

# The US Army War College Quarterly: Parameters

---

Volume 12  
Number 1 *Parameters* 1982

Article 5

---

7-4-1982

## OF BATTLE AND DISEASE: THE EAST AFRICAN CAMPAIGN, 1914-18

John Sloan Brown

Follow this and additional works at: <https://press.armywarcollege.edu/parameters>

---

### Recommended Citation

Brown, John S.. "OF BATTLE AND DISEASE: THE EAST AFRICAN CAMPAIGN, 1914-18." *The US Army War College Quarterly: Parameters* 12, 1 (2020). <https://press.armywarcollege.edu/parameters/vol12/iss1/5>

This Article is brought to you for free and open access by USAWC Press. It has been accepted for inclusion in The US Army War College Quarterly: Parameters by an authorized editor of USAWC Press.

# OF BATTLE AND DISEASE:

## THE EAST AFRICAN CAMPAIGN OF 1914-18

by

JOHN SLOAN BROWN

**I**t is generally accepted that extended military operations before the 20th century often saw more troops lost to disease than to hostile action. Yet disease has received comparatively meager attention down through history as a significant element of consideration in operational planning. Armies kept little in the way of medical records before the 19th century. Then, in the latter half of that century, military medicine made great advances, accurate medical records first appeared, and medical problems received some attention in general military studies.<sup>1</sup> This developing interest flourished briefly, before further medical advances, including the advent of "wonder drugs," again reduced any general interest in the effects of disease on operations. Military medicine became the domain of specialists expected to sweep away the medical implications of decisions military planners had already made.

An inattention to medical matters has characterized military history as well as military planning. In most works, disease joins the blazing sun and choking dust in a "how rough it was" backdrop to the apparently more important details of strategic movement and tactical deployment. In part, this inadequacy of coverage of the medical aspects of a campaign is the result of a legitimate appreciation of the limitations of the sources. It is hardly worthwhile to speculate extensively upon a slender body of original materials. In part, however, inattention to medical matters is also the result of the "use" to which military history is put. Many military officers read or study military

history from a utilitarian perspective. Understandably, in the furtherance of their professional development, they tend to be most interested in the timeless principles of maneuver and leadership.<sup>2</sup> Since disease has been conquered and no longer matters, the reasoning goes, it would make little sense to give it undue attention when canvassing history for "useful" information.

There is some danger, however, in assuming that history should have immediate utility. Whether one believes that typhus has been conquered or not, one can hardly understand Napoleon's catastrophe in Russia unless he first understands the influence of that disease in that campaign.<sup>3</sup> Furthermore, bacteriological weaponry now raises new specters—the introduction of novel diseases into immunologically naive populations, artificially altered medical environments, and disparate troop immunology—specters that give one less reason to be sanguine concerning the elimination of disease as an operational factor.

A number of campaigns occurred during the period between the development of military medicine as a respectable science and the further advances that rendered that science the domain of the specialist. Of these, perhaps the most instructive from a medical point of view is the East African campaign of 1914-18, which pitted a small force of German colonial troops against a larger force of troops pulled together from various parts of the British Empire. Throughout this campaign medical and operational considerations were strikingly interdependent. Five unique troop immunological profiles—

European, white African, black East African, black West African, and Asiatic Indian—demonstrated strengths or weaknesses that profoundly influenced battlefield developments. In turn, battlefield developments exposed troops to new medical environments in which they once again demonstrated immunological strengths or weaknesses.

**T**he East African campaign ultimately spread across a vast territory stretching 1200 miles from Nairobi south to Chinde and 700 miles from the Indian Ocean west to Lake Tanganyika.<sup>4</sup> Climate ranged from steaming equatorial jungle to Alpine chill, and topography varied from featureless savannah to jumbled mountains. Soldiers measured themselves against monsoon-like wet seasons, parched dry seasons, enormous distances, and wild animals of all sizes—of which crocodiles, bees, and ancylostome larvae (“worms”) were the most prone to attack humans with effect. Troops also measured themselves against a telling array of infectious microbes—insect-borne, water-borne, and effluvial.<sup>5</sup>

Endemic East African insect-borne diseases included yellow fever, malaria, black-water fever, sleeping sickness, nagana, and relapsing fever. Mosquito-borne parasites cause the destruction of red blood cells characteristic of yellow fever, malaria, and the severe variant of malaria labeled black-water fever because the victim passes blood-colored urine. Yellow fever generally attacks a victim once; if he survives, his immunologies protect him from further attacks. Malaria causation is more complex and can involve a number of different strains of protozoa. Victims build up resistance over time but fall ill under successive waves of exposure. Residual anemia often saps the energy and will of survivors for extended periods.

The tse-tse fly is to sleeping sickness and nagana what the mosquito is to malaria. There are at least two strains of sleeping sickness, one carried by a species of fly that thrives in damp shade and another by a fly that thrives in hot sun. Nagana is the counterpart of sleeping sickness that affects

horses and livestock. Nagana and sleeping sickness are so deadly that immunities do not tend to develop; before 1922 the only effective prophylactic was to avoid being bitten by the tse-tse. Relapsing fever is a disease carried by ticks, here considered an insect for the purpose of simplicity.

Water-borne diseases endemic to East Africa included typhoid, cholera, and dysentery. All are caused by microorganisms from contaminated water. During World War I, typhoid and cholera were clearly defined diseases identified with specific microorganisms and known vaccines. Dysentery was an imprecise term describing a variety of intestinal disorders. Doctors thought the “disease” was caused by protozoans and aggravated by an unfamiliar diet.

Effluvial diseases are transmitted mouth-to-mouth. Of these, the most significant in the East African campaign were smallpox and “croupous pneumonia.” Smallpox was a well-defined disease identified with a specific microorganism and a specific vaccine. “Croupous pneumonia” was a vague term for a range of respiratory disorders that doctors attributed to exposure and infection.

**A**gainst this East African array of medical hazards, the Germans mustered techniques and resources as comprehensive and sophisticated as the medical knowledge of the time allowed.<sup>6</sup> Their biological institute at Amani, 40 miles west of Tanga, had involved itself in

---

Captain John Sloan Brown is an instructor in the History Department at the US Military Academy. Captain Brown graduated from the Academy in 1971 and subsequently received a master's degree from Indiana University, where he is now a doctoral candidate. His military assignments have included service as a tank platoon leader, tank company executive officer, tank company commander, armored brigade assistant S-1, armored battalion S-1, and armored brigade assistant S-3. Captain Brown's publications include “Jena, as if War were a Science” in *Campaign Studies* (USMA, 1973).



research, tropical medicine, and preventive medicine before the war. The Germans in East Africa mobilized 63 doctors and a proportional staff to support Lieutenant Colonel (later General) Paul von Lettow-Vorbeck's peak strength of 260 German officers and noncommissioned officers and 13,000 black askaris.<sup>7</sup>

The doctors of Amani clearly understood pathology—and immunization—insofar as yellow fever, cholera, typhoid, and smallpox were concerned. With an extensive immunization campaign they virtually eliminated smallpox in German East Africa even before the war began. Their efforts with respect to yellow fever, cholera, and typhoid had been less comprehensive, but they had at least insured that the troops were immunized.<sup>8</sup>

With regard to malaria and dysentery, the Germans relied on camp discipline more than medical science. They knew that the mosquito carried malaria, knew the black African was surprisingly resistant to local strains of malaria and dysentery, knew quinine had a prophylactic and therapeutic effect on malaria, and knew that boiling water effectively precluded dysentery. These considerations suggested a simple solution: each German was accompanied by black porters bearing the equipment and supplies necessary to keep him in good health. Even when traveling light, von Lettow-Vorbeck's Germans required five porters each.<sup>9</sup> Maintaining a European in good health required an elaborate assortment of tentage, off-the-ground bedding, mosquito-netting, medical supplies (especially quinine), familiar food items, pots, pans, and equipment for sterilizing laundry and utensils. Attendants not only carried this equipment, they also set up the tents and netting, killed vermin in the tented area, boiled water, sterilized laundry and utensils, cooked, whisked flies, ran errands, and attended to their employer's personal comfort. Keeping a German in good health proved to be a full-time job for five Africans.

German doctors accepted that the black was resistant to malaria, but they were not sure that his resistance to dysentery was

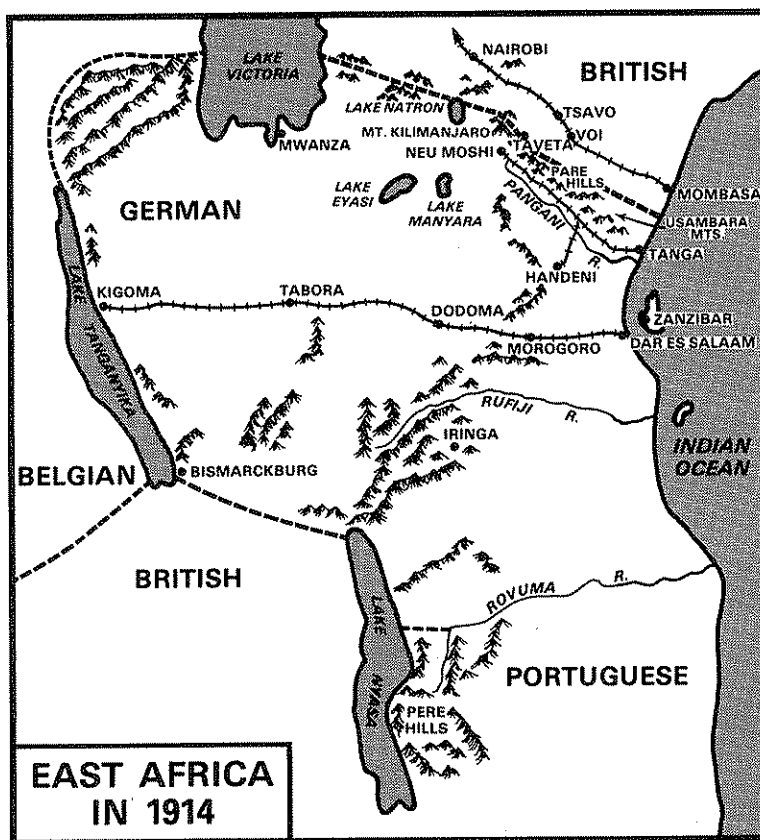
comprehensive enough to protect him from all the various sources of infection. Doctors thought the blacks should also drink boiled water and deposit sewerage at a considerable distance from their sleeping areas. Unfortunately, Africans who went to extraordinary lengths to protect European employers thought such measures unnecessary for themselves. Boiled water and distant latrines were for Europeans, not Africans. The Germans gave up after one major medical crackdown when they found the askaris hiding sewerage in, of all places, their pots for boiling water.<sup>10</sup> In the face of this resistance, doctors could only wring their hands and keep a wary eye on the sick rate. Dysentery proved to be of little consequence to the German askaris until they were forced out of familiar territory.

If Europeans could not persuade Africans to do much to protect themselves from dysentery, they had little trouble persuading them to protect themselves from the carriers of sleeping sickness and relapsing fever. Ecology dictated the range and extent of "fly-belts." The African was familiar with these and keenly aware of the habits and habitats of the tse-tse. A fly-whisk was considered a necessity throughout much of East Africa. The blacks also paired off and checked each other for ticks and other parasites. The African may not have understood disease causation, but he was acculturated to protect himself from the most deadly of the East African diseases. Protecting the European from these insect-borne diseases was, of course, yet another task for the ever-present porter.<sup>11</sup>

"Croupous pneumonia," the last of the East African killer diseases, was too vague a notion to allow for specific prophylaxis or cure, but the Germans rightly thought that undue exposure to cold, wet conditions had much to do with the development of the "disease." The danger zone was the East African highlands, and the most vulnerable troops seemed to be the black soldiers rather than their white officers and NCOs. The Germans saw to it that askaris in the highlands carried blankets and tentage; unit discipline included traditional measures for

keeping soldiers warm, dry, and well fed.<sup>12</sup> When on leave, askaris had the authority to requisition food, shelter, and blankets from local headmen.<sup>13</sup>

All factors considered, von Lettow-Vorbeck's tiny army was surprisingly well prepared for the medical hazards of East Africa. Vaccination programs had greatly improved troop immunology with respect to yellow fever, cholera, typhoid, and smallpox. The black askaris seemed immune to malaria and dysentery, and the black porters took extraordinary precautions to protect the Germans as well. Black and German alike were aware of the necessity to avoid exposure to the tse-tse fly, the tick, and cold, wet conditions. There were gaps with respect to knowledge and practice, to be sure, but the Germans mustered a creditable medical effort for an army of 1914.



The British medical effort in the East African Campaign was somewhat more uneven than that of the Germans. For political reasons—in particular the desire to maintain East Africans as a demilitarized peasantry—the British initially relied on troops from all over their empire rather than troops locally recruited.<sup>14</sup> Whereas the German army in East Africa, the *Schutztruppe*, was altogether black in the rank and file, the British employed indigenous troops only in the three battalions of their King's African Rifles (KAR). These native troops were joined, and greatly outnumbered, by black West Africans, white East Africans, white South Africans, Indians, and British. Physicians accompanied all of these units, although never in the ratio of physicians to soldiers enjoyed by the *Schutztruppe*.

The British black East African and West African units approximated the *Schutztruppe* in organization and medical habits.<sup>15</sup> Black soldiers and white officers and NCOs

benefited from vaccinations against yellow fever, cholera, typhoid, and smallpox. Each white had black bearers assigned to carry medicine, food, off-the-ground bedding, mosquito netting, tentage, pots, pans, and tin bathtubs. Blacks assiduously attended to the medical frailties of their employers while disdaining to take precautions themselves. The KAR was familiar with the dangers posed by the chill of the highlands, although some of the black West African units apparently were not.<sup>16</sup>

The white East African and South African units had little good to say concerning their black counterparts. To them, arming lowly “niggers” or “fakirs” seemed socially irresponsible. The pandering the white officers of these black units received was also offensive. South Africans ridiculed the Nigerian Brigade as the “bed-and-bath brigade” because of the “absurd luxuries” in the loads of the bearers.<sup>17</sup> The white Africans acknowledged the value of the modest tentage

and netting they themselves carried but never gave medical matters the kind of attention that the porters of the KAR gave to their European charges. In particular, white Africans considered themselves "acclimatized" to the water and usually did not bother to boil it.<sup>18</sup>

The more properly British units, many of whom had served with "colored" units before in Africa or Asia, were less contemptuous of the KAR. It is not clear what they thought of the elaborate support the whites in the black units received, but they could not be similarly supported at any rate because there were so few porters available in all-white units.<sup>19</sup>

Indian units, like black units, were led by Europeans and carefully tended to the medical needs of their European officers. Indians also had the advantage of being "colored," a characteristic considered proof of resistance to a wide range of tropical diseases.<sup>20</sup> Indeed, the evidence is that the British considered Indians a politically acceptable immunological substitute for the black African. There were medical hazards in East Africa, to be sure, but surely the Indian could weather them.

Taken as a whole, the British military establishment in East Africa presented striking contrasts to that of the Germans insofar as disease prophylaxis was concerned. Only their black African units were comparable to the *Shutztruppe* in troop immunology and medical habits. The British did have a far wider range of immunological profiles, which could have been an advantage, depending upon where they chose to fight.

**W**orld War I was less than three months old when an Indian Expeditionary Force stormed ashore at Tanga, an important port and railhead in German East Africa. Von Lettow-Vorbeck was fully prepared to contest this landing and neatly repulsed it with heavy losses. Stung by this defeat and burdened with requirements elsewhere, the British evacuated Tanga and allowed the war in East Africa to settle into a year of inconclusive border skirmishing.

During this period the British deployed their tiny KAR, raised white units in East Africa and Rhodesia, and retained some British and Indian remnants of the original expeditionary force in the East African theater. Most of the inconsequential fighting took place in the relatively healthy uplands around Kilimanjaro, where both British and German railroads ran close to the frontier. In this environment neither side suffered much from disease, although the British European units suffered from dysentery much more than their black or white African counterparts.<sup>21</sup>

The British did exploit their naval supremacy to isolate German East Africa from the rest of the world. German countermeasures included the creditable maverick campaign of the light cruiser *Konigsberg*<sup>22</sup> and an extraordinary long-distance dirigible attempt from the Balkans,<sup>23</sup> but the British blockade held. The prospect of dwindling medical supplies greatly troubled the Germans, especially since the traditional South American sources of quinine had been cut off. Fortunately, the doctors of the Amani Institute discovered a way to synthesize quinine from local plants, thus averting a shortage of this critical medical item. The German doctors demonstrated similar imagination with regard to other medical supplies, and their immunization programs were, as previously noted, already well-advanced.<sup>24</sup>

Neither blockade nor border skirmishing could bring von Lettow-Vorbeck down. In late 1915 the British began organizing another major offensive. The South African Army, under General Jan Christian Smuts, had by then completed its conquest of German Southwest Africa and was available for further service. The Cameroon campaign was also over; thus West African units such as the Gold Coast Regiment and the Nigerian Brigade were available as well. Smuts arrived in British East Africa and assumed command of an invasion force that numbered 30,000 by March 1916.

Smuts' choice of an invasion route necessarily narrowed to the relatively open terrain around the shoulders of Mount Kilimanjaro. Shipping requirements to

support other theaters (the Dardanelles Campaign was under way) precluded another amphibious invasion, even if memories of Tanga had not been deterrent enough. The formidable Usambara and Pare ranges paralleled the Anglo-German frontier from the Indian Ocean to the Kilimanjaro area. West of Kilimanjaro, German rail lines gave out and British rail lines swung away from the frontier, making the support of large troop concentrations west of Kilimanjaro infeasible. Small columns could invade German East Africa from Uganda, Rhodesia, or the Belgian Congo, but the main attack had to come through Kilimanjaro.

On 5 March 1916 Smuts attacked. Frontal attacks were coupled with threatened envelopments to force the *Schutztruppe* back. The Germans demonstrated considerable skill in choosing positions and in conducting the loose-order warfare of the African bush, but British numbers and mobility—here mounted troops proved of considerable value in maintaining the threat of envelopment—weighed too heavily against them. Von Lettow-Vorbeck fought a classic delaying action back to his railhead at Kahe, then shifted his direction of withdrawal to the southeast along an axis described by German East Africa's Northern Railway.

Once Smuts closed to Kahe in the last week of March 1916, he too shifted direction to parallel the Northern Railway. The railway offered obvious logistical advantages and led in the direction of Tanga and Dar es Salaam, the well-developed ports that were German East Africa's most significant geographical objectives. Further, Smuts hoped that by a vigorous pursuit he could force von Lettow-Vorbeck into a decisive battle.

Thus far neither adversary had suffered much from medical problems. Dysentery had sporadically infected some European units, and unfamiliar dietary practices had led to a disproportionate number of cases of appendicitis among white troops,<sup>25</sup> but no unit had suffered significant losses to either of these ailments. The only unit significantly debilitated during Smuts' initial offensive was the Gold Coast Regiment. While marching to the front from a British railhead,

the regiment found itself exposed to unseasonably cold weather. White officers found this change of climate bracing, but virtually all of the black rank and file suffered attacks of "croupous pneumonia." Few died, but the unit was unable to participate in the initial fighting.<sup>26</sup>

