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Man Su: 1 ♀, 4. 10. 57.

Anopheles pampanae contributed during our observation period in September 1957 9.1% of the mixed *A. minimus-A. pampanae* population.

Bodo (Myitnge Valley), near Mandalay 1 ♀, 15. 11. 57.

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References.

BÜTTIKER, W. (1958 a). Report on the Entomological Survey, Burma. WHO ATME No. 3, September-November 1957, WHO, Geneva.

BÜTTIKER, W. (1958 b). Rapport sur l'activité entomologique de l'Equipe Consultative d'Eradication du Paludisme No. 3, Cambodge, février-juin 1958, OMS, Genève.

BÜTTIKER, W., BEALES, P. F. Notes on Anophelines of Cambodia; in preparation.

A Yaws Mass Campaign in Liberia; Organization and some Preliminary Results.

By E. G. H. BENDEL [1].

The Republic of Liberia is located half-way down the west coast of Africa about 300 miles north of the equator. (It is centred about a point 6°30′ north of the equator and 9°30′ west of Greenwich.) The British Colony of Sierra Leone is on the west boundary and the north and east are French Guinea and Ivory Coast. The Atlantic coastline is 370 miles long and the country extends inland for 100-200 miles. Liberia is estimated to cover about 40-45,000 square miles.

It belongs to the "wet tropics" where a rainy season from May to November and a dry season from December to April can be distinguished. In Harbel the average rainfall is about 150-180 inches and the annual and seasonal variations of the temperature are negligible. It is between 70-95°F in the coastal area, while in the hinterland a greater difference can be noticed. The humidity is about 80-95%.

The Government estimates the population to be two million. Our estimate was no more than 750,000. Americo-Liberians, who are descendants of the originally freed slaves of the United States of America, amount to 16,000. The main part of the population belongs to 20 indigenous tribes divided into three ethnological groups: the Kru, the Mandingo and the Gola.

Because of its rainfall and climate the economy of the country is adapted to a tree-crop agriculture. It was once covered with high tropical forest of

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great commercial value. A great deal of this forest has, however, been depleted by the shifting cultivation which has been carried out in the most primitive manner. The major or more promising crops are: rubber, cocoa, kola, oil palm for its kernel, piassava, coffee, banana, rice, sugar-cane, pine-apples, grapefruits, oranges, limes, lemons and calabar, a wild leguminous plant used for making several important drugs, and the last, but of greatest importance, are the virgin forest products.

Dysenteries, both amoebic and bacillary, are common. Helminthiasis (ankylostomiasis) is widely spread in the coast region and in the hinterland. Schistosomiasis *(S. hematobium* and *S. mansoni)* is present in limited areas, but mostly in the hinterland. Smallpox epidemics occur, but are localized because of lack of transportation. This may change as new roads are built and an air service exists between several towns. Leprosy is widespread and is estimated to affect 25-50 per 1000 habitants. Malaria is hyperendemic throughout Liberia. Its rate of infection is between 60 and 80%. After spraying, the rate still remains very high, possibly 30-35%. This is due to the so-called "rice kitchen", where the village population migrates in order to do their planting and harvesting. The rice-kitchens are small huts built far inside the bush, where the families live during several months of the year. The second reason is that the behaviour of the *Anopheles gambiae* has changed. It is no more an indoor mosquito, but an outdoor one. Some authors state that two kinds of *A. gambiae* exist in Liberia. Trypanosomiasis caused by *T. gambiense* is prevalent in the Western Province, e.g. Kolahun; *Glossina palpalis* is common. Filariasis *(Wuchereria bancrofti)* is endemic throughout the country. Infections with loa-loa are rare. *Onchocerca volvulus* is found in localized foci, e.g. at the Firestone plantation in Harbel. Gonorrhea, syphilis and granuloma inguinale are prevalent. Granuloma is a common disease, while syphilis exists only among the Americo-Liberians, where yaws is practically non-existent.

Before the nation-wide yaws campaign, yaws had been endemic all over Liberia, but the infection rates varied considerably in the different parts of the country. In the central province they amounted to 24-48%, in the western province to 6-11%. According to the treatment policy recommended by the World Health Organization, total mass treatment is recommended when the prevalence of clinically active yaws in a community is over 10%. In the case of Liberia this and other criteria were present to carry out a total mass campaign.

The following plan quoted in original below had been worked out prior to the Yaws Mass Campaign. It should be observed, however, that preliminary work is essential before beginning a mass campaign. This preliminary work has several steps:

A proper headquarters must be established. It is unnecessary to go into details to explain how to prescribe rules for transport and stores; this is an administrative procedure presumably known to the officer-in-charge, but no movement is possible without it.

The responsibilities of the staff members should be clearly stated on an organizational chart. To determine staff members' respective duties and to avoid future discussions, a "job description" should be issued for every post.

An adequate system of supervision should be worked out in advance to ensure the success of the campaign. It is essential to keep the entire field group under close supervision for about one month before it is sent out to the field. This "probationary" period allows the staff to become acquainted and at the same time gives the supervisors an opportunity to assess the work performance to be expected. It has sometimes been noted that people from different clans or from different tribes should not be included in the same

TABLE I.

Results of Mass Campaign Against Yaws in the Gbarnga District Liberia. Five Chiefdoms and 20 Clans Populate this District.

Basic Data	Initial treatment survey 24 March to 30 September 1955		Resurvey 10 September 1956	
Total number of huts found	14,996		14,607	
Total population estimated	58,500		58,428	
Total population examined	64,562		65 318	
Yaws cases diagnosed	31,427		2,346	
Yaws cases treated	31,427		2,346	
Contacts protected	33,135		7,326	
Number of injections	64,562		62,044	
Penicillin spent in c.c.	159,247		46,796	
Average penicillin pