D.H. of New Guinea Force, was appointed as the medical representative of the force in the coastal area, and remained at Soputa in a coordinating capacity. Further coordination was effected on 4th December by a conference called by the A.D.M.S., Colonel Norris. Here arrangements were made for Captain H. G. Bruce, Lieutenant Adam and twenty-three O.Rs. to take over the Popondetta staging post, and other personnel of the 14th Ambulance to relieve the 2/4th Ambulance at their forward posts as soon as possible. The remainder of the unit proceeded to Soputa in preparation for the complete relief of Hobson's

unit, which was now very tired and needing rest. In fact, owing to the depredation of malaria the 2/4th could not have carried on without the help of the 14th Field Ambulance. A week later the 2/6th Field Ambulance, having finished its work at Myola, moved on towards the roadhead of the mountain trail, and staged temporarily at Ilolo. So the two units, which with the help of the 14th Ambulance had carried the medical burden of the final phases of the Owen Stanley actions, were freed for a period of rehabilitation.

Popondetta Staging Post

On the 7th the number of patients held at Popondetta reached its maximum to date, 450. There was considerable activity of enemy bombers and fighters that day, especially over Buna, and no planes landed. Landings were expected at No. 3 strip, but though a party of fifty of the less incapacitated made the hour's march, they had to remain there, and arrangements had to be made to send rations and cooking gear for them. The Popondetta staging post party continued its activities under very fluctuating conditions. Weather, operational activity and shortage of motor transport produced unpredictable changes: sometimes the patients would go straight from jeep to plane, even at times with planes waiting while approaching vehicles arrived; at other times the post would overflow, exhaust its supplies and exceed the capacity of its workers. As many as 440 had been sent by air in one day. At this stage of the campaign the number of American personnel varied considerably: on occasion they numbered 40 per cent of the total evacuated. It was sometimes necessary to enlist the help of patients, and in this way a cookhouse for 180 men was built and manned. Only the most seriously ill could receive individual attention, and most had to fetch their own water, and a limited number of wounded men could be washed. Crowding in shelters was common when numbers rose, and mess gear was usually inadequate. Tents and tent flies were needed for independent shelters, and complete protection from the weather could not be given. Although prompt air evacuation was a blessing, and enabled men to be in bed in Moresby a very short time after leaving the airstrips, unfavourable conditions could alter the whole picture, and many anxieties were felt by those responsible.

The ordeals of a wounded man were considerable, even with the greatest care. He was often subjected to a difficult and hazardous carry to muddy Soputa, there to undergo operation by skilled hands, though under primitive conditions, and at varying intervals thereafter had to make another rough journey to a staging post at an airstrip. Here he faced some further period of waiting, during which he received all necessary care, but with little comfort, and then was quickly returned to an airfield at Moresby base, where a smooth organisation sent him on by a rather rough but efficient ambulance trip at last to find himself in bed in a tented or hutted ward, though still far from the mainland. It should be said that in spite of these calls on the fortitude of wounded men, their condition on arriving at the Moresby base was surprisingly good.

FALL OF GONA

Gona was subjected to a heavy assault early in December. The 30th Brigade had come under command of the 7th Division, and the 39th and the 2/14th Battalions went along the coast towards Sanananda, but could make little headway in the swamps. Gona was attacked by artillery and from the air, and during the 8th and 9th increasing pressure was applied till patrols found few survivors. Gona had fallen. Both sides sustained heavy losses: the four battalions of the 21st Brigade lost 530 killed and wounded and were 40 per cent below their strength when first they engaged the Japanese at Gona. Though the Japanese had relinquished pressure here, the same could not be said of Sanananda, where determined resistance was offered to the 30th and 16th Brigades.

Conditions were difficult between the front at Gona and the M.D.S. at Soputa. The rear A.D.S. on this track was at Jumbora where there were facilities for blood transfusion, and the forward post at Dunn's post. From the latter to Gona was about a three-quarter hour walk through kunai, and thence two hours' muddy march to Jumbora, from which a corduroy road stretched to Soputa, transit taking one and a half hours. Casualties were sometimes held overnight if it was too late for them to reach Soputa: they were usually from the 39th Battalion and elements of the 21st Brigade. After Gona fell these posts were still maintained, and used as brief holding posts for men with malaria, so as not to deplete the fighting ranks. An order was issued that no one would be evacuated sick with a temperature less than 104°, though men with a temperature of 102° were not sent out on patrols. Most of the casualties came from the Amboga crossing and considerable delays were not uncommon before they arrived.

In view of the heavy losses along the Sanananda track and the determined resistance, the corps and divisional commanders, Herring and Vasey, decided that no more full-scale attacks would be made on Sanananda at present. It was evident that something would have to be done to give adequate rest to the hard-worked formations which had been exhausted by fighting on the mountains and on the coast. There would also be need for experienced troops to replace them.

Relief and Rehabilitation. Early in December two important decisions had been reached by Blamey. The Atherton project was under way, and though it was as yet an official secret, Blamey had decided to send the 16th, 21st and 25th Brigades to the Atherton Tableland in North Queensland for rehabilitation. This project was designed to provide a spacious camp and training area with a bracing climate and without any malarial mosquitoes. Here men could be sent from highly malarious areas with every benefit to themselves and without any danger of communicating the disease to others.

Blamey's other decision was to bring Wootten's 18th Brigade from Milne Bay to take part in the drive on Buna. Little progress had as yet been made on this part of the front. Following the fall of Gona there was a relatively quiet interlude during which preparations were made for

further assaults on Buna and Sanananda. The 14th Field Ambulance was now assembled in sufficient numbers to take over the duties of the 2/4th Ambulance, and its members were placed in the M.D.S. and the forward posts in preparation.

MEDICAL ARRANGEMENTS

At midnight on the 16th the 14th Field Ambulance took over the M.D.S. at Soputa and on the following day Hobson transferred most of the 2/4th Field Ambulance to Popondetta, there to rest until they were flown to Moresby. A considerable number of the outgoing officers and men had already had malaria. Hobson stayed on with five officers and thirty-five O.Rs., who made up about half the unit, to help the 14th over the next few days. It will be realised that except for these experienced assistants from the 2/4th, Earlam's unit now held the medical position in their hands on the Australian Gona-Sanananda front. Captain L. V. Merchant and party, using A.A.S.C. men as bearers, set up a loading post near the 30th Brigade on the Sanananda track; Gatenby and Watson had gone to Jumbora, and the new surgical team, Captains J. I. Hayward of the 46th Camp Hospital and I. H. McConchie of the 5th C.C.S., at Ackland's request proceeded to Soputa to work there. Day arrived on the 18th December from Wairopi. A month earlier he had been holding six slightly wounded and 265 sick, most with mild diarrhoea. Fortunately he had ample cover and rations at this time, but the food available, tinned beef and biscuits, was not suitable, though he had welcome assistance from the local Angau representative at Wairopi, who provided fruit for patients. He was not able to establish successful contact with divisional headquarters during this period. Alexander and Hobson visited all the R.A.Ps. on the right flank, where further action was soon to take place.

Medical arrangements for this action on Sanananda Point were checked. The 49th Battalion needed some extra help, owing to its difficult location, and twelve stretcher bearers were attached to the R.M.O., who had to send them on a carry of an hour and a half from the aid posts through an area where natives would not go. This involved passage through the muddy jungle for about 3,000 yards and the crossing of a stream running waist-high between steep banks. For the first time since the beginning of the Owen Stanley action white bearers cleared the aid posts. It was evident that the real nature of the fighting north of the ranges was not realised by all at the base, as one medical officer arrived who had been advised that the warfare was static, and that his equipment could be packed in panniers instead of haversacks.