The advance beyond Kahe required a descent from the healthy Kilimanjaro uplands into the Pangani River Valley. The medical effect was negligible for von Lettow-Vorbeck, but catastrophic for Smuts. Malaria ravaged white units with almost unbelievable severity. Representative statistics illustrate the devastation. The Second Loyal North Lancashire Regiment began the March offensive with 552 officers and men; after a week in the Pangani Valley, 236 of these were considered unfit because of disease, and within a month the unit was withdrawn to South Africa to recuperate.<sup>27</sup> The Second Rhodesia Regiment, starting with 541, lost 60 men as battle casualties and 148 to disease.<sup>28</sup> The Ninth South African Infantry dwindled from 1135 to 528 during the same period.<sup>29</sup> Overall, white African units averaged a continuous sick rate of 50 percent, and their European counterparts fared somewhat worse. Indian units averaged a continuous sick rate of 20 percent.<sup>30</sup> Indians were probably not as much more resistant to East African diseases, however, as these statistics would indicate. Their camp discipline with respect to tentage, netting, boiled water, and so forth seems to have been better than that of other units—certainly it was better than that of the notoriously unruly white Africans.<sup>31</sup> Only black African units—and their white officers—carried on without significant debilitation from disease, and even their relatively healthy record was marred somewhat by dysentery. Officers of the West African units commented that dysentery made the coastal lowlands and river valleys unhealthy for all but the indigenous African.<sup>32</sup>

Numbers alone were not a full measure of the British loss of effectiveness. Skeletonized regiments faced command-and-control problems when they attempted to jointly accomplish missions appropriate to a single

full-strength regiment. At times Smuts had as many as four reduced regiments attempting to do the job of one.<sup>33</sup> Trained squads and crews also proved difficult to hold together. A British artilleryman remarked:

In this country, where sickness is so rife, it is impossible to keep an efficient gun team together for any length of time. Old hands slip away each week, and men to replace them have endlessly to be instructed in the intricate mechanism of the gun.<sup>34</sup>

Subordinate attacks into other portions of German East Africa supported Smuts' main drive toward Tanga and Dar es Salaam. These columns repeated Smuts' experience in miniature: they drove all before them in the highlands but suffered severe attrition if called upon to descend into lowlands or flybelts. British gunboats, assembled on Lake Tanganyika after having been carried disassembled by railway and porter, swept away a tiny German flotilla and secured the lake port Kigoma. An 11,000-man Belgian force brought into Kigoma then pushed through to Tabora and linked up with a British column based on Lake Victoria. Three thousand troops from Rhodesia seized the highland town of Iringa while South African cavalry were split off from Smuts' main body to seize Kondoa Irangi and then Dodoma on the Central Railway. This last column was devastated by malaria and nagana when its route dipped temporarily into the mosquito and tse-tse infested lowlands around Lake Manyara. The other allied columns stayed in the uplands and suffered little from disease; the cross they bore was the almost insuperable logistical problem posed by rough terrain, primitive transportation routes, and the mud of the rainy season.

By September 1916 the East African campaign had reached a stasis of sorts. British units, for the most part white or Indian, had swept the Germans out of the highlands. The *Schutztruppe* had withdrawn to the strategically more significant coastal plain, where it stubbornly contested further British advances. In the malarial lowlands the efficiency of white units proved to be

something less than 50 percent and that of their Indian units something less than 80 percent. Thus von Lettow-Vorbeck was able to hold his own against greatly superior odds. At one time, 114,000 allied troops weighed in the balance against the 13,000-man *Schutztruppe*. Smuts' offensive ground on with appalling inefficiency as von Lettow-Vorbeck deftly maneuvered from position to position. Smuts' personal letters reveal a transition from the confident enthusiasm of the Kilimanjaro fighting to the despair and frustration associated with the disease-riddled lowlands. Disease is a dominant theme in Smuts' letters from April 1916 onward.<sup>35</sup> On 28 September Smuts called off one attack altogether simply because his men were too diseased to continue.<sup>36</sup>

After some soul-searching, the British radically increased the numbers of the King's African Rifles from three to 22 battalions during the winter of 1916-17.<sup>37</sup> This mass mobilization of black troops represented a radical departure from previous social policies, but in his desperation Smuts even toyed with the idea of deploying 10,000 armed Zulus into his theater.<sup>38</sup> As new KAR battalions entered the coastal fighting, first the white and then the Indian troops were withdrawn. By the end of 1917 the last Indian unit redeployed to the Middle East, and white units confined their activities to the uplands. The war in East Africa became a contest between the blacks of the King's African Rifles and the black *Schutztruppe*.

