extra rice for themselves (quite unnecessarily, as they could have had more from store for the asking). I doubt if they would care for imported (East Indian) rice to the same degree, as it is not so nourishing. Cassava they will also eat.

The salt ration was inadequate. When each man prepares his own meals he needs more salt than the ordinary ration.

The sugar and cocoa rations were adequate, and not too large. Rum is the West Indian's natural drink, and he appreciates it very much at the end of a day's march.

General Conclusions.—The march has, I suggest, clearly demonstrated the ability of the West India soldier to subsist on the country in Sierra Leone, to say nothing of any other part of West Africa, provided certain groceries are carried for him. As, however, the natives in warfare hide all foodstuffs that they cannot remove, it is necessary for troops operating against them to carry their supplies with them, for little besides cassava would be obtainable in the affected districts. The men have kept very fit and marched well on the grocery ration mentioned before, together with meat twice a week, $\frac{3}{4}$ lb. of rice daily, and whatever vegetables they might like to buy. It remains only to determine suitable equivalents for the vegetables. The simplest equivalent is another $\frac{1}{2}$ lb. of rice.

Recommendation.—I believe that a suitable scale of rations for the West India soldier for active service in West Africa will be found in the following: Rice (Sierra Leone grown) $1\frac{1}{2}$ lb., meat $\frac{3}{4}$ lb., sugar $\frac{1}{4}$ lb., cocoa, naval, 1 oz., salt 1 oz., oatmeal 2 oz., vegetables (when obtainable, reduce rice in proportion, but rice not to be less than $\frac{3}{4}$ lb.), lime juice (when fresh vegetables are not obtainable), rum $\frac{1}{2}$ gill.

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Travel.

A VISIT TO A WEST AFRICAN GOLD-MINE IN 1907.

BY LIEUTENANT-COLONEL T. E. NICHOLSON.

Royal Army Medical Corps (R.).

In December, 1906, I was asked by the Secretary of the Liverpool School of Tropical Medicine whether I would care to temporarily accept the post of Medical Officer to a West African Gold-mining Company, as the Directors had specially applied to the School for an expert in tropical sanitation to look after their goldfields in the Gold Coast Colony. Travelling has always been my favourite hobby, and the further afield that I can get—especially if out of the way of the ordinary tripper or tourist—the better pleased I am; consequently, the chance of seeing Kumasi and the wild West African "bush" was one that I could not deliberately
throw away; I therefore accepted, subject to the approval of the War Office authorities.

I left Liverpool on January 5th, 1907, in the ss. "Karina," and I was so fortunate as to meet on board several friends and acquaintances, most of them Army officers, whom I had previously known in other parts of the Empire and who were now employed as Consuls, District Commissioners, &c., on the West Coast of Africa. Las Palmas, in the Canary Islands, was the first port of call; but this place is doubtless too well known to most of us, owing to its being a coaling station for troopships during the Boer War, to merit any description here. Five days later we called off Konakry, in French territory, to land a few passengers, and later on the same day we anchored in the harbour of Freetown, in Sierra Leone. Here I spent a very pleasant time ashore, and was one of those asked to Government House to afternoon tea.

The following day we called at Monrovia to land the British Consul-General for Liberia, but much time was lost in doing so, owing to the tedious delay of the lordly natives in sending out a launch to convey him ashore; it was generally supposed that they had first to fill the boilers, and then light the fire and get up steam, although previously warned by telegram as to the date and hour of our arrival—a fair test (as I then thought) as to their fitness...
generally for self-government! Early on the morning of the 18th we stopped off Axim to land the mails, and soon afterwards rounded Cape Three Points; two hours later we anchored in the roads of Sekondi, after a very quick passage of barely thirteen days from Liverpool. Here I left the ship. There were several passengers for Sekondi, and although there is a good pier here we had all to land through the surf, which was running very strong that day, and then we had to wait for our heavy luggage. There was also much uncalled-for delay in getting it through the Custom House; I was waiting outside on the beach for over two hours, but I was relatively lucky, for some of the luggage was not cleared until the next day, so that after all Liberia was not so very much behind an old-established British Colony; but I had not then discovered that I was now in the land of "softly, softly"—the favourite catch-word out here for covering all deficiency in zeal, which is evidently not considered good form and only to be looked upon as a marked disqualification for popularity.