The bearers were armed because of the possibility that the Japanese, after being driven out from their strongholds, would break through Australian positions along the route. Later the work at the 49th Battalion aid post by the R.M.O., Captain J. D. Fotheringham, was aided by the establishment of the aid post of the 36th Battalion. From the A.D.S. to the M.D.S. the patients were carried by natives and by the converted

sedan. The work of the light aid detachment in keeping this useful vehicle practically constantly on the road was commendable.

Air Supply and Evacuation

During the early days of December heavy fighting continued, and in five days 166 battle casualties were admitted, some of whom came from the activities of patrols and other small groups. The assembly of the Allied forces along this most unpromising battlefield could not be accomplished quickly, but time was nevertheless an important factor, because tropical disease was rapidly and insidiously attacking the forces. The Australian success at Gona gave no promise of similar rapid victories, but certain advantages had by this time been gained. At Popondetta and Dobodura there were two reliable airfields, and already reinforcements, supplies and rations had been landed, while casualties and tired troops had been flown back to the haven of a base area. An airstrip had been laid down at Soputa also, but its surface was not reliable for take-off, as trial showed, and it was used only for dropping.

Early in December the American troops had initial encouragement in Buna village from which their newly-arrived III Battalion of the 127th Regiment had forced the Japanese on the 14th; by the 17th the coconut grove and the village had been taken, but these were not vital points in the possession of Buna. Assaults on the right flank produced little effect, and by the 17th there had been no substantial change in the position before Buna or Sanananda. American troops attached to the Australian 7th Division had previously succeeded in establishing and holding a position on the Sanananda track known as Huggins road block. Men of the 2/7th Cavalry Regiment attacked along the track, and on 19th December established another road block with Japanese holding the track in between the two blocks. The cavalry were in a most difficult position where parts of the unit were separated considerably from the rest. This made the collection of wounded difficult; some men could not be removed for long periods, up to three days. It is not surprising that some wounds were fly-blown, but a much more serious matter was the possibility of gas gangrene in this dangerous terrain. The surgeons at the Soputa M.D.S. were kept on day and night shifts, and tackled all branches of surgery. One difficulty at night was how to know when the last stretcher patient had arrived: staffs were too short to permit of messengers being sent.

Just after the middle of December, the expected 18th Brigade from Milne Bay began to arrive, and Brigadier Wootten took command of Warren Force, which included the 2/9th Battalion, and a troop of the 2/6th Armoured Regiment. The 2/10th and 2/12th Battalions were following.

The remaining members of the 2/4th Field Ambulance and those attached from the 2/6th Field Ambulance were released from further duties in the Gona-Buna area on 24th December, and after a period of waiting were flown back to Moresby and gathered in the Donadabu rest camp.

ACTION AT BUNA

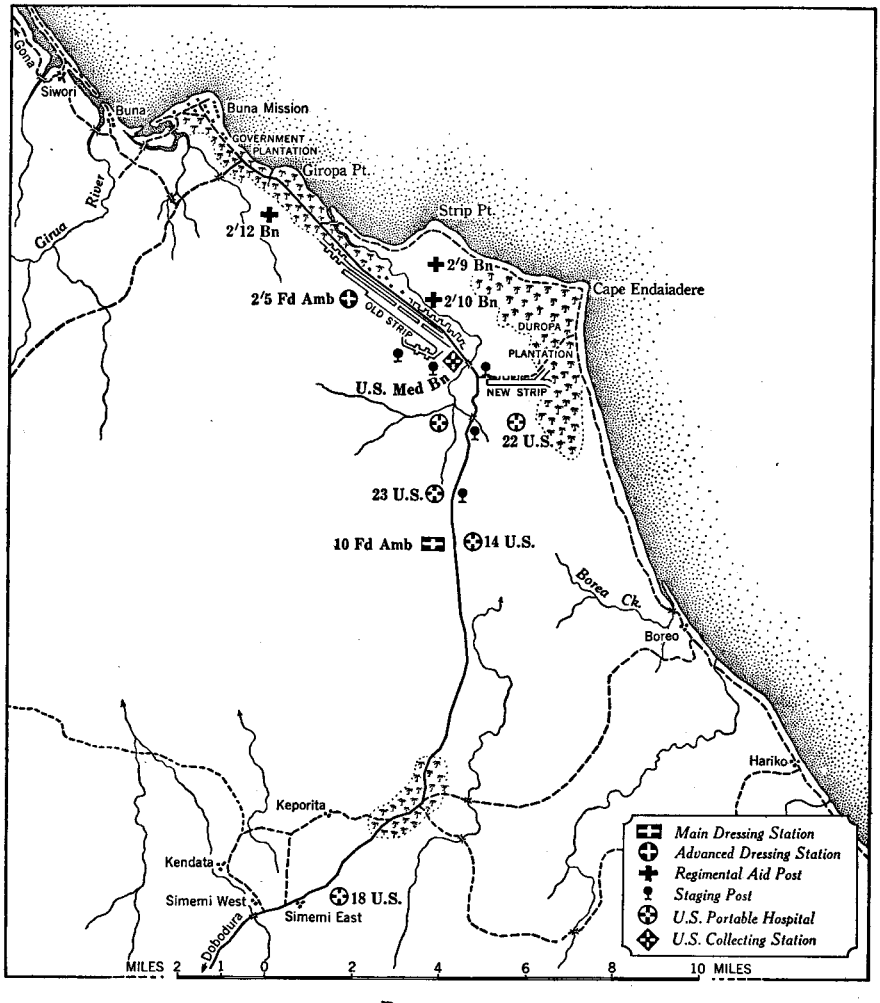
The phase of assault on Buna and Cape Endaiadere now began, and the participation of the 18th Brigade in the fighting called for special medical arrangements. The 2/5th Field Ambulance, whose companies had been used for forward work during the action at Milne Bay, had been used to service several of the detached military forces holding outlying areas from Milne Bay. A single detachment of this field ambulance was formed by fusion at the Buna front as its components arrived. Major Lavarack was in charge of the detachment, and brought part of it from Milne Bay, arriving at Buna on 15th December; in this section there were only ten O.Rs. Captain J. L. D. Scott's party included Lieutenant T. Raine and fifteen O.Rs., some of whom had been stationed at Wanigela and Porlock, areas being held for purposes of general security and, more significant, for the establishment and maintenance of air and sea transport on the north-eastern part of Papua. This party arrived at Buna with the 2/10th Battalion on the 17th.

Captain R. A. G. Holmes brought seven O.Rs. with the 2/12th Battalion from Goodenough Island, which had been held by an establishment largely façade, a successful deception which had discouraged the Japanese from further efforts to possess the island. This last section did not arrive at Buna till the end of December, but the sections together made a useful detachment of nominal company strength able to accompany the 18th Brigade to the Buna-Endaiadere sector in a determined effort to capture this important area. The equipment brought by Lavarack's party was somewhat unbalanced, but sufficed for the carrying out of its functions, which varied from that of aid posts to a main dressing station. Tentage, stretchers and blankets, medical companions, surgical haversacks, dressings, splints, transfusion apparatus, patients' utensils and cooking appliances, were carried.