The blacks of the KAR proved efficient as soldiers and benefited from considerable advantages with respect to logistics, strategic mobility, and numbers. Von Lettow-Vorbeck's command had dwindled through three years of attrition, and his logistical problems were becoming critical. In November 1917 the British finally pushed him across the border into Portuguese East Africa. Here his immunological luck changed for the worse.

Portuguese authorities had never coped with smallpox in the comprehensive manner of the Germans or British. Von Lettow-Vorbeck's askaris, many of whom had joined the *Schutztruppe* after the British cut off



medical supplies in 1914, seem to have had an incomplete resistance to that disease. In German East Africa prewar immunization programs had held up well, perhaps because the diplomatic status of Portugal allowed for little traffic across the border. When the *Schutztruppe* retreated into Portuguese East Africa where smallpox was rife, however, the askaris suffered astonishing rates of debilitation. Fully 50 percent of von Lettow-Vorbeck's blacks were incapacitated by smallpox.<sup>39</sup> None of his Germans contracted the disease, but the prewar immunization of the whites had been more comprehensive, of course, and they may well have had more inherent resistance.

While the *Schutztruppe* suffered, the British pursuit quickened. The KAR suffered some, but apparently not much, from smallpox. Their comprehensive immunization dated from the mass mobilizations of 1916-17, and they had never been cut off from European sources of medical supplies. Alarmed by the pace of the British pursuit and fearing that the British might complement their pursuit from the north with amphibious landings from the south or east to cut him off, von Lettow-Vorbeck skillfully shook his pursuers with hairpin turns behind screens of skirmishers and escaped to the west, into the Pere Hills.

As the Germans worked their way north through the Pere Hills, "croupous pneumonia" debilitated half of the blacks still in von Lettow-Vorbeck's column. Much of the equipment used to protect the soldiers from exposure had been lost in the pursuit. Troops were tired and poorly fed, and the Pere Hills were cold and wet. Dysentery also became a problem; Portuguese East African water contained novel agents of infection.<sup>40</sup> Again logistical advantages favored the British. They had taken a lesson from the Germans with respect to camp discipline and they had the equipment to protect their soldiers; hence, they suffered less in the same environment.

In three weeks disease did more damage to von Lettow-Vorbeck than the allies had done in three years. The vagaries of medical logistics ultimately did him in, despite the

extraordinary efforts of his medical personnel. Von Lettow-Vorbeck was still able, however, to outmaneuver his opponents, survive, and ultimately stabilize his medical situation. An intact, albeit much smaller, *Schutztruppe* continued on in an anabasis until the armistice in Europe.<sup>41</sup> The last year of the war did see a creditable display of German finesse and tenacity, but the slender hope the Germans held of stalemating the British in East Africa evaporated in smallpox-ridden Portuguese East Africa.

**T**he East African Campaign of 1914-18 is not without its lessons. It illustrates in a dramatic manner how significant the effects of disease can be as a factor in military operations. The campaign fell into four medical environments: a relatively healthy uplands, a domain of "croupous pneumonia" at yet higher elevations in which blacks were at risk, a domain of malaria and nagana in which whites and horses were at risk, and a domain of smallpox in which the marginally immune were at risk. Indians were at risk everywhere, but they seem to have taken relatively good care of themselves. Dysentery was a geographically indefinite hazard in all four domains; as a rule of thumb, the farther from home a soldier drank unboiled water, the more likely he was to suffer dysentery. Yellow fever, sleeping sickness, relapsing fever, cholera, and typhoid seem to have caused little damage during the campaign. Prewar prophylaxis, camp discipline, and healthy revulsions to the tse-tse fly and tick combined to preclude significant damage from these diseases.