The Hotel Metropole was fortunately full up, so I had to be accommodated outside with a bedroom in the private bungalow of one of the residents, where I was made most comfortable. I, however, dined at the hotel, but the place was in possession of a lively holiday crowd of miners, who seemed bent on making a night of it, and the atmosphere was "cerulcan," to say the least, so I was
a much-envied man for being able to quietly escape from the inferno.

Early the next morning I left for Kumasi, and as I was travelling by the special "boat-train" I was able to reach my destination that same evening, otherwise I should have had to spend the night at Obuassi. I was made most welcome by the officers of the Gold Coast Regiment, and dined with them that night. The next day I was asked to luncheon with the Commissioner in the historic Kumasi Fort, and was afterwards taken round by him to see the town and neighbourhood. Amongst the sights, I was shown over the prison, and there I was allowed to inspect the apparatus for the execution by hanging of three condemned murderers, who were callously awaiting their doom, which was to take place within the week; the arrangements were most humane and unobjectionable, and death ought to be instantaneous. I was also shown the historic Juju-tree, which is now, happily, free from its ghastly human ornaments, but if it could relate all its experiences, the tale would be a lengthy one of almost unparalleled cruelty and suffering.

Early the next morning I started to retrace my journey by rail as far as X., where I left the train, and with it practically also civilisation. Here I met some more men who were proceeding to the same place that I was eventually bound for, and I soon had an insight as to what I might expect for the next few months. Ten of us sat down to dinner together. The conversation soon became lively and general and consisted mostly of "shop." Before the meal was over I was quite au fait with shafts and winzes, levels and drives, "stoping" and timbering, amalgamating and cyaniding, and I was soon able to follow, more or less, a wordy contest between the representatives of the mining and milling departments respectively.

The following morning I started for a four days enjoyable march though the glorious evergreen "bush," or African forest, and I was most lucky in having very fine weather all the way. The only drawback (as I then thought) was that for three nights I had to sleep in negro huts, which had been specially vacated for our party. I had my own portable bed and mosquito curtain, but possibilities of jiggers, malarial parasites, small-pox, skin diseases, as also of snakes, scorpions, centipedes, ticks, and floor-maggots, would continually force themselves on my imagination; furthermore, I was not yet inured to the "bouquet d'Afrique," but it is astonishing how soon one gets to be more or less accustomed to these little drawbacks to an epicurean existence.
On the afternoon of the fourth day's march we reached the boundary of the gold-fields which formed our final destination, and here we met the local fife and drum band, which had marched some three or four miles out from Chrysolite (the name which I have given to this gold-mine for the purposes of this Journal) to welcome back the popular manager who was to have come with our party, but who had unfortunately been detained by business at Sekondi. The band now headed the procession to escort us into Chrysolite with musical honours, and raised the devil's own din and dust at the same time, and as the performers were rather more than half naked and the road lay through a long and narrow clearing, with a tropical burning sun shining down in full force on our heads, the atmosphere soon became almost un breathable for Europeans, and altogether the afternoon of my triumphal—but unpleasant—entry into Chrysolite will never be forgotten by me, for to make matters worse, not only had the eight men whom our party had been sent to relieve not started on their return journey, but a judge and a barrister had also just arrived from the coast in order to try a boundary case between two rival native chiefs who were prepared to fight over the matter, and these gentlemen had to be put up in the best rooms in the camp, so that the crush and overcrowding in the hutments—which at the best of times were not adequate to the
vicissitudes of the climate—were the cause of much unparliamentary language for the next week or so.

