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LIBERIA

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Notice

This report was prepared by the Department of Health Data primarily for the use of officers of the Army Medical Service and is based on the latest information available.

WALTER REED ARMY INSTITUTE OF RESEARCH
Walter Reed Army Medical Center
Washington, D.C.

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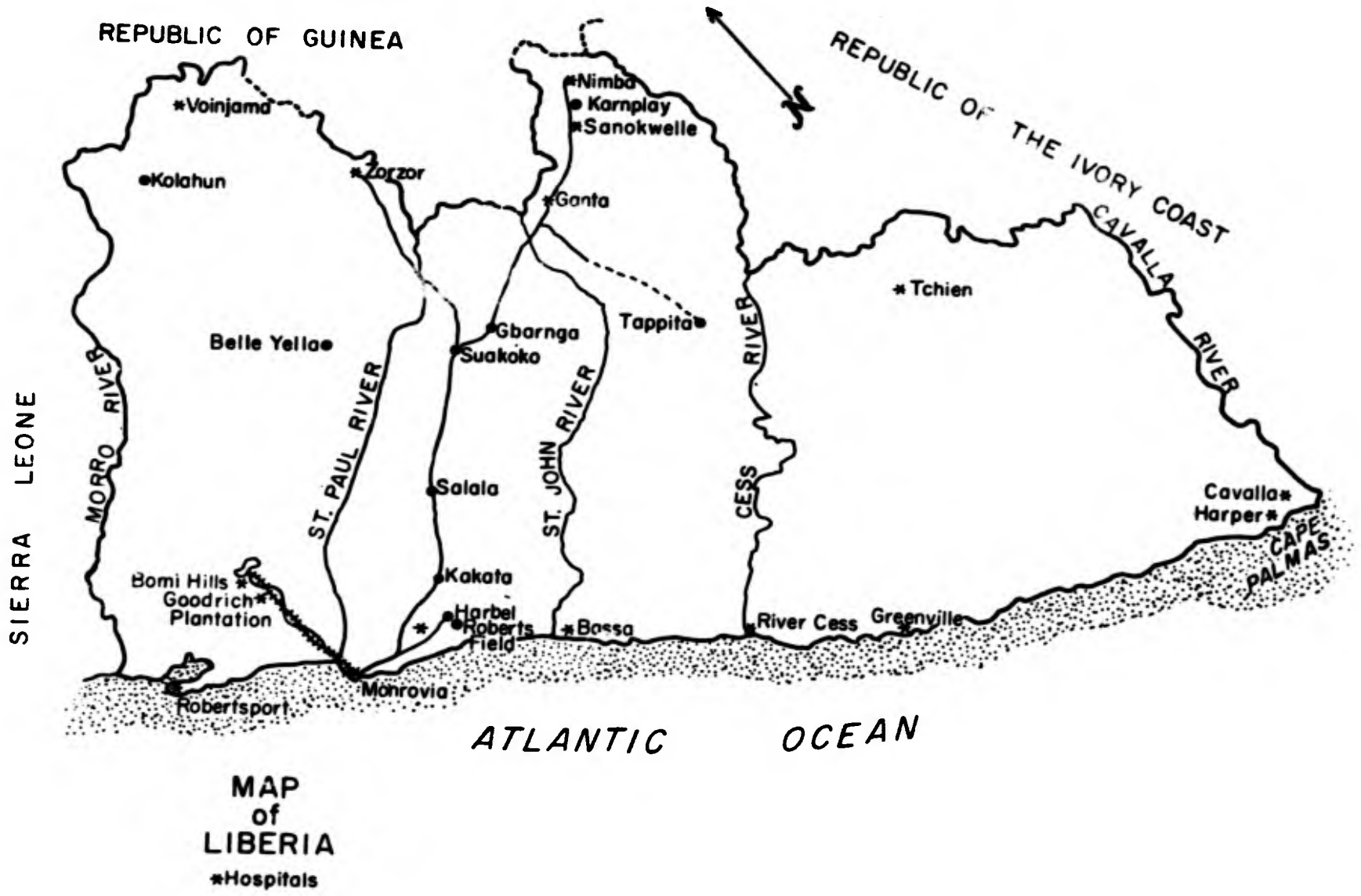
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LIBERIA
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I. GENERAL

1. Location and Government

The Republic of Liberia is situated on the west coast of Africa on the Gulf of Guinea. Roughly rectangular in shape, it is oriented along a northwest-southeast axis. Bounded on the northwest by Sierra Leone, on the north by the Republic of Guinea and on the east by the Republic of Ivory Coast (Cote d'Ivoire), it occupies an area of approximately 43,000 square miles and closely approximates the State of Virginia in size. For more than one hundred years it was the only independent Negro republic in Africa. Founded initially in 1847 as a homeland for Negro freedmen returned from the United States, its national development proceeded slowly until World War II, when its strategic location for transatlantic ferrying of aircraft opened a period of vigorous progress. English is the official language. The country is organized into five counties, a territory, and three hinterland provinces. The counties and provinces send senators and representatives to the bicameral National Legislature. A complete system of federal governmental bureaus, headed by cabinet officers, exists. There is a supreme court. The executive branch of the government is extremely influential.

2. Population and Organization

a. Number and Character. There has never been a country-wide census in Liberia. The official population is given as 2,500,000. An estimate of inhabitants has recently been made by a "hut count." The number of huts appearing on aerial survey photography multiplied by an arbitrary 4.5 inhabitants per hut gives a population figure of about 750,000. Only members of the Negro race may be citizens or own property in Liberia. In the capital, Monrovia, there are many Americo-Liberians, descendants of the original settlers. These have contributed most members of the government, have furnished the aristocracy of the country and have, in general, been most successful financially. The indigenous population is divided into tribes and clans. There are a great many of these, each with its own dialect, and loosely organized under its chiefs. Among the more prominent tribes are Vai, Kru, Bassa, Kpelle, Mandingo, and Kpwessi. Each tribe possesses certain ethnological and anthropological characteristics which are far from completely lost. Tribal and clan chiefs exercise jurisdiction in minor matters and collect taxes. Paramount chiefs, appointed by the government often along dynastic lines, and district commissioners, also appointed, exercise greater authority.

b. Foreign Residents. There is a small minority of Caucasians in Liberia, none of course citizens, who reside there mainly for business reasons. Many of the merchants are of Middle Eastern origin, the "Syrian traders," who have shops in Monrovia and in many of the crossroad villages. There are also British, German, French, Spanish, and Dutch shopkeepers or hoteliers, engineers, and entertainers. There are in the interior many American, German, and Swedish planters, technicians, and mining experts. Missionaries are principally American and Irish.

3. Socio-Economic Conditions

a. Culture. There is a marked difference in culture between the urban residents of the capital Monrovia and the "upcountry" people. In the city there is a concentration of the educated people -- the government officials, the more highly skilled artisans, and businessmen. However, a 1956 census of Monrovia revealed a 73 percent illiteracy in a population of about 41,000. The native population outside of Monrovia lives under fairly primitive conditions. The illiteracy rate is very high and there has been little change in the way of life for a very long time. Almost all of the labor force of the country is employed on the great rubber plantations or in the open-pit iron mines. These workers are provided food and living quarters in villages on the company estates. Neither provision is much more than bare necessity demands.

b. Religion. The higher-class Liberians are Christian, mostly Protestant. There are several churches in Monrovia and in many of the principal towns. A Roman Catholic bishop has his see in Monrovia. Missionaries of both Protestant and Catholic faiths are active throughout the country. Many of the natives are Moslem and there is a mosque in Monrovia. Witch doctors, often called "bush devils," still exist and initiation ceremonies and "bush schools" are still held. Until recently, and probably to some extent still, there existed in the "bush" secret societies, such as the Poro. These societies, bound in with the pagan rituals, exercised great social influence by threat of bodily harm or even death. They have been officially disbanded because of their political interference.

c. Agriculture and Industry. The natives practice for the most part only subsistence farming, raising cassava (manioc) and rice. Rice is grown on a moderate scale by dry farming methods. The government is encouraging endeavors in raising swamp rice. Experimental farms have been established in cooperation with outside

agencies but have yet to influence the local practices to any large extent. The amount of rice grown is insufficient for the needs of the country. Rubber grows beautifully in the soil and climate found here and rubber plantations are the major source of the national product. The Firestone Rubber Company has two enormous rubber plantations, one at Harbel and another at Cavalla, near Cape Palmas. The Goodrich Rubber Company has been planting a new plantation near the Bomi Hills area since 1950. Many smaller plantations are owned and operated by Liberians. A venture of coffee growing has been undertaken in the area north of Tappita, but, while Liberian coffee has an excellent flavor, the trees do not grow as well as could be desired. Cocoa has also been planted without marked success. A German company raises bananas commercially and exports the dried fruit. Large deposits of high-grade iron ore are being mined by open-pit methods in the Bomi Hills. Much of the ore is as high as 67 percent pure iron, but the proximity of lower-grade ore has made economical the construction of a benefication (concentration) plant to permit the working and export of the poorer ores. A new "mountain of iron" on the northeastern frontier in the Nimba Mountains is about to be exploited by the Liberian-American Mining Company.

4. Transportation

a. Surface. One of the biggest drawbacks to the development of Liberia has been the lack of transportation. Surface transport is extremely limited. Only one railroad of about 47 miles exists, running from the Free Port of Monrovia to Bomi Hills. This railroad was constructed to haul iron ore from the mine to the ships.

A double-lane highway exists from Monrovia to the northeast. This is unpaved laterite except that portion between Monrovia and the Firestone Plantation at Harbel and that which traverses the plantation. Until recently bridges over the numerous streams were poor, but since the beginning of exploitation of the iron near the northeast frontier, new bridges have been built and should allow passage of most vehicles. This highway runs from Monrovia, through Salala, Suakoko, Gbarnga, Ganta, Sanokwelle and to the boundary of the French territories. A branch was constructed from Suakoko to Zorzor in 1957, which includes a fine new bridge over the Saint Paul River. A dirt, dual-lane highway runs northward from Monrovia to Bomi Hills, passing over a good bridge over the Saint Paul. There is a road from Ganta to Tappita. There are scarcely any other roads in the country. As one progresses away from those roads mentioned, only tracks are available and these most often diminish to footpaths or end abruptly

at an impassable water course. Along the highways the dense underbrush pushes in as soon as human interference stops.

There is a moderate amount of commerce carried on via highway, particularly the road to Sanokwelle, and trucks of about 3- or 4-ton capacity are frequently encountered, traveling at what seems breakneck speed, raising large dust clouds and stopping for nothing. Road habits of drivers are poor and many hazards are encountered, such as cars stopped for repairs while incompletely off the road, around blind curves, or just over the crests of hills. Pedestrians are numerous and are difficult to see at night.

b. Air. A large airport exists at Roberts Field, about 30 miles from Monrovia. This can accommodate the largest of piston engine transport planes and has the only paved runway in the country. Air passenger and freight service is provided by a number of scheduled airlines. Pan American World Airways has two flights weekly into Roberts Field from Lisbon and return. Air France provides service once weekly each way with Europe. West African Airways flies from Roberts Field to Abidjan, Ivory Coast, and Lagos, Nigeria. The Liberian National Airline provides internal air service from Roberts Field to Monrovia, Cape Palmas, and the north with two C-47 type aircraft (1958). There are several small planes operated by missionaries, mining companies, or for hire.

c. Water. Until a deep water port was built during World War II, no docking facilities were available. Now the Free Port of Monrovia can accommodate a number of ocean-going vessels simultaneously. Ships of the Farrell Line (America-South Africa Line) and the Delta Line (Mississippi Shipping Company) make regular stops at Monrovia from New York and New Orleans, respectively. The ships are cargo carriers which transport a limited number of passengers.

5. Communication

a. Telephone and Radio. There is a telephone system in Monrovia, but generally this does not function well. Communication between parts of the country is best conducted by radio. The missionaries in the hinterland maintain a daily radio watch at specific times of the day when messages are exchanged. There were six transmitter-receiver radios in the district commissioners' offices in 1958, by which official communications could be maintained. The United States-Liberia Radio Corporation maintains a transmitter at Harbel and handles commercial international traffic. The Firestone Plantations have an internal

telephone system which is fairly reliable. This company also maintains radio communication with the United States Trading Company, a subsidiary in Monrovia, and with its Cape Palmas offices.

b. Post Office. A Post Office Department of the Republic of Liberia is established but neither internal nor international service is completely reliable. This is particularly true of parcel post, there being a considerable lag in the clearing of packages through customs. In the hinterland, post offices may be established at missions and operated by the missionaries. Air mail is handled more efficiently than ordinary post, and this is particularly true if the mail can be delivered to the dispatching office at Roberts Field.

6. Nutrition

a. Composition. The diet of the natives in the interior is both quantitatively and nutritionally poor. Cassava (manioc) and rice are the staple articles of diet, with palm oil the principal source of fat. Bananas and pineapples are easily obtained. Goats are kept, usually in twos and threes by a few families, as are chickens. Fish are available along the coast but there is no fishing industry. An occasional truck of fish finds its way upcountry from time to time. Peppers, small, red, and hot, are used as seasoning. Salt in rough blocks (probably from the French territories) is sold in the country markets and seems in ample supply. Most cooking consists of boiling or of stewing in palm oil. Kola nuts, mildly stimulent, are evident throughout the country and are chewed by many persons. Peanuts (called ground nuts) are raised and eaten. Papayas are available. Meat, except for chicken, is very scarce. Many natives, walking along the roads, carry shotguns but the game has been so reduced by overhunting that it plays only a meager role in food supply.

Some sugar cane is raised in patches, and probably contributes something to the diet in the form of crude molasses. Much cane juice is fermented and drunk as a beverage. A kind of palm wine is made by cutting out the heart of a palm tree and allowing the accumulating juice to ferment. Imported rice is the staple food of plantation workers, and much finds its way into the hinterland. The "Syrian traders" stock a variety of tinned fish and corned beef, biscuits, and the like, but the poverty of the average native prevents these from figuring greatly in the over-all nutrition.

Cattle are seldom seen and cattle raising is not generally successful. Occasionally cattle are brought in from the adjacent French

territories, but these are mostly bullocks. Cows are allegedly not exported to Liberia by her neighbors. A few pigs are raised.

b. Consequences. From the foregoing, it can be readily deduced that protein is very low in the diet of the average Liberian. Very few Liberians are obese. Avitaminosis is common. Kwashiorkor is often seen.

II. ENVIRONMENTAL FACTORS AFFECTING HEALTH AND SANITATION

7. Forests

There are about 4,000,000 acres of virgin rain forest in Liberia. Recently 3,000,000 of these have been made national forests and cutting has been prohibited. These forests are generally uninhabited. Around the periphery, the natives cut and slash the forests, burning the underbrush and logs to clear the land for subsistence agriculture. The leaching of the laterite soil is excessive and after a year or two insufficient organic material remains to support crops. It has been the practice to move then to a new location, cut off the forest and use the land thus opened for a crop or two. Stream banks are lined with thick undergrowth and in the coastal area there are sizable mangrove swamps. In the open coastal country where rubber has not been planted, the majority of the trees are palms of the thatch variety with large fronds. Almost everywhere abundant ferns festoon the tree boles and cover the open areas with waist-high stands of bracken. There are everywhere large deciduous, but evergreen, trees, often of enormous height and girth. Many of these have huge buttress root formations extending from the ground upward for 20 to 30 feet. The wood of most trees is generally hard and exceedingly heavy. Since trees have no annual rings in this unvarying climate, it is not possible to determine accurately how long it takes for forests to mature. Vines, lianas, orchids, and other lush vegetation grow abundantly except in true "high forest." Here the thick, high canopy of arboreal foliage keeps sunlight from reaching the ground and underbrush is limited.

8. Rainfall, Temperature, and Humidity

The climate is tropical and practically unvaried. The rainfall is very heavy, exceeding 100 inches annually. While there is rain in every month of the year, the heaviest rainfall comes in two wet seasons May through July and September through November. Between these two come the "big dries" and the "little dries." Temperatures in May through November range into the nineties and occasionally over 100° on sunny days. During the "big dry" (November to May), the temperatures are somewhat cooler, generally in the upper seventies to the eighties. Nights generally cool off, but are often still oppressively warm. Humidity is generally 80 percent or higher. The Harmattan, a dry dusty wind from the Sahara, blows occasionally during the northern winter season, dropping temperatures to the sixties and reducing the relative humidity to 60 or 70 percent.

9. Soil and Topography

The soil is mostly laterite, a reddish, loose soil of high iron and aluminum content but without silica. There are three topographic zones, each between 40 and 80 miles wide: the fairly flat coastal strip, rolling hilly middle zone, and the mountains of the interior which attain a height of some 6,000 feet. In the latter are deposits of high-grade iron ore. Terrain is so rugged in some of these areas as to seriously impede traffic. The roads themselves may become impassable in the rainy seasons unless continuing engineer effort is expended.

10. Rivers

There are numerous rivers which for the most part flow northeast to southwest. The Saint Paul, the Saint John, the Du, the Lofa, the Cess, the Cavalla are all sizable streams which are natural barriers. They swell enormously in the rainy season. Some are navigable by small boats for 25 to 50 miles, but are little used for communication.