If one believes that bacteriological warfare is possible, one cannot help wondering if our performance when faced with its ravages would be more akin to that of the *Schutztruppe* or to that of the British before 1917. Would we make disciplined use of protective equipment and medical assets, or would we be devastated by our own lack of preparation and understanding?

#### NOTES

1. For example, see Emory Upton, *Military Policy of the United States* (Washington: GPO, 1911).

2. See Major John I. Algar, *Definitions and Doctrine of the Military Art* (West Point, NY: US Military Academy, 1979) for a current definition of "timeless principles."
3. Frederick Cartwright, *Disease and History* (New York: Thomas Y. Crowell, 1972).
4. The best modern account of the campaign seems to be Charles W. Miller, *Battle for the Bundu* (New York: Macmillan, 1974). Miller's bibliography (pp. 335-38) is also very good.
5. This discussion of the East African medical environment is drawn primarily from M. Taute, "A German Account of the Medical Side of the War in East Africa, 1914-1918," *Tanganyika Notes and Records*, No. 8 (December 1939); Charles Horden, *History of the Great War: Military Operations in East Africa* (London: His Majesty's Stationery Office, 1941); and Cartwright, pp. 137-67.
6. Taute.
7. Paul von Lettow-Vorbeck, *My Reminiscences of East Africa* (London: Hurst and Blackett, 1920).
8. Taute.
9. Von Lettow-Vorbeck, p. 176.
10. Taute, p. 7.
11. See Taute; Horden; Cartwright, pp. 137-67; and von Lettow-Vorbeck.
12. Ibid.
13. Miller, p. 17.
14. H. Moyses-Bartlett, *The King's African Rifles* (Aldershot, Eng.: Gale and Polden, 1956), p. 291.
15. Hugh Clifford, *The Gold Coast Regiment in the East African Campaign* (London: John Murray, 1920); W. D. Downes, *With the Nigerians in German East Africa* (London: Methuen, 1919).
16. Clifford, p. 14.
17. Downes, p. 55.
18. C. J. Wilson, *The Story of the East African Mounted Rifles* (Nairobi: East African Standard, 1938), pp. 9-29.
19. Angus Buchanan, *Three Years of the War in East Africa (25th Fusiliers)* (London: John Murray, 1919); H. C. O'Neill, *The Royal Fusiliers in the Great War* (London: Heinemann, 1922).
20. Horden, pp. 520-22. See also W. J. Thatcher, *The Fourth Battalion, Duke of Connaught's Own, Tenth Baluch Regiment in the Great War, 129th D.C.O. Baluchis* (Cambridge, Eng.: The University Press, 1932).
21. Wilson, pp. 17-29.
22. Miller, pp. 44-50, 75-87.
23. Letter from Robin Higham to the author in response to inquiries, 23 December 1977.
24. Taute.
25. Ibid., p. 11.
26. Clifford, p. 14.
27. Horden, pp. 520-22.
28. Ibid.
29. Ibid.
30. Ibid.
31. Ibid.; see also Wilson, pp. 17-29.
32. Downes, p. 87.
33. J. R. Sibley, *Tanganyika Guerrilla* (New York: Ballantine Books, 1971), p. 93.
34. Buchanan, p. 142.
35. Jan C. Smuts, *Selections from the Smuts Papers*, ed. U. K. Hancock and Jean van der Poel (Cambridge, Eng.: The University Press, 1966), Vol. III.
36. Moyses - Bartlett, p. 319.
37. Ibid., pp. 332-36.
38. Smuts, 26 October 1916.
39. Taute, p. 18.
40. Ibid., p. 19.
41. Ultimately 155 Germans and 1156 askaris surrendered to the British on 25 November 1918 (Miller, pp. 325-26).