The Milne Bay section travelled by corvettes, but only the battalion command group could be landed at Cape Endaiadere because of proximity of the Japanese, and the remainder was later landed at Oro Bay. Here some medical equipment was left to be brought up later and the party proceeded on foot through dense jungle and deep streams to the Buna area. A number of men fell out with recurrent malaria and had to be treated and then left to follow later with assistance. It was evident that Lavarack's party could not evacuate casualties without help from the Americans. Its first assignment was that of organisation of transport of casualties from the 2/9th Battalion R.A.P. by jeep and Bren carrier 500 yards to the A.D.S. of the 2/5th Field Ambulance, with help from American stretcher bearers if necessary. From here casualties were taken by native bearers from the 22nd United States Portable Hospital ten miles to Dobodura airstrip.

At Soputa the work of the 14th Field Ambulance detachment continued, but there was need for further assistance, as there was not an entire ambulance unit in the area for a period. The necessary help was supplied by the 10th Field Ambulance, commanded by Lieut-Colonel E. C. Palmer.

This unit disembarked on 28th November, and had been since at Port Moresby, where all ranks were temporarily employed with the 2/9th A.G.H. This brief tour of duty was appreciated by both the units concerned.



Buna area

In the second week of December Palmer was directed to prepare a detachment to work with the force in the Buna-Endaiadere area. This detachment included Major J. G. Johnson and Captain C. R. Copland, with twenty-eight O.Rs., and a surgical team was attached, under the direction of Major J. M. Yeates. Two plane loads of equipment and stores were taken with the party, a load of some 10,000 pounds. On the

morning of the 17th this detachment flew to Dobodura, where Humphery was acting as medical liaison officer. The stores were conveyed by jeep to Simemi plantation, and thence on the 18th December to a position beyond Hariko some three miles behind Cape Endaiadere. Here a dressing station was set up alongside the 22nd Hospital. Lavarack's detachment of the 2/5th Ambulance was established at a dressing station one mile behind Cape Endaiadere. Johnson had not known about Lavarack's party previously, though Lavarack was the S.M.O. of the 18th Brigade, but the two parties combined surgical forces. Johnson's surgical team and equipment were moved to the 2/5th dressing station and a theatre was set up in a pyramidal tent. On the next day surgery was being performed. Most of the battle casualties were treated by Yeates and his team with the 10th Field Ambulance, at the 2/5th dressing station, while Lavarack's detachment dealt chiefly with the sick.

The action for which these preparations were made was under the direction of Wootten. On the 18th the 2/9th Battalion was in action and with tanks of the 2/6th Armoured Regiment broke through the Japanese defences at Cape Endaiadere. The enemy lines were strongly fortified, and in the heavy assaults necessary to overcome them, the 2/9th Battalion sustained heavy casualties. The action swept right down to the sea, and near Simemi Creek the American troops supported attacks on some strong positions which were captured from the Japanese. Urbana Force made repeated attempts to take the "triangle" area at Buna, but as little headway was made here the force of the attack was turned on Buna Mission.

Warren Force now held a line extending from the new airstrip to the coast, where the 2/9th Battalion occupied the area. The 2/10th Battalion arrived on the 19th, and the Australian troops in the coastal sector made a determined attack on the following day, when practically all the country east of Simemi Creek was captured. During the next two days Urbana Force made some advances in the Buna area, but was not able to capture the mission. The swamps of Simemi Creek inland from Cape Endaiadere offered a serious obstacle, as the only tank crossing was strongly defended by the Japanese, but the 2/10th Battalion patrols succeeded in finding a crossing through apparently impassable swamp country. The Japanese withdrew and tanks were able to support the combined forces in an advance. Heavy enemy attacks were repulsed by the 2/10th Battalion, while the 2/9th continued to oppose enemy movements at the mouth of the Simemi Creek: the initiative remained with the Australian forces.

Urbana Force was still pressing on towards Buna Mission, but had not been able to reach through their corridor to the sea. The 127th Regiment on the 28th then made a successful attack, while still keeping the enemy within the "triangle" area, and found that most of the Japanese were withdrawing. The 2/10th Battalion was strengthened on the 30th by the arrival of the 2/12th Battalion from Goodenough Island, which then took over the attack. On 1st January, with the assistance of artillery and tanks, a drive was made right through to the coast against strong defences. The

American forces had by now overcome and pushed past the "triangle" defences south of Buna Mission, and were making for the sea. The 2/12th Battalion after a fierce struggle captured Giropa Point. Meanwhile the 127th and 128th United States Regiments had overrun the enemy defences at Buna Mission, and in a final attack captured the last enemy stronghold there. From 18th December to 2nd January the combined forces before Buna and Cape Endaiadere fought hard and continuously, facing great difficulties and hardships in the formidable obstacles of nature and the determined resistance of the strongly defended enemy. Naturally casualties were heavy.

MEDICAL ARRANGEMENTS FOR BUNA

As we have seen, the two Australian ambulance detachments fused with Yeates' surgical team from the 10th Field Ambulance to form an advanced operating centre. Casualties were received from the battalion aid posts and about fifty could be held for one or two days before sending them on to Dobodura. The decision to perform necessary surgery as far forward as possible arose from a discussion between Brigadier Disher, D.D.M.S. New Guinea Force, and Colonel C. W. B. Littlejohn, the Consultant Surgeon of the area. Only bare necessities could be taken so as to permit air transport; these included instruments, anaesthetics, dressings, drugs, plaster, medical, surgical and blood transfusion panniers, wet serum and four "Primus" heaters. Neither operating table nor autoclave could be taken.

Yeates and his team arrived at Dobodura on the day before the beginning of the attack. The only road was a muddy track which was passable for jeeps when the weather permitted. Therefore the team had to go farther forward, so as to be sure of receiving casualties within eight to twelve hours of their being wounded. After difficulties in obtaining transport the team made a muddy trip and met Lavarack's party. Already casualties were passing the two parties on the way back, but by sunset the theatre was being set up. A carpenter, brought for the purpose, had an operating table and other furniture made on the next morning, and by noon operations were being performed within a few hours of the wounding of the men. Movable trestles were made so that the patient could be placed on the edge of the tent in good light if the weather was fine. A very wide range of surgery was performed with simple equipment, and without being unduly radical the team found it wisest to follow the routine of "excision" even for simple perforated wounds, having regard for the dangerously infected soil.

During the period 19th to 23rd December the Australian ambulance detachments worked in cooperation with the 22nd United States Portable Hospital; on the 23rd this hospital moved forward next to the 2/5th dressing station, and the next day the 10th Field Ambulance detachment joined the dressing station. Copland was detached to replace Captain A. H. McGregor, R.M.O. of the 2/9th Battalion, who had been wounded.

EVACUATION OF WOUNDED

Most of the wounded arrived at night, and the small number of medical officers sometimes found it hard to cope with the work. Trial was made of operating on day and night shifts with two teams, Yeates' and Scott's, but this was quite impracticable, as the officers had to work by day and at night whether they were in the theatre or not. The dressing station was only thirty yards from the beach, and strict blackout was necessary: the theatre tent was khaki; a dark green tent would have been easier to black out, as the pins and blanket method was not very effective. On the 27th the brigade commander instructed that another site be chosen. Most of the area was kunai or sago swamp country, but a site was selected in jungle; this shortened the line of evacuation from the 2/10th Battalion and gave a better road. The move was effected with interruption for only half a day in the theatre.

Trouble arose later when the evacuation line from the 2/12th Battalion was found unduly long, and another advanced station was necessary; a site was selected with good cover, and just high enough to be dry above the neighbouring swamps. The siting of a dressing station was made doubly difficult during an action in this country, with its poor alternatives of kunai grass with no cover, or swamps with poor access and few dry spots. These difficulties of terrain also multiplied the trials of casualties and bearers. During the last two days of the Buna action the stretcher bearers worked all day and most of the night. Humphery had previously applied to New Guinea Force for more bearers, but problems of transport caused delays. During 1st January 151 casualties were sent to the M.D.S.; with a long carry over swampy ground this meant great effort to the bearers. A certain amount of transport was saved by holding sick men for a day or two if they appeared likely to make quick recoveries, when they could be returned to their units.

Some troubles arose with wounded patients being staged to Dobodura. Attention *en route* had been left to the 18th United States Portable Hospital at Simemi, but it was found that more special care was needed. Men could not be spared to man a light section post, but for several days after 31st December a nursing orderly and another orderly were sent back to Simemi equipped to give hot drinks to all the native carriers and the patients able to take them. Wound dressings were adjusted if necessary and morphine was given as required. No transport over this track was possible at night, so no night-time service was required, but this simple plan appeared to work well.

In this last phase of the Buna action on the night of 2nd January seventy-seven patients were held in the 10th Field Ambulance M.D.S., fifty were sick and the remainder battle casualties, many of whom could not be moved. Rain had fallen during previous nights, and on the night of the 2nd-3rd the area was swamped by a heavy downpour and was most uncomfortable next day. Further movement had been planned for the 10th Field Ambulance; it had proved its value in rapid evacuation to Dobodura. On 21st December the D.D.M.S. New Guinea Force was

arranging that Palmer, commander of this unit, should go to the Buna area to take charge of medical arrangements. Lieutenant J. E. McGill, bearer officer, and twenty-four O.Rs. were sent to Dobodura as reinforcements.

On 29th December a detachment under Major H. V. Francis left Moresby by sea and arrived at Oro Bay with a quantity of stores. This party was directed to march to the Buna area; leaving a guard to look after the stores and bring them round by barge, Francis reached Soputa on 7th January. Unfortunately the barge sank off Hariko, and its cargo was lost, with the exception of a number of panniers which were later recovered. The remainder of the unit was then to proceed by sea to Oro Bay under command of Major I. A. Wilson. There they arrived on 6th January, and proceeded to the 1st United States Portable Hospital at Eroro Mission five miles away. Japanese planes bombed the wharf area while their ship was being loaded, causing a number of casualties. A rear party was left at Oro Bay and the remainder moved to Soputa on foot and on the 17th were accommodated at the M.D.S. of the 14th Field Ambulance.

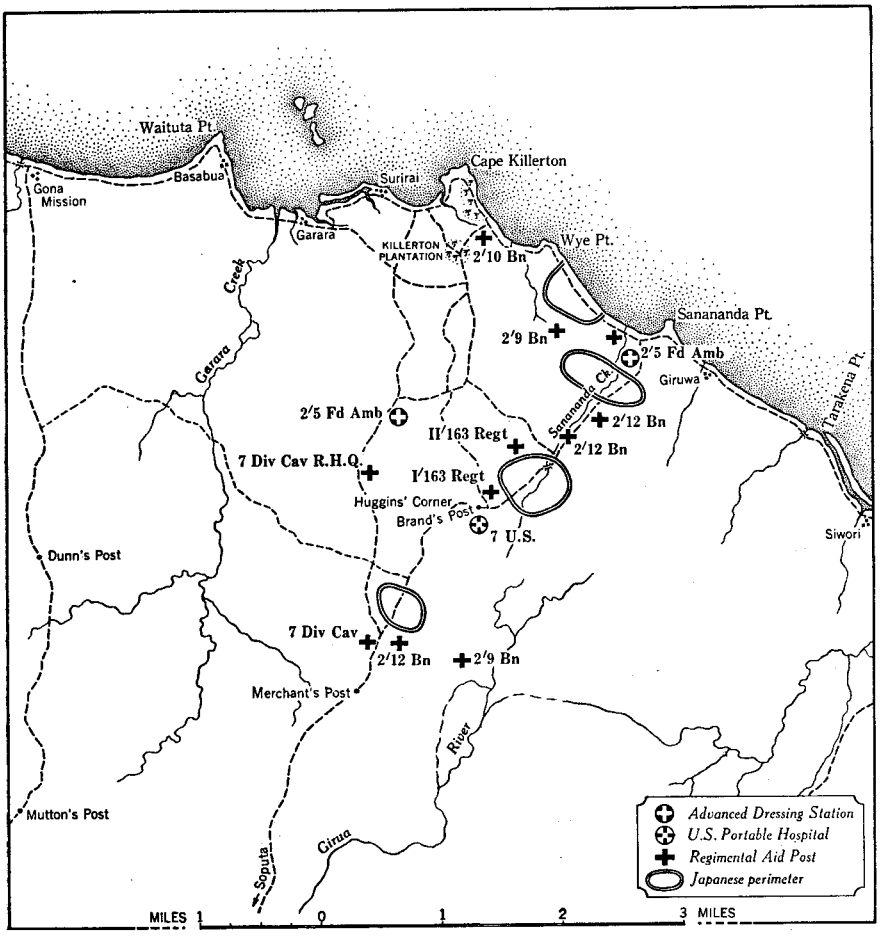
ATTACK ON SANANANDA

Even when Gona and Buna were disposed of as enemy strongholds there still remained the problem of Sanananda. After the capture of Buna the 163rd United States Regiment began to arrive, and Vasey planned to use these new arrivals and the 18th Brigade to clear the Sanananda track. By mid-December the 18th Brigade had taken over the main Australian positions; the American troops were forward in the region of the road block positions and were astride the Killerton branch track above its junction with the main track; the newly constituted 14th Brigade (36th, 55th/53rd Battalions) was settled on the left flank, and the 30th Brigade (39th and 49th Battalions and the cavalry) held the main Sanananda track and the ground northward to the Killerton track. Following the fall of Buna the 18th Brigade came under command of the 7th Division, and a week later relieved the 30th Brigade on the track.

Norris, Earlam, Palmer and Alexander conferred about the medical arrangements. They decided that the whole of the 14th Field Ambulance should now be concentrated at the M.D.S. at Soputa, and the 10th Field Ambulance should therefore take over the post at the Popondetta strip with three officers and ninety men. Twenty of the 10th Ambulance men were also at Soputa to act as stretcher-bearers.

The surgical team with the 18th Brigade was brought to the Soputa M.D.S. to work; this included Major J. M. Yeates and Captain Scott. Major D. M. Yeates of the 2/2nd C.C.S. also worked for a short period at Soputa. The presence of Colonel Littlejohn was of immense help to the staff at Soputa; his assistance and advice were much appreciated by the surgeons throughout the whole action. The remainder of the 2/5th Ambulance detachment was also to work at Soputa, and in preparation for the expected advance of the 18th Brigade on Sanananda, a reserve medical post under Holmes was formed before the move on 10th January.

Twenty stretcher bearers were also in readiness to work from the Sanananda post in clearing the battalion casualties. The movement of casualties in the Killerton-Sanananda sector was placed under Lavarack's control. Ackland's surgical team was now to return to Moresby, and to be replaced by Majors E. P. Row and R. C. Huntley.



Sanananda area

The attack on the Sanananda sector began on the 12th. After heavy artillery bombardment the 2/9th and 2/12th Battalions with one troop of the 2/6th Armoured Regiment attacked the heavily guarded positions of the Japanese on the Sanananda-Cape Killerton road junction. Casualties soon began to come in, and the surgical teams at the M.D.S. worked double shifts both day and night. The work was supervised by Littlejohn, and all battle casualties needing operation had been treated by the early

morning on the 13th. Both organisation and surgical standard were at a high level, and the centre was an excellent training ground for all ranks.

The weather was very bad and heavy rain on the coast made the forward tracks heavy going even for jeeps, and additional native carriers were provided to transport wounded to the dressing station. There was no air evacuation on the 12th as clouds prevented planes from landing and the next day only twenty-nine men were moved by plane from Popondetta. Fortunately it was a quiet day at the M.D.S. owing to the abandonment of a planned attack on the front. Only eleven battle casualties were admitted to the M.D.S. on the following day; this eased the strain at Popondetta, where the heavy rain had flooded many of the wards, robbing both patients and staff of sleep. Popondetta strip post was now holding 615 patients. Saturation point had been reached; blankets and food were scarce, though extra tins of food were produced from little private stores in the packs of some of the patients. The strip organisation could carry on one more day without further air-lift, but after that patients would have to be taken to Dobodura by native carriers.

On the 14th, conditions improved and 436 patients were evacuated by air to Moresby. This eased the strain on the M.D.S. at Soputa and its staff. The Japanese were retiring from the forward zone, and further attacks on them were planned for the next day on Sanananda and Killerton. Further advances were made by the 18th Brigade and the 163rd United States Regiment and Holmes was sent on with the brigade. Row and Huntley's team had now arrived at Soputa and Ackland's was returning to Moresby.

Disher also arrived on the 15th and visited the posts. Merchant's post was now known as the rear Sanananda post: it was realised that seriously wounded men would have to be taken there by native carriers, and those able to sit up, by jeeps. A surgical team was sent to carry out life-saving procedures. An extra staging post which could be moved forward when the road was cleared for motor transport was formed from some of the 10th Ambulance staff who had recently arrived at Soputa.

Up to the 16th, casualties had been lighter since the heavy losses of the first phase of the attack, but during the next few days the numbers rose again, owing to more activity on the front. By a rapid movement Cape Killerton was taken by Vasey's force, and the 2/9th and 2/12th Battalions penetrated almost to the beach on the main track. The Japanese abandoned their prepared positions, leaving the jungle torn and blasted by the attack, and flooded with the recent torrential rains. The attackers too suffered the discomfort of the coastal swamps, but the worst was over, and the 2/9th Battalion found on the 18th that the area to the north-east was not strongly held. Later this day Sanananda was captured, and Australian patrols penetrated as far as Giruwa.

The Japanese still held out in several pockets of resistance which needed strong attacks from the 2/9th and 2/12th Battalions. Once a route had been found through a swamp into the enemy's central defences, a concerted move was possible from each end of the beach and from the centre. The 163rd

Regiment tackled a large pocket of Japanese north of the post on the Sanananda track known as Huggins and cleared this up entirely on the 21st. By the next day the last resistance of the Japanese forces was overcome and the Sanananda area was entirely in Allied hands.

CARE OF CASUALTIES

After dark on the following day thirty-four battle casualties were admitted to the M.D.S. at Soputa. Before dawn ten inches of rain had fallen, flooding the wards; one tent holding casualties collapsed, but before long all patients were dry and comfortable. Two surgical teams worked all night, and performed thirty-nine operations during the dark hours. Only one theatre was blacked out and could work continuously; the open theatres could not be used all the time as enemy aircraft were overhead, but work went on with only brief periods of intermission.

The tour of duty of the 14th Field Ambulance was now coming to an end, and the 10th Field Ambulance was to take over the M.D.S. at Soputa. During the lull consequent on the fall of Buna, Lavarack's detachment of the 2/5th Field Ambulance took the opportunity of sorting and packing equipment and making up deficiencies. There was considerable difficulty in moving this equipment, but eventually it arrived at Soputa intact. On 15th January the detachment marched to Soputa and was attached to the M.D.S. A light section under Holmes moved to join a forward section of the 14th Ambulance, where it had the assistance of bearers of the 10th Ambulance. On the 17th the remainder of the 2/5th detachment at Soputa reinforced this light section, thus enabling the post to act as an advanced dressing station for the rest of the action.

It was proposed to follow the brigade attack along the Killerton track and send casualties by jeep to Soputa. This plan was followed, but there was no track suitable for jeeps, and as the brigade split into three battalions, each on a track leading towards Sanananda and Killerton the problem of evacuation became much more difficult. Bearer squads were attached to each R.A.P. as it moved on and casualties were taken from all three battalion aid posts over distances which increased until some were up to 4,000 yards. The carries had to be made through the worst jungle country encountered so far, and from the 2/10th Battalion the route led through mangrove swamps to the coast. This work was done by the 2/5th Ambulance bearers, but as time went on native porters going up with supplies and ammunition brought patients back on their return.

On the 19th the 2/9th Battalion took Sanananda Point, but the 2/12th was still held up on the track. To overcome this difficulty a direct route was found and used with success: it led farther back on the Sanananda road round the road block and so to Soputa. The picking up and transportation of sick and wounded in this area were extremely difficult.

This is well illustrated by an episode which centred round Brand's post, an additional aid post on the Sanananda-Soputa track. Captain N. E. Brand of the 10th Field Ambulance formed a forward dressing station on the 20th at Huggins corner on the road, and was able to bring wounded

from the 2/12th aid post over a track of over two miles to his post. Squads of six stretcher bearers were used over four separate sections of this route. Later in the day the number of casualties was too great for this to be done adequately, and 150 natives were sent to Brand's post to augment the ambulance bearers. They did not arrive at the battalion aid post till 7 p.m., and as most of the carrying would have to be done in darkness an escort party was provided by the divisional cavalry. As darkness fell heavy rain further obscured the muddy and treacherous track with only signal wires as a guide. The casualties began to arrive by 9.30 p.m., wet and exhausted, to find Brand's post covered with water, and with the swamp rising. The best course was to send the patients on; jeeps were commandeered and men posted along the Sanananda trail. A few patients went through the 7th United States Portable Hospital at Huggins corner, 300 yards from Brand's post, but before midnight thirty-four casualties were safely at Soputa, only one man with malaria being kept at the post. This journey was not only hazardous from the nature of the country but dangerous from the proximity of Japanese. Sergeant J. R. Urquhart of the 10th Field Ambulance, who was in charge of the bearers, found that the torrential rain made such a din on the trees that the noise of the large party was well disguised.

When the 2/10th Battalion cleared the last of the Japanese bands from the coastal front and joined the 2/9th and 2/12th at Sanananda, the A.D.S. moved to Sanananda Point with help from native bearers and thence went with the brigade back to Soputa. The 2/5th Ambulance party moved to Dobodura on 11th February and thence was flown to Moresby.

The 10th Field Ambulance, like other units whose versatility was proved by being used in sections and detachments of various sizes and functions, took over the responsibilities of the M.D.S. from the 14th Ambulance at Soputa on 25th January, a few days after the military situation on the northern coastal plains had successfully stabilised. Earlam and his unit arrived back in Moresby on 3rd February. From 18th December to 25th January, 694 battle casualties and 2,902 sick had been admitted to this M.D.S. Scattered small bands of Japanese were found for several days afterwards, but the problems of the medical units were then those of final evacuations of small numbers of wounded, and still considerable numbers of sick.[1]

In the Killerton-Sanananda area evacuation of wounded was controlled by Lavarack under the direction of the A.D.M.S. of the 7th Division. Almost a company of the 10th Field Ambulance was employed in this task, including the staff of Brand's post which has been referred to already. In its various degrees of sub-division and later of concentration, the unit was at Oro Bay, Buna area during the action, and Popondetta where the work of the airstrip post was taken over.

---

[1] Australian casualties at Buna-Gona-Sanananda 14th Nov 42-22nd Jan 43: killed in action 107 officers, 1,154 other ranks; wounded in action 133 officers, 2,076 other ranks.

During the spell of bad weather late in January considerable difficulties were encountered at Popondetta. Planes landed on the 21st, but there was considerable delay before they could take off with patients, owing to the wet state of the runway. Some medical officers felt the need of unified control in such matters; they realised that delays and even indecision were sometimes unavoidable, though they might cause fatigue and discomfort to patients brought some distance to await transport. Patients had to be moved next day to the other end of the strip, as planes were ordered to land south to north; nevertheless several planes landed north to south. Nearly 500 patients were held at the strip that night, but fine weather permitted all to be flown to Moresby by early afternoon. These fluctuations gradually smoothed out as numbers dwindled, and delays did not interfere with the treatment of casualties so far as this was possible at Popondetta.

Adoption of Atebrin

With continuation of malarial treatment there was as a rule no difficulty. At the beginning of February arrangements were made to return to their units American servicemen who had begun the second stage of their treatment. It may be noted here that atebrin had become the official suppressive drug at the end of December in the Australian armed forces. On 7th February the remaining patients at Popondetta were flown back, and the ambulance detachment then closed down. After this, patients returning to Moresby by air were sent from Dobodura and if necessary held by an American medical unit. Angau supplied natives to help in clearing the area, and, leaving a small rear party, the members of the 10th Field Ambulance at Popondetta were taken to Soputa. Some were attached to the M.D.S. for duty, and a party of forty-one proceeded to join those at Oro Bay.

On 2nd February Palmer was instructed to send a company to Oro Bay for Australian soldiers in the area. He went to Oro Bay to examine the stores left there previously, but had some difficulty in travelling by jeep as the road to Dobodura was often under repair. Therefore the party was despatched from Sanananda Point by schooner to Oro Bay on the 4th, under charge of Johnson. Another detachment sent later by road convoy was held up for several days until the 22nd. Other parties of fit men travelled to Embogo on foot and thence by launch and jeep to Oro Bay. By this time the M.D.S. at Soputa had been closed, and arrangements were made with the divisional surgeon of the 41st United States Division and the regimental surgeon of the 163rd Regiment for the care of small Australian units still in the area served by Soputa. The rear party left Soputa on the 23rd and rejoined the unit at Oro Bay. The site occupied by the camp hospital here was on high ground. Constructional work was slow at first with a depleted staff, and the provision of a water supply, one of the frequent paradoxes of these wet areas, was not altogether easy. The commanding officer at last had most of his unit in one place, and established his official headquarters there.

MEDICAL AND SURGICAL WORK

In some ways it would be difficult to conceive of more diverse conditions for the performance of medical and surgical work than those existing at the Moresby base units, on the Owen Stanley Range and on the Gona-Sanananda-Buna front. Yet the same principles infused each of them, the same call for improvisation, the same adherence to the essential tenets of surgery.

It was most important to site the main dressing station so that casualties could be transported without undue difficulty or delay, and desirable also that the next stage of evacuation should not be too long or unreliable. When the M.D.S. at Soputa was first set up by the 2/4th Field Ambulance these considerations were heeded, and wounded were given all necessary surgical attention as far forward as was safe. Similarly the dressing station used by the 2/5th and 10th Field Ambulances during the battle for Buna and Cape Endaiadere were designed to give service where it was most needed.

The question of cover for medical units was of particular importance in this country. There were open areas, but some of these were proved unsafe by events, and others were impracticable as they were swampy and readily flooded. The unfortunate experience of the air attack on the Soputa M.D.S. showed that it was better not to select an open area, even though under the apparent protection of the Geneva emblems. The question of the relative safety of forward dressing stations was considered in one of the reports of the D.D.M.S. New Guinea Force. Major Day, commanding the American 2nd Field Hospital near Simemi, had the experience of being bombed with his unit on the Dobodura strip before they had unpacked. Some days later when the hospital was set up in an open space, enemy planes flew over but left the unit undisturbed, but on two subsequent occasions they were again attacked.

The 17th United States Portable Hospital was sited three miles north of the Australian M.D.S. at Soputa, in an uncomfortable place near the Australian 25-pounders, and exposed to "searching fire" from the Japanese. It is questionable if good work can be done in such locations without exposing the surgical staff to undue strain, apart from considerations of safety. The Australian view was rather to compromise between the advantage of forward work and safety with relative quietude. Palmer in reporting on the siting of dressing stations, stated that "the jungle gives perfect cover and must be used". The risk of clearly visible tracks of access had to be remembered too; patches of kunai grass were higher and therefore on drier ground, but jeep tracks could easily be seen from the air. In re-siting dressing stations during the Buna battle suitable jungle patches could be found, but these were usually on swampy ground, and a suitably dry yet protected area was not easy to find. Here both an A.D.S. and the M.D.S. of the 10th Field Ambulance were finally placed on areas barely above swamp level, but the choice was successful, though a few days later heavy rain altered the whole picture. These sites made hygiene difficult; water was drawn from shallow wells and was chlorinated in

Lister bags or in the valises of E.P.I.P. tents. Sanitation was provided by deep-trench latrines where possible, but the high water table sometimes made building up necessary. In some of the wet areas guide tapes such as bandages were essential to mark the paths.

Accommodation was usually in tents, but when possible native type huts were found very useful. The American pyramidal tent was found to make a good theatre, especially if the height of the pole was raised. E.P.I.P. tents and marquees were also used. Care had to be taken that cover was not sacrificed by the men cutting trees for tent poles. Lighting at night was difficult because of the imposed blackout, but overlapping blankets fastened to the sides of the tent were reasonably effective. Layers of palm leaves on the roof assisted the natural growth of trees in preventing escape of light from the theatre at night. Pressure lamps were effective but fragile; Yeates' team found jeep headlamps better; these were run off batteries which were kept charged by the signals unit. A surgeon's electric headlamp and good torches were most valuable, and enabled an operation to proceed even with aircraft overhead. Operating tables were usually improvised from material at hand as only limited loads were permissible in air transportation.

Preparation of patients was a much more difficult procedure than in the warmer parts of the Middle East. The long green garments of the jungle-fighter were soaked in sweat and mud, and often covered with blood. The majority of wounds involved the extremities. It was found simplest to undress the men and wash them if conditions permitted; the exposure was harmless except in the presence of severe shock when more care was necessary, and the practically universal use of morphine simplified matters. Intravenous anaesthesia was once more a blessing, and could be continued for an hour if necessary.

Triage, or the selection of patients with regard to surgical priority, often required great judgment, especially when batches of wounded men arrived in quick succession, when lists would need drastic revision. The officer responsible for admissions had also to be sure that a complete examination of each patient was made, that transfusion was begun when necessary, and that care was exercised to limit loss of blood. Sufficient room was necessary for the reception of patients, their preparation, and if necessary resuscitation, and also for the storage of their belongings.