The day after my arrival at Chrysolite I began to look into matters, and I was horrified at first at the magnitude of my task, for the whole camp was one huge object-lesson in insanitation. Tins, bottles, and rubbish of all sorts, apparently for years, had been scattered broadcast over the camp, which was generally filthy. The surface drains for storm waters were all blocked with tall rank vegetation, and their sides in many places had fallen in; stagnant and slimy pools were frequently to be met with. The earth-closets for the Europeans were in a loathsome condition, with insufficient seat accommodation; one was roofless, and situated at such a distance from the huts that it was not used at night. There were no latrines for the 3,000 odd native employees, so that the neighbourhood of many of the buildings and adits was in an indescribable condition. None of the huts (with the sole exception of the Manager's bungalow) were altogether suitable to the tropical climate, and several of them were in every way unsuitable, even at the best of times; not every man had the luxury of a room to himself. Those of the huts which were raised off the ground were simply acting as shelters for a luxuriant growth of vegetation, which not only harboured reptiles and insects of all sorts, but also served to screen the misdeeds of the "boys," who seemed to have been chosen from the lowest and most useless types of natives. There was hardly a filter in decent working order. Even the surgery was filthy dirty, and exhibited a condition of carelessness and neglect more than verging on sinfulness; the surgical instruments and appliances had been shamefully kept, many were missing (especially knives and anything that would cut); nothing had been kept under lock and key, and the medicines and drugs were hopelessly jumbled up on a series of high shelves. The meteorological instruments were mostly defective or useless. This matter I considered my first duty to put straight, and after getting the whole place emptied and then thoroughly cleaned, I was occupied for yet another eight full days before the surgery and dispensary were arranged to my satisfaction.

The provision store next claimed my attention, and much that was old and putrid was condemned and destroyed.

I next tackled the latrine arrangements. All the European earth-closets were carefully cleaned and put in good repair; some were moved to more convenient sites, and two extra ones were asked for; sand-boxes were supplied, and hand-shovels, brooms,
and latrine-paper were requisitioned for from England. For the natives, I caused four huge trenches to be dug in different parts of the camp; these were 4 feet wide, 8 feet deep, and varied in length from 20 to 45 feet; these trenches were then crossed by beams or logs at about 9 inches interval, and on any two of these the natives squatted; these latrines were then neatly finished off and carefully screened from view by growing shrubs.

There was a large fruit and vegetable garden—much too large in my opinion; but on my arrival it was a perfect wilderness, and well on its way back towards reversion to the jungle. I had it carefully cleaned out, although this (as indeed did fully nine-tenths of my work) caused me to remain out in the sun from early morn to dewy eve, to personally supervise matters, for I could trust nobody. From henceforth, every week I personally issued out the seeds (which were sent out monthly from England), and saw them planted, and I was thus able during the remainder of my stay at Chrysolite to keep up a continuous and abundant supply of fresh vegetables (e.g., lettuces, endive, mustard and cress, red and white radishes, carrots, turnips, parsnips, beetroot, beans, peas, tomatoes, cabbages, yams, cassava, coco-yams, spinach, and sweet potatoes). There was also an abundance of bananas and pineapples, which were the only fruits locally obtainable; potatoes were received from the Canary Islands every month.

The meat was always carefully inspected by myself early in the morning before it was allowed to enter the cook-houses, and after a time I also insisted on inspecting the animals both before and after slaughtering. The kitchens were inspected daily at odd hours, and the kitchen refuse was taken away twice a day to pits specially reserved for this purpose.

The undergrowth—and the rubbish which it concealed—was removed from under all the huts that were raised off the ground, and the earth was afterwards levelled and beaten down, and attended to once a week. An iron bin, painted red, was now placed outside each room as a receptacle for tins, bottles, paper, banana-skins, &c., &c., and emptied by the permanent scavengers every morning.

I daily employed a fatigue party varying from four to ten men, for close on three weeks, simply at clearing away the empty pots, tins, and broken bottles, &c., &c., and then removing them to a short distance in the bush; but this work seemed never-ending, so at last—for one week—I commenced to stack this particular kind of rubbish where all those in the camp could see it, and then...
everyone marvelled at the quantity which was thus collected in so short a time; but this object-lesson was soon forgotten, for although the overworked Manager always gave me what assistance he could, I appealed in vain to the other European employees to help me to keep the place clean and tidy, for they were, as a rule, too indolent, slack, and apathetic themselves, and simply allowed their "house-stewards" to do as they had always done.

The storm-water trenches were carefully cleared of all vegetation and put in repair; stagnant and festid pools were filled in, and swampy parts were drained. The paths were cleared, widened, put in order, and gravelled wheresoever this was feasible, and fresh ones were made where required. The jungle was cleared from those huts which actually abutted on to it, and the clearing was afterwards extended further away from all the huts.