11. Water Supply

There is a water distribution system in Monrovia. Information on the absolute quality, quantity, and dependability of this source is not available. Most natives outside the capital depend on shallow wells or surface streams and ponds for their water. No water in Liberia should be considered potable until it has been boiled. Even boiled water, it must be remembered, is subject to recontamination by careless or insanitary handling. Because of the danger of schistosomiasis, bathing in surface water in the interior is hazardous.

12. Waste Disposal

A sewage system has been installed to serve part of Monrovia. There are public latrines connected to this for use outside of homes but these are inadequate in number and necessitate queuing. Elsewhere septic tanks and pit privies are utilized by those people who have any sort of sanitary facility, but these facilities are not always truly sanitary. In the hinterland the natives have such a lack of understanding of sanitation that even the most primitive facilities are lacking and the nearby forests receive all waste.

III. ANIMALS OF MEDICAL IMPORTANCE

13. Mosquitoes

a. Liberia's numerous swamps, abundant rainfall, and warm year-round climate provide excellent mosquito breeding environment. There have been several abortive attempts at mosquito control, but these have been confined largely to the coastal areas, around Monrovia, and adjacent to control centers. Most of these control campaigns have ended in the development of resistance to the insecticide used. (See Par. 20, Malaria, for comments on mosquito control measures.) The abundance of medically important mosquitoes is attested to by the almost universal prevalence of malaria.

b. Anopheles. Mosquitoes of the genus Anopheles are found in great numbers throughout Liberia, but particularly along the coast. Anopheles gambiae, A. melas, and A. funestus are the most common vectors of malaria. A. nili, A. hargreavesi, A. marshallii, and A. pharoensis are other vectors which occur. Other anophelines which are found are: A. smithii, A. muritainus, A. obscurus, A. cinctus, and A. hancocki. A. gambiae, A. funestus, and A. nili are often infested with and transmit filarias to man.

c. Aedes. Aedes mosquitoes which are capable as vectors of yellow fever and dengue are frequently found. Aedes aegypti, A. africanus, A. apicorgenteus, A. fuscinervis, A. palpalis, and A. tarsalis have been reported. No yellow fever has been known in Liberia for many years. Dengue may occur.

d. Culex. These mosquitoes may act as vectors of yellow fever or filariasis. Culex pipiens quinquefasciatus (fatigans) occurs very frequently in Liberia. C. nebulosus, C. decens, and C. consinilis have been identified.

e. Other. Eretmapodite chrysogaster and Taeniorhynchus uniformis capable of carrying yellow fever, have been found in Liberia.

14. Flies

a. Houseflies. The common housefly, Musca domestica, as well as many other pestiferous flies, abound. They are capable of acting as mechanical vectors of enteric and other diseases by the contamination of food.

b. Simuliidae. Black gnats, aptly named Simulium damnosum, are quite common. Many of these are infested and can transmit Onchocerca volvulus. About 3 mm. in length, these flies breed in running water and are found on bushes and grass, usually in shade. S. dentulosum also has been found.

c. Tsetse Flies. Formerly abundant, tsetse flies are now increasingly rare. Glossina palpalis, G. fusca, G. pallicera, G. nigrofusca, and G. medicorum have been identified. These flies are the vectors of African trypanosomiasis (sleeping sickness). They prefer shady areas, particularly along streams.

d. Mangrove Flies. Chrysops dimidiata and C. silacea are two of twelve species of Tabanidae identified in Liberia. They are capable of carrying Loa loa, the causative agent of loaiasis.

e. Tumbu Flies. Cordylobia anthropophaga has been identified but is rare. It causes cutaneous myiasis by depositing eggs where the larva may enter and develop under the human skin.

f. Sandflies. Phlebotomus flies are present in Liberia, but sandfly fever has not been reported. Sandflies may carry the agent of cutaneous leishmaniasis (oriental sore).

g. Midges. Culicoides grahami and C. austeni are found in Liberia. These can be vectors of Acanthocheilonema perstans, a filarial nematode.

15. Ticks

Ticks are not common in Liberia. Ornithodoros erraticus is present, as are Amblyomma variegatum, A. splendidum, Rhipicephalus sanguineus, Haemophysalis leachi, and Boöphilus decoloratus. There are two species of Ixodes: I. rasus and I. pilosus. Tick-borne typhus is not recognized as a particular problem, although it may be present.

16. Fleas

The dog flea, Ctenocephalides canis, is the only common flea in Liberia. A species of Xenopsylla is found, but more rarely.

17. Rodents

The roof rat, Rattus rattus alexandrinus, is an inhabitant of the thatched roofs of native villages. The black rat, R. rattus rattus,

and the Norway rat, R. rattus norvegicus, and several species of other rats and mice have been identified. Groundhogs, duikers, dormice, and squirrels are reported. The protein-starved people of the interior work great destruction on the small animal population.

18. Snails

Snails which can serve as intermediate hosts of schistosoma are not found along the coastal strip. In the interior there are several species of snails capable of harboring Schistosoma hematobium and S. mansoni. These include Physopsis africanus and Planorbis pferfferi.

19. Snakes

There are several species of poisonous snakes in Liberia but these are seldom encountered. Only three of four snake bites are reported as treated at the government hospitals each year and these are not fatal cases. Since it is doubtful that antivenin is available and the type of snake is not given, the conclusions must be that bites of truly poisonous snakes are exceedingly rare or the victims do not live to reach medical help.