Theatre "linen" was of course restricted. Towels were found very useful and constant washing and boiling kept supplies up to a reasonable extent. Ground-sheets under the patients and water-proof "jaconet" over the table served their purpose well. The surgeons usually wore water-proof aprons. All swabs and towels were sterilised wet by boiling, as autoclaves could seldom be carried. The selection of a team was important. If the team was self-contained the majority of its orderlies were employed for nursing, cooking and general duties, and men were specially selected for theatre work. Some of these had been at least partly trained, and some most successful members, endowed with keenness and intelligence, soon became extremely competent. Under the spur of necessity and constant

supervision some orderlies became excellent assistants, carried out theatre routines faithfully, and could even learn to give anaesthetics and transfusions of blood.

Ackland pointed out in his report some most important considerations concerning the surgeon himself; these were chiefly the scope of his work, and the need for rest. He might be able to handle ten major cases in twelve hours, with perhaps five more less serious in addition. In the foul muddy swamps of these plains the risk of infection was great, and gas gangrene might ensue. Therefore prompt operation was often necessary, and amputation might be imperative. If wounded continued to come in a stream, no surgeon could continue to work at full pressure, unless the emergency was brief and temporary. Twelve-hour shifts were therefore most desirable. Ackland gave the instance of the Sanananda battle at its height, and stated that "when one hundred casualties arrived at an operating station within a few hours, five surgeons were found to be necessary to avoid delay in operating, and a high standard was thus achieved".

Previously-trained orderlies of course reduced the strain on the surgeons. Good organisation in a forward operating centre was conducive of good training in all members of the staff. Where teams were attached to an M.D.S. good relationships were established. It is significant that three different field ambulances were in charge of the M.D.S. at Soputa during this campaign, and worked with several surgical teams. The staffs concerned built up a reliable organisation, in addition to supplying an excellent technical service, and the training thus carried out improved the standard of work of all ranks. When the 18th Brigade began its final attack on the Sanananda positions Littlejohn directed the surgical policy of the centre, and even relatively untrained orderlies benefited greatly by the concentrated experience they gained.

Methods of evacuation. These have been described in typical stages. The battalion stretcher bearers had some trying and dangerous carries to perform. It was thought safer to dispense with brassards, as these were conspicuous even in the jungle. Troubles arose over stretchers. Native litters were loaded on to planes direct, but sometimes had to be cut down with a saw to conserve space. Ambulance type stretchers were often scarce, owing to their non-return. As flying conditions were stabilised these troubles were adjusted. Natives were sometimes available for transport from the aid posts onwards, and where tracks were rough, particularly those of corduroy type, wheeled vehicles made uncomfortable travelling. The overcrowding of M.D.Ss. after an influx of wounded was difficult to avoid when the weather was bad enough to prevent planes from landing on the strips. This caused an almost impossible situation in the strip posts at times, but these crises like others passed without serious results. The transport plane was the pivotal point of evacuation on this front, although its organisation represented the concentrated efforts of a large number of people. The Australian sick and wounded owed a great deal to the American air transports. Jeep transport on the intermediate stages was

also invaluable, and though other duties demanded priority at times, the utmost consideration was given to the casualties. When evacuation from the M.D.S. began to slow down owing to lack of vehicles, the Army Service Corps would send extra vehicles to cope with a rush. Coordination in various departments and between the Allied organisations was greatly helped by the work of medical liaison officers such as Major Humphery and Major C. C. Wark.

It was in these early campaigns in New Guinea that the foundation of organisation was laid for the handling of casualties in forward areas. R.M.Os. in forward units, on account of the long evacuation line, formed forward R.A.Ps. These were staffed by the R.M.O., a corporal and three orderlies, who carried and used personal equipment. In addition a rear aid post was used, consisting of a sergeant, a chaplain, the rest of the orderlies and three or four carriers. All sections sent out on patrol were accompanied by a trained stretcher bearer orderly who was often armed as well as medically equipped.

Amenities for sick and wounded. An important adjunct to the comfort of patients was the supply of comforts by the Red Cross, the Comforts Fund and other charitable organisations. These stores were flown over when possible and were distributed at the airstrips and Soputa, where they were of the utmost assistance in increasing the well-being of the sick and wounded. Services which provided hot drinks at the airfield of departure and arrival were also much appreciated. In addition to these an official supplement to the standard ration was supplied to medical holdings. At Soputa Humphery arranged a supplementary issue on the scale of 200 patients for a week which arrived through medical channels.

Angau. Captain Vernon of Angau was again concerned about the rations available for his native carriers. After the drive on Sanananda had begun he approached Humphery to see if an extra amount of fat could be added to their diet. He suggested that dripping and if possible cod liver oil be sent to the native hospital at Popondetta with weekly maintenance rations. He had noticed that many of the 250 or more native patients he was caring for were quite emaciated. The request was passed to New Guinea Force.

Attention was given to the food for patients in native hospitals, and a unit of supplementary ration was made available for them. No formal scale was laid down for these hospitals, but the military scale was considered suitable. Their chief needs were carbohydrates and sources of vitamins. Humphery remarked in a letter to the D.D.M.S. that Vernon himself was exceedingly thin, and unless he had meals with other members of Angau he ate very little, and indeed would give away to the natives any special food which he was given. Following these enquiries a case of special mixed food was sent to Angau at Popondetta for Vernon's personal use.

TYPES OF WOUNDS

Chest Wounds. The usual method of suture was adopted for "sucking" wounds. It was observed that a wound which gave no evidence of com-

munication with the pleural cavity at the aid post might do so on arrival at the M.D.S. It was practically impossible to maintain these patients in the sitting position and they usually arrived in poor condition. An answer was found to this problem by having natives make a back-rest on American Stokes litters, consisting of blankets lashed over a framework to the litter. Littlejohn later designed such a back-rest for routine use with the Stokes litter.

Abdominal wounds. Effusion of blood was nearly always present and transfusion was necessary. The extent of wounds over the right lower ribs was difficult to estimate, and study of rigidity and of the assumed track of the missile was necessary. It was important not to overlook wounds of the colon. Wounds of the buttock were misleading, as the pelvis and its contents, including small intestine, might be damaged. Ackland laid it down that a buttock wound was one of the most difficult for exact diagnosis, since so many visceral, nervous or bony complications might exist. Even excision was not easy to carry out except with a bold hand, and this was imperative to avoid sepsis. The mortality in abdominal wounds was high, but some astonishing recoveries took place: one of Yeates' patients was completely covered with coarse sea sand, and the intestine was extruded with multiple perforations, and yet survived.

Head wounds. There were not many of these, but only those men were operated on who were likely to benefit, and in busy periods only those who were partly or wholly conscious.

Wounds of limbs. A really serious problem was the lack of control of the femoral artery by tourniquet resulting in severe loss of blood. Fractures of the femur did not do well, and Yeates suggested in his report that the best treatment for shattering of the femur might be amputation. Resuscitation was applied after bleeding had been controlled, directly or with an Esmarch bandage. Ackland made special reference to the danger of wounds of the popliteal artery, and considered that immediate amputation was often required in patients whose further evacuation to Moresby might be delayed by bad weather conditions. Lesions of the arms were not infrequently associated with nervous damage.

Gas gangrene was recognised as a distinct danger during this campaign. From 1st November 1942 to 28th February 1943, 82 (4.5 per cent) of 1,815 Australian battle casualties admitted to the 2/9th A.G.H. at Moresby had clinical gas gangrene. These men were wounded in the Owen Stanley and Gona-Buna campaigns; twelve of them died. Over 100 cases of anaerobic infection were seen, but some of these were saprophytic in type. Lieut-Colonel K. C. Ross and Captain W. P. Ryan, who studied this series found that shock, rapid blood destruction, discomfort and mental unrest were constant signs.[2] All had received sulphonamides in standard doses and fifty-one men were given antitoxin. The effect of the antitoxin was difficult to estimate, but there seemed no doubt of the value of repeated blood transfusions. The most important aspect in this series was the value

[2] *The Medical Journal of Australia* 8 July 1944.

of surgical excision. Treatment in this campaign, as we have seen, was early, but it was not always possible in the very bad conditions on the coastal plains to examine every wound meticulously; this could only be done in a relative sense because of anatomical or pathological considerations. Observations made at Moresby showed that gas gangrene occurred most frequently in wounds which had not received sufficient radical attention. After the campaign was over, Littlejohn conferred with the surgeons who had worked at the advanced posts, and they produced evidence from their individual notes and the subsequent progress notes that adequate excision or *débridement* was a valuable safeguard against clinical gas gangrene, which was more commonly found in neglected or partially treated wounds in which muscle and blood vessels had been seriously damaged. Yeates summed up the situation "one is bound to remark that battle casualties in New Guinea demand early and very radical surgery".

Resuscitation. Resuscitation followed the lines laid down in the Middle East, and the set-up of admission and resuscitation tents was similar to that used in Libya. Trestles were made of logs running the length of the tent or series of brigaded tents, and on these stretchers could be placed at a convenient height. Here patients were examined without being further moved and if necessary transfusions were given. In this campaign X-ray units were not brought up to forward posts. Heat was not required except to a limited extent for cold and shocked men, and here hot water-bottles sufficed.

The possible dangers of transmitting malaria were disregarded if blood was badly needed, as any infections caused in this way could easily be cured. Blood films from prospective donors were obtained in the M.D.S. and examined for parasites. Occasionally members of an ambulance unit were used as donors, when no suitable donor was to hand and the need was great. Patients often had a rise of temperature after transfusions of blood, and frequently parasites were found on examination. This was no doubt due to suppressed infection.

When whole blood was used, complete reliance was placed on the blood grouping carried out on all soldiers on enlistment. Severe degrees of shock were not common, possibly because of prompt treatment, but if required, intravenous fluids were freely given in the form of a litre or more of blood, or wet and dry serum. As a rule serum was given, and with good results, but blood from volunteer donors was also used if necessary, though no stored blood was available. Intravenous saline or Ringer's solution was used as a post-operative measure where hollow viscera had been perforated.

Fatigue in Tank Crews. During the action at Buna some information was gathered concerning fatigue of crews of "General Stuart" tanks (American M3 light tank) and embodied in a report by Captain H. I. McKenzie, the R.M.O. of the 2/6th Armoured Regiment. This was based on enquiries made from 100 men, including tank commanders, drivers, gunners and wireless operators, whose average age was twenty-three and a half years. Height was a significant factor in fatigue particularly in men

over 5 feet 11 inches in height; lack of previous experience in arduous work also contributed to fatigue. Malaria introduced a complication; sixty-six of these men were infected, a high figure when compared with battle casualties, fifteen in number. Though tanks were rarely used at night, and the crews spent the night in a harbour area the men had little or no protection from the heavy rain, which did not encourage the use of mosquito nets. McKenzie recommended that tank crews should sleep off the ground in these malarious areas, have efficient cover and use nets.

The commonest symptoms noted in members of crews showing fatigue were headache, anorexia, nausea, faintness and breathlessness. Eye strain was also common, owing to the irritant effect of fumes, and the continual strain of looking through narrow slits and prisms, especially when these were fogged and when excessive sweat ran down the forehead into the eyes.

Some loss of weight was noted during the period of action: the average amount was estimated at 15 pounds; this was only an estimate, but the loss was definitely greater in men who contracted malaria. No evidence was found of cramps or other symptoms due to salt lack. It was found, however, that men who did not have a proper meal before action were more likely to suffer from headache; the men attributed their loss of desire for food to excitement. During action, crews welcomed dehydrated fruit rations and chocolate, but not milk tablets, which increased thirst. Most of these tank crews experienced faintness and breathlessness. These symptoms were connected with the presence and density of fumes in the tanks. Even with the engine running rapid firing produced more fumes than the ventilation system could cope with, and with the engine disabled further fighting increased the density of the fumes. Some men were completely overcome and had to be propped near an open port. The crews stated that these fumes came from the 37-mm. gun, which had an ammoniacal content, and the symptoms were accentuated by the heat and humidity.

McKenzie estimated that crews could tolerate up to seven and a half hours of duty in a tank, after which their fighting efficiency declined. Such decline was rapid after this point had been reached, and twelve hours of continuous action brought about a state of indifference even to personal danger. The men thought that a day of five hours' fighting was a reasonable limit if efficiency was to be maintained for seven days of continuous action. The R.M.O. commented that the conditions prevailing at Buna were responsible for this figure, which was low by comparison with the desert fighting. At Buna not only was the heat humid and excessive, but the tanks were closed down, and did not go into action with turrets open as in the desert. The discomfort of wet sleepless nights must also have been significant as a causal factor of fatigue. A final factor of importance is that of the cohesion of tank crews. Crews trained as a team felt much happier if they went into action together, and still more confident if they were associated with infantry units whose members had also trained with them.

The United States Medical Services. Major Humphery visited the American medical units in the neighbourhood of the airstrips so as to be familiar with their plans for the area. The American and Australian medical services cooperated in giving care to such of their personnel who needed it. The 10th Field Ambulance had close association with the American medical services, and treated and held American patients at forward posts at Sanananda, and at Popondetta airstrip. Similarly the American portable hospitals in the Buna area held and treated some Australians, and the 2nd United States Field Hospital was part of the Australian line of evacuation from the 10th Australian Ambulance M.D.S. to Dobodura. Assistance was always cheerfully given; supplies of material such as dried plasma were obtained from the Americans, who also helped in transport of wounded if necessary, and shared the carrier trains with the Australians with perfect fairness.

Wastage by illness. Sickness, apart from battle wounds, was of great importance to the forces on the coastal plains. We have seen how dysentery became not only a menace on the Owen Stanley Range but an active agent in seriously lessening the strength and endurance of the men, and was only countered by such vigorous measures of hygiene as could be established and maintained over that long and fantastic line of communication, and by the use of sulphaguanidine in the aid posts. Malaria was then only of secondary importance, but the descent to Kokoda re-introduced this subtle enemy, and by the time the troops had gathered on the plains the danger was apparent. The actual wastage by illness, in particular malaria, was very great. During the action periods the fighting forces were seriously reduced by this ruthless enemy, and the need for keeping all possible men in the fighting force compelled medical officers to keep many who were not fit. A previous experience had thinned the fighting forces in Milne Bay, but there the campaign had been brief, and the full lesson of prophylaxis had to be learnt afterwards. These two experiences may now be reviewed with advantage, for out of them arose decisions and action which were of the first importance in establishing sound anti-malarial measures in military forces engaged in highly malarious regions.