I also took the cemetery in hand, or rather what passed muster for such! Hitherto, when a European died he was taken to a
grave dug in the bush, and a pile of stones was left to mark the place. Within three months after my arrival I had reclaimed all the graves that I could find, and caused them to be cleared of stones and then fitted with suitable tomb-railings; the cemetery, as a whole, was now defined, cleared, and fenced-in with barbed wire, the entrance being fitted with a lych-gate with a suitable superscription on its outer gable-boards; paths and lawns were made, and then palms and flowers were added for a finishing improvement, and before I left I was congratulated on having made the prettiest cemetery in all West Africa, and I have just heard that it has been consecrated by the Bishop of Sekondi, who specially visited Chrysolite for this purpose.

I may now mention that several of the adjoining villages had grown together into one large composite town of over 10,000 inhabitants, which has been carelessly permitted to entrench on the precincts of the camp, and I fear that the very close proximity of this town will be a very possible source of danger in the near future, not only to the inhabitants of the camp at Chrysolite, but also to the whole district; for if once cholera, plague, yellow fever, enteric, pernicious malaria, or malignant small-pox, &c., appear here, these diseases will probably have come to stay, owing to the conditions being highly favourable for their development. But the relative modernisation of the town of Chrysolite, with its narrow and crooked streets, almost impassable lanes, and long heritage of sanitary incompetence, will probably soon be a matter of considerable difficulty, and possibly also of expense, if vested rights have foolishly been allowed to spring up, and thus render sanitary reform practically prohibitory on the score of the price demanded for compensation.

The climate of Chrysolite is, fortunately, not a deadly one, but in common with the rest of West Africa it is not altogether favourable for Europeans, although much might be done by prophylactic measures, if they could only be enforced strictly.

The water supply for Europeans was good; it was derived from a natural spring about three-quarters of a mile away from the camp, and the spot where it issued from the hillside was completely covered in by a wooden building, the door of which was fastened by a lock and key, the latter being kept in the medical officer's quarters. A special set of men were detailed permanently as water carriers, and they did nothing else, but at the same time their occupation was no sinecure, as they had to walk many miles altogether during the day carrying heavy loads. The provisions
supplied were very good, and well cooked as a rule, and there was no stinting of food. Fresh meat (beef, mutton, and goat) was issued on six days in the week, and tinned Army rations once a week only, generally on Tuesdays. Wines and spirits of good quality were issued at cost price and to the European employees only, but the men in the second-class mess were restricted to one bottle of spirits a week, and even these requisitions had to be countersigned by the medical officer; this step was taken partly in the interests of the men themselves, and partly to prevent loss of time through intemperance. Sparklet-bulbs, for aerating the drinking-water, were issued free to all Europeans. There were two excellent tennis-courts, which were practically the only form of recreation obtainable, and they were in great request from 5 to 6 p.m. daily.

A short description of gold-milling may now perhaps be interesting to those who have never seen the process. I may here state that gold is found in all parts of the world, even in England, also in sea-water; but it is often found only in such small quantities that it cannot be obtained at a profit. At Chrysolite the methods of extracting gold from the ore are now conducted on scientific principles. The ore is carried in trucks direct from the different levels of the mine to the rock-breakers or crushers, where it is coarsely broken up, and the pieces then fall by gravitation into the mill, where they are crushed small by heavy iron stamps, on which water plays; the water next flows through a screen, carrying with it the finely crushed ore and gold, and then passes over amalgamating plates on which the greater part of the gold is now deposited. The amalgam of gold and mercury is then collected by scraping the plates, and, after coarse purification, it is squeezed through canvas into hard balls, which in their turn are then retorted (whereby the mercury is distilled off and then collected again under water), leaving the impure gold in the retort; this gold is next melted in a crucible in a hot furnace, and the more or less pure residue, cast in moulds, is henceforth known as “bullion.” The residue from the mill, known as “tailings,” now passes into tanks, where it undergoes treatment by cyanide, which enables much of the suspended gold to be recovered. What remains in the tanks is known as “slimes,” and this, until comparatively recently, was considered worthless and cast out on to the dumping-ground, but now it is also made to deliver up its quota of the precious metal. At Chrysolite developments are somewhat checked by the difficulties of transport and the increased expense entailed thereby.
With regard to professional work, I saw very few tropical diseases of much interest. The greater number of cases amongst the Europeans was due to malignant tertian ague, or to accidents incurred in connection with their work. Amongst the natives, the medical cases seen by me suffered usually from "fever" (uninfluenced, as a rule, by quinine, but yet not tick fever), yaws and dracunculus, also, occasionally, small-pox; but the large majority of the native cases were caused by wounds (often very severe) as the result of accidents, usually due to their own carelessness or foolhardiness. As a rule, even the very severe injuries healed up well, and the natives were not very much afraid of the knife. They seemed to dread having anything in the shape of a tumour, and I soon had a good deal of experience in the surgical removal of lipomata and fibromata. When consulted about one of these tumours, I was usually asked to "give it a soul, and make it live, and then kill it!" and this was evidently the gentle idea of the native "medicine-man," who had manifestly tried his hand on the patients before they came to see me, for every kind of swelling bore obvious marks of previous treatment, either in the shape of tiny scars resulting from free scarification as if with a lancet, or else a biggish central scar which appeared to have been caused by a stab from a red-hot spear-head.

Although, as a rule, it is contrary to native etiquette for women to be treated by a European, nevertheless they are all daughters of Eve, and therefore as keen as to their personal appearance as any West End beauty, and as a special mark of favourable condescension I was often graciously permitted to play the part of "beauty-doctor" to them; one buxom female even came from a village nearly 40 miles away to get an ugly and inflamed and foul-smelling wen removed from her cheek, which had evidently undergone much in the way of unnecessary preliminary treatment before I was privileged to look at it. The chief causes of disfigurement were large fibrous tumours—often as big as golf balls—growing from the lobes of the ears, and one of these once gave me some little trouble and blunted two of my best scalpels before I could remove it. On section of this tumour afterwards, I found in its interior a piece of steel about \( \frac{1}{2} \) inch in length, which appeared to have belonged to a stout tapestry-needle; the good lady professed to have no recollection as to how it came to be there, but I am inclined to think that it had been plunged, when red-hot, into the swelling (with a view to causing suppuration and subsequent dispersal), and that it had broken off short and had acted only as an irritant, thus causing the tumour to increase in size.
T. E. Nicholson

I had always to be my own chloroformist, assistant, and operator, all in one, as the native dispenser who was supplied by the Company was more of a nuisance than otherwise on these occasions, although he came in very useful for first-aid work and took a good deal of the minor work off my hands, thus leaving me free to supervise my sanitary work and to attend to the more important cases.

During my last month's stay at Chrysolite I was asked by the entomologist at the Liverpool School of Tropical Medicine to collect tabanidae, mosquitoes, &c., for the School, and by the next mail he was kind enough to send out all requisites for the purpose. Although I had not much time to devote to this sort of work, I did what I could, and soon had started quite a small collection of insects, but one afternoon a favourite little white-nosed monkey frayed its rope through, and then on regaining its freedom simply ran amuck about my room, and after first sampling, and then breaking several of my bottles of microscopical staining fluids, and my last bottle of "Black and White," finally made his afternoon tea off most of my specimens, in spite of the pins by which they were fastened. On my return I chased it more in anger than in sorrow, but the poor little animal had the good sense—or the good luck—to make itself scarce until the following day, by which time the greater part of my indignation had blown over, when I was once more willing to forgive it, I think for at least the seventy-times-seventh time.

When I had fairly finished my task, although my time was not yet up, I asked to be allowed to return home, as I was fairly "fed up" with the utter thanklessness of the whole job, and I gladly handed over my charge to my successor.

I wish to place on record my deep sense of gratitude to the Manager, who did his best to help me as far as he was able to do so, as well as to make me comfortable, even to the extent of allowing me to have all my meals in his bungalow—a privilege extended to no one else.

Although I am not over keen to repeat my experiences, I do not, on the whole, now regret my "visit to a West African gold-mine."