The most common of the poisonous snakes are cobras, vipers, and mambas. The Black Cobra, Naja melanoleuca, attains a length of up to 7 feet and is glossy black, or may be shiny brown in the anterior half and black posteriorly. It is hooded when in the striking posture. A large arboreal type, Naja goldii, is black above and greenish yellow below, nearly hoodless, and has large eyes. The Green Mamba, Dendraspis viridis, is up to 7 or 8 feet long, and is very slender, resembling a "carriage whip." The head is small with large eyes. Fangs are located far forward in the mouth. Green in color, it frequents low trees and bushes. Movements are exceedingly swift when it is aroused. VENOMS OF BOTH COBRAS AND MAMBAS ARE NEUROTOXIC. The vipers are represented by the Cape Viper, Causus rhombeatus, and the Gaboon Viper, Bitis gabonica. The former is sometimes more than 2 feet long and is gray with a series of light-edged, dark lozenges along its back. The Gaboon Viper is a thick-bodied snake, up to 4 feet in length. The stout body tapers abruptly to a stubby tail and there is a decided neck. The head appears quite broad. A chain of oblong creamy markings surrounded by brown ovals, all enclosed in a series of purplish markings, runs along the back. On the sides are dark brown or purple triangles, while there are brown triangles on each side of the head with the apex just under the eye. THE VENOM CONTAINS BOTH EXTREMELY POTENT HEMOTOXIN AND POWERFUL NEUROTOXIN.

Two pythons, Python sebac and Calibaria reinhardtii, are present. The former may attain a length of 20 feet. The pythons are not venomous. No facilities exist in Liberia for the processing of antivenin.

IV. DISEASES

20. Malaria

This is undoubtedly the most serious disease problem in Liberia. Every Liberian has malaria some time in his life and parasites are present in the blood of probably 50 to 75 percent of the population at any one time. The predominant parasite is Plasmodium falciparum. Quartan malaria, caused by P. malariae, is fairly common and infection with P. ovale occurs but is much rarer. It is generally agreed now that the P. vivax, so common in other parts of the world, does not occur in Liberia.

A control program, based on elimination of the vector mosquitoes, was initiated around Monrovia in 1947, but has never encompassed the entire country. A coastal strip with a depth of perhaps 20 miles was covered from Monrovia and environs to a distance of perhaps 100 miles. In addition, control measures were carried out on the Firestone Plantations, along the Bomi Hills road, and in the vicinity of Kpain in the interior. Reliance was placed on the spraying of houses with residual DDT. Initially great success was achieved but over a period of years the principal vector, Anopheles gambiae, developed resistance to DDT. The malaria rate began to return to its former level. A switch from DDT to dieldrin was made in 1953 and the spraying program continued. Malaria began to decline. Unfortunately, mosquitoes quickly developed resistance to dieldrin and a return to DDT will probably be necessary. Apparently by 1957 this was possible, for it was demonstrated that A. gambiae were no longer resistant to DDT to the same degree they had been when its use was discontinued. The control program was largely supervised by United States personnel under International Cooperation Administration (ICA) auspices.

21. Tuberculosis

Tuberculosis is probably a seriously prevalent disease in the country. No mass surveys have been conducted which would permit an estimate of prevalence. However, because of the low level of nutrition, the unhygienic living conditions, the crowding and poverty, this disease is most probably widespread.

22. Filariasis

Infections with Wuchereria bancrofti occur, although the agent is seldom demonstrated and reported. Elephantiasis is not uncommon.

It is likely that infections with Acanthocheilonema perstans and A. streptocerca occur. Loa loa is probably present but is poorly diagnosed or reported. Infections with Dracunculus medinensis (guinea worm) are not common, but probably occur.

23. Ancylostomiasis

Hookworm infestation is relatively common. Most natives do not wear shoes and promiscuous defecation contaminates the soil. As in other parts of the world, anemia is a frequent concomitant with hookworm infestation. Necator americanus may be the chief hookworm threat.

24. Yaws

Prior to 1956, yaws was very common. In 1955-57 a nationwide yaws campaign inoculated and protected more than 409,000 persons. The prevalence dropped enormously. It is still possible to see "crab" yaws, an erosive type of lesion with hyperkeratosis particularly on the soles of the feet in many persons. These crab yaws are at their worst during the rainy seasons when maceration due to the continued exposure to the wet complicates the disease. Treatment with penicillin and the wearing of footgear would almost certainly eliminate even those remaining cases.

25. Schistosomiasis

Infections with Schistosoma hematobium and S. mansoni are prevalent in the inland portions of Liberia where snails are present in many ponds and streams. Physopsis africanus and Planorbis pferfferi are reported as the principal vectors. The vector snails are not found along the coast.

26. Diarrheas and Dysenteries

Gastroenteric diseases are common among the natives and are easily acquired by visitors to the country. No accurate information is available concerning the etiology of these diseases. Because of the general lack of sanitation and the inadequacy of refrigeration, the bacterial diarrheas and dysenteries are probably the most prevalent. The protozoan parasites are probably responsible for a part of the enteric infections; the most dangerous of these, Entamoeba histolytica, is fairly common. No work is believed to have been done on the investigation of viruses as a cause of enteric disease in Liberia.

27. Infectious Hepatitis

This condition is probably widespread throughout the native population, perhaps as inapparent infections of childhood. Medical diagnosis and reporting are so scant that a proper evaluation of the presence of this disease is impossible. Because of the few barriers to transmission of disease by the fecal-oral route, prevention of this disease requires continual good personal hygienic habits.

28. Smallpox

There was a considerable epidemic of smallpox in Liberia in 1958. The disease continued epidemic in Montserrado County in 1959. Not many of the natives in the hinterland have been vaccinated. The disease seen in 1958, while often fairly severe, did not cause high mortality.

29. Intestinal Parasites Other than Hookworm

Intestinal parasitization is well-nigh universal in Liberia. The most common intestinal parasites encountered are Ascaris lumbricoides, Giardia lamblia, and Strongyloides stercoralis. In a high proportion of natives infestation with two or more parasites is usual. As was mentioned above, the ease with which fecal-oral transmission can be accomplished will complicate the problem of these parasites. The best food-handling sanitation will be required.

30. Tropical Ulcer

Ulcers of the skin, particularly of the feet and legs, are encountered fairly frequently in Liberia. The etiology of these cannot always be determined. Secondary infections of primary lesions occur easily and the surface bacterial flora may obscure the underlying disease. Cutaneous leishmaniasis is probably a common disease, but laboratory facilities for accurate diagnosis are so scarce that a determination of actual prevalence is impossible. Abrasions and lacerations are often daubed with mud or wrapped with dirty cloths and bacterial invasion is given excellent opportunity to occur. The response of these infections to antibiotic therapy is often not remarkable, probably because of insufficient dosage, inadequate treatment time, and the constantly recurring contamination.

31. Dermatophytosis

Dermatological diseases are highly prevalent in Liberia. The high humidity, the warm climate, and a low level of personal hygiene contribute to the development of these conditions. Specific etiological agents have not been completely identified. Skin diseases are particularly bothersome to visitors. High standards of personal cleanliness combined with intelligent conservative treatment do much to alleviate the significance of skin diseases.

32. Onchocerciasis

Infection with Onchocerca volvulus is very common. The presence of the vector, Simulium damnosum, in all parts of the country and the scant clothing of the natives favor the spread. The African variety of O. volvulus does not seem to cause the ocular pathologic change so often seen in the Americas. The predominant symptoms in Liberia are skin itch and palpable cutaneous nodules and lymph nodes. The parasites are most surely demonstrated by taking skin snips from shoulders, loins, and hips.

33. Yellow Fever

Human cases of yellow fever have not been reported from Liberia for many years nor has jungle yellow fever occurred to anyone's knowledge. It is not impossible that monkeys in the high forests may serve as reservoirs of the virus and succumb, but there are too few people there to observe and report this if it occurs.

34. Leprosy

This disease is fairly common. While no official figures are available, there are probably several thousand lepers. Many lepers are unconfined and unattended, though in most of these the disease has not yet become incapacitating. The government of Liberia at present does not operate any leprosarium, nor is there any system for the continuing treatment of lepers.

35. Venereal Diseases

Gonorrhea is widespread throughout the country. Syphilis is deemed not common, particularly in the interior. As is well known, yaws causes a positive result in serological tests for syphilis and therefore high percentages of positive STS reactions can be expected.

In the absence of specific tests for syphilis, the exact extent of infection cannot be determined absolutely. Other venereal diseases may be present but are not reported as common. The lack of personal hygiene and soap would foster the spread of chancroid, should a focus develop.

V. MEDICAL FACILITIES

36. National Public Health Service

The public health administration is known as the National Public Health Service (NPHS). It is under the Director-General of Health, a cabinet minister. There are two main divisions, one for Health and Sanitation and one for Hospitals. Each is headed by an Assistant Director-General. A system for central procurement of medical supplies has been begun by the NPHS. All drugs and medical supplies are imported, there being no pharmaceutical production houses, vaccine laboratories, or other medical supply manufacturers in Liberia. The Director-General has conjoint (with other cabinet ministers) administrative supervision of the School of Nursing of the Tubman National Institute of Medical Arts. The programs of the NPHS are assisted by United States International Cooperation Administration, the World Health Organization, and United Nations Children's Fund (UNICEF). Each county and province has a health officer. Immunization programs are conducted from time to time, usually on a "scare" basis. By and large, the thoroughness of the immunization program i suspect, for the aboriginal people often flee from vaccinators. There is also room for doubt as to the potency of vaccines used when the distances, means of transportation, and lack of refrigeration are considered.

37. Medical and Paramedical Personnel

Only two native Liberians have attained the degree of Doctor of Medicine. In 1957 there were reported to be 62 physicians and 10 dentists in the country. More than one-third of these are employed by Firestone or other commercial concerns. About 10 are either medical missionaries or are working for the United States Operations Mission or the World Health Organization. Perhaps 15 physicians are employed by the National Public Health Service, principally as staff for the government hospitals but also in the administration of the service. There are a few physicians in private practice in Monrovia. The dentists are either with the NPHS or in private practice. There are several hundred nurses, both professional and practical. Classes of each are graduated every year by the Tubman National Institute of Medical Arts. Public health nursing has begun in the past few years in an effort to provide home care for patients discharged from hospitals and for communicable disease patients for whom beds are not available. Standards of nursing are being constantly raised through the efforts of the Liberian government and the United States Operations

Mission. Midwives are given training, but there are still numbers of bush midwives in the hinterland who proceed with only meager scientific training.

There is a nucleus of personnel experienced in house spraying and other mosquito control measures. A number of personnel were trained at a school in Ivory Coast in the methods of detection of the sleeping sickness. These people were trained several years ago and their education has not been used, so that it is likely that much that they learned has been forgotten. Laboratory assistants are generally of limited ability, although some may be fairly capable in very narrow fields. Dressers have probably been trained by the apprentice system and their value is extremely questionable, although there may be exceptions to this.

38. Hospitals

a. Governmental

(1) Monrovia

(a) Liberian Government Hospital: This is a general hospital of about 180 beds. Staffed by non-Liberian physicians, it has active medical, surgical, eye, outpatient, and x-ray departments A new building was under construction in 1958.

(b) C. V. Dyer Maternity and Child Welfare Center: With 66 beds, this center averages a monthly census of about 30 prepartum, obstetric, gynecological, and pediatric admissions each. The buildings and facilities of this hospital are old and generally not satisfactory.

(c) Congotown Tuberculosis Hospital: Near Monrovia, this hospital has 25 beds dedicated solely to care of tuberculosis patients. There is a serious lack of specialized equipment to permit all types of modern therapy.

(2) Bassa (Buchanan), Grand Bassa County

This small (25-bed) general hospital admits about 250 patients annually. One doctor here also sees several thousand outpatients annually. Equipment, standards, and supplies are inadequate.

(3) Sanokwelle, Eastern Province

The G. W. Harley Hospital here is in a good, fairly well maintained building. Of about 25 beds, it has been operated efficiently with minimum equipment. One physician sees about 4,000 outpatients annually and cares for more than 300 hospitalized patients a year. It has an electric generator.

(4) Greenville, Sinoe County

The F. J. Grante Hospital has 35 beds and was opened in June 1956. One physician is normally assigned here. He probably cares for about 300 hospitalized patients and some 4,000 outpatients annually.

(5) Tchien, Eastern Province

The Martha Tubman Hospital has 10 beds. One physician here sees about 6,000 outpatients and 35 hospitalized patients annually. It has an electric generator. Supplies are not adequate to meet needs.

(6) Voinjama, Central Province

This small hospital was housed in buildings recently constructed for a rural health center. One physician is normally there and probably sees several thousand outpatients and cares for about 100 patients in hospital in a year.

(7) River Cess, River Cess Territory

A 15-bed unit completed in 1956.

(8) Robertsport, Grand Cape Mount County

Saint Timothy's Hospital, with 35 beds, was purchased by the Liberian Government from the Protestant Episcopal Church in 1957. Redecorated, this hospital was opened under government auspices the same year. One physician was in attendance. Equipment and supplies were not completely satisfactory. A camp for lepers, under a dresser, was conducted as a satellite.

(9) Harper, Maryland County

The Tubman Government Hospital, of 75 beds, was built and opened in 1958. One doctor is stationed there. The number of in- and outpatients probably will be consistent with the counts at other government hospitals.

b. Mission

(1) Ganta

Operated by the Methodist Church, the Ganta Mission and Hospital are long established. The hospital has about 40 beds. There were three permanent and one temporary American physicians here in 1958. There is a fair laboratory operated in conjunction with the hospital. The leprosarium, operated by the same medical personnel, is located nearby and houses several hundred lepers in a native compound. A very large outpatient service is conducted. Medical standards are commensurate with the local conditions. There are two American nurses. No x-ray equipment is present

(2) Zorzor

The Lutheran Mission Hospital here has about 30 beds. There is at least one American physician. Two American nurses are usually on the staff. General hospital service is given and a large outpatient clinic is held regularly. Equipment is less elaborate than in a small American hospital. X-ray is available.

c. Industrial

(1) Firestone Plantations, Harbel

The largest, finest, and best hospital in Liberia is this 140-bed general hospital. A full-time medical director is employed. A staff of about 10 full-time physicians, mostly dutch, operate the plantation dispensaries and care for hospitalized patients here. There is a completely equipped medical laboratory. In a modern, well-constructed building are isolation wards, complete kitchen facilities, x-ray and other diagnostic equipment, and adequate, well-lighted operating rooms. Sufficient medical supplies are maintained for efficient operation. Standards are high, but not elaborate. There are three or four American or European nurses.

(2) Liberian Mining Company, Bomi Hills

Here there is a modern, well-equipped hospital of about 60 beds. There are usually three or four European-trained physicians on the staff, as well as three or four nurses with European or American training. Complete operating room, laboratory, and x-ray facilities for a small general hospital are maintained. Kitchen facilities are present.

(3) Goodrich Rubber Company

This new 30-bed hospital was opened in 1958. The staff is small. One American physician was present in 1958, but with increased employment at the plantation the staff will probably be augmented. Equipment and facilities, x-ray, and laboratory adequate for a small general hospital are available.

(4) Liberian American Mining Company, Nimba

A small dispensary-type hospital with about eight beds is maintained. A swedish physician is in charge (1958). He has a few dressers and assistants with local training. No kitchen facilities are present. Other facilities are limited.

39. Clinics

Government clinics are operated at the following locations:

Kakata	Belleyella	Monrovia
Clayashland	Camp Barclay	Gbarnga
Kanobo	Gborno	Karnplay

The clinic at Camp Barclay is for the Liberian Frontier Force. The clinics at Kanobo and Gborno are satellites of the Tchien Hospital. The clinic at Karnplay is a satellite of the Sanokwelle Hospital. These clinics exist more in name than in actual practice. The staff is usually a politically appointed solitary dresser with a nondescript medical background. He usually has only minimal, if any, medical supplies. His accomplishments in the medical field are not especially noteworthy.

40. Research Institutes

The Liberian Institute for Tropical Medicine (LITM) was established in 1952. It is now operated by the American Foundation of

Tropical Medicine, Incorporated, with headquarters in New York City. Buildings were built and donated by Harvey S. Firestone, Jr., on land, near Roberts Field, granted by the Liberian Government. Equipment was furnished largely by the United States Public Health Service, which had originally intended to staff and operate the Institute. A large, well-constructed, brick laboratory building and an animal house are in operation. There are three family-type residences and a commodious communal staff residence. In 1958, principal investigations concerned malaria, leprosy, and methods of experimental transmission. Staff consisted (1958) of one parasitologist, one physician, an entomologist, and several visiting investigators. Of the latter, there are two of semi-permanent tenure, one working on the snail vectors of schistosomiasis and one anthropologist investigating the abnormal hemoglobins (sickle-cell trait) of the region. A sleeping sickness center, established at Voinjama under the auspices of the LITM using a USPHS grant, was to begin operation in 1958.

41. Teaching institutions

There is no medical school in Liberia. The level of education in Liberia is not yet adequate in the premedical subjects to permit graduates to enter any recognized medical school without repetitive premedical studies. The Tubman National Institute of Medical and Applied Arts (TNIMA) conducts a school of nursing and trains both professional and practical nurses. Standards are being continually improved with the help of the United States Operations Mission. Midwives are given training at the TNIMA and at the Dyer Memorial Hospital. Many physicians at the governmental hospitals outside Monrovia also conduct midwife training

APPENDIX I

Arthropods and Insects of Liberia

Species	Breeding Place	Disease(s) Transmitted
Aedes		
A. aegypti	Domestic water collections	Dengue (?)
A. africanus		
A. apicorgenteus		
A. fuscinervis		
A. palpalis		
A. tarsalis		
Anopheles		
A. gambiae	Efficient breeder	Malaria, filariasis
A. melas	Brackish water	" "
A. funestus	Large bodies of water	" "
A. nili	Rivers	" "
A. hargreavesi	Pools	Malaria
A. marshallii		
A. pharoensis	Swamps	Malaria
A. smithii		
A. muritainus		
A. obscurus		
A. cinctus		
A. hancocki	Slow streams, ditches	Malaria, filariasis
Culex		
C. pipiens quinque quinquefasciatus (fatigans)	Domestic water collections, ground pools	Filariasis
C. nebulosus		
C. decens		
C. consinilis		
Eretmapodite		
E. chrysogaster		
Taeniorhynchus		
T. uniformis		

APPENDIX I

Arthropods and Insects of Liberia (Continued)

Species	Breeding Place	Disease(s) Transmitted
Flies		
Houseflies		
Musca domestica		Enteric diseases
Gnats	Swiftly moving	
Simulium damnosum	streams	Onchoceriasis
S. dentulosum		
Tsetse flies		
Glossina palpalis		Trypanosomiasis
G. fusca		
G. pallicera		
G. nigrofusca		
G. medicorum		
Mangrove flies	Swamps	
Chrysops dimidiata		Loaiasis
C. silacea		
Tumbu flies		
Cordylobia anthropophaga		Myiasis
Sandflies		
Phlebotomus spp.		Leishmaniasis (?)
Midges		
Culicoides grahami		Acanthocheilonematosis
C. austeni		
Ticks		
Ornithodoros erraticus		
Amblyomma variegatum		
A. splendidum		
Rhipicephalus sanguineus		
Haemophysalis leachi		
Boöphilus decoloratus		
Ixodes rasus		
I. pilosus		
Fleas		
Ctenocephalides canis		
Xenopsylla spp.		

APPENDIX II

Common Poisonous Snakes of Liberia

Species	Common Name	Type of Venom
Bitis gabonica	Gaboon viper	Hemotoxic and neurotoxic
Causus rhombeatus	Cape viper	Hemotoxic and neurotoxic
Dendraspis viridis	Green mamba	Neurotoxic
Naja goldii	Tree cobra	"
Naja melanoleuca	Black cobra	"

APPENDIX III

Communicable Diseases of Liberia

Likely to be Encountered	Rare	Not Reported but Environmentally Possible
Chickenpox	African trypanosomiasis	Dengue
Common resp. disease	Rabies, human	Encephalitis, arthropod-borne
Dermatophytoses	Tetanus, adult	Kala azar
Diarrheas & dysenteries		Leptospirosis
Amebiasis		Sandfly fever
Salmonellosis		Yellow fever
Shigellosis		
Filariasis		
W. bancrofti		
Onchoceriasis		
Loaiasis		
Infectious hepatitis		
Influenza		
Intestinal parasitism		
Ascariasis		
Enterobiasis		
Guardiasis		
Hookworm		
Leprosy		
Malaria		
Falciparum		
Ovale		
Quartan		
Measles		
Meningitis, meningococcic		
Mumps		
Pertussis		
Schistosomiasis		
H. hematobium		
H. mansoni		
Smallpox		
Tetanus neonatorum		
Tropical ulcers (diverse undetermined etiology)		
Tuberculosis		
Typhoid & paratyphoid		
Venereal diseases		
Yaws (mostly "crab")		

APPENDIX IV

Hospitals in Liberia

(a) Government Hospitals

Location	Name	Beds	Remarks
Monrovia	Liberian Govt. Hospital	180	Medical, surgical, eye, O. P. D., x-ray. Staffed by non-Liberian physicians. New building under construction in 1958.
	C. V. Dyer	66	Maternity and child welfare center. Obstetrics, gynecology, pediatrics. Buildings old and unsatisfactory.
	Congotown	25	Tuberculosis hospital - lacks equipment for modern therapy.
Grand Bassa County	Bassa (Buchanan)	25	1 physician - large O. P. D. Equipment, standards, & supplies inadequate.
Sanokwelle (Eastern Province)	G. W. Harley	25	1 physician - has large O. P. D. Operates efficiently with minimum equipment. Has an electric generator.
Greenville (Sinoe County)	F. J. Grante	35	Opened June 1956. 1 physician - has large O. P. D.
Tchien (Eastern Province)	Martha Tubman	10	1 physician - large O. P. D. Inadequate supplies but has an electric generator.
Voinjama (Central Province)	Voinjama	20	1 physician - large O. P. D. Buildings recently constructed for a rural health center.
River Cess (Grand Bassa County)	River Cess	15	Completed in 1956.
Robertsport (Grand Cape Mount County)	Saint Timothy's	35	1 physician - hospital transferred to Govt. from mission in 1957. Equipment & supplies deficient. Has a leper colony as a satellite.
Harper (Maryland County)	Tubman Government	75	1 physician - built & opened in 1958.

APPENDIX IV

Hospitals in Liberia (Continued)

(b) Mission Hospitals

Location	Mission	Beds	Remarks
Ganta	Methodist	40	4 physicians & 2 nurses in 1958. Laboratory facilities. Leprosarium in conjunction. Large O. P. D. No x-ray.
Zorzor	Lutheran	30	1 physician & 2 nurses. Large O. P. D. Equipment fairly adequate. X-ray available.

(c) Industrial Hospitals

Location	Sponsor	Beds	Remarks
Harbel	Firestone Plantations Co.	140	General hospital. 10 full-time physicians & 4 nurses. X-ray, O. R., well-equipped laboratory & kitchen. For employees - others special.
Cavalla	" " "	50	For employees - others special.
Goodrich Plantation (near Bomi Hills)	Goodrich Rubber Co.	30(?)	1 physician, x-ray, laboratory, O. R., modern kitchen. Built in 1958. For employees only.
Bomi Hills	Liberian Mining Co.	60	2 physicians & 4 nurses. X-ray, laboratory, O. R., modern kitchen. For employees only.
Nimba	Liberian American Mining Co.	8	Dispensary-type. 1 physician (Swedish) & a few dressers & assistants. No kitchen facilities. For employees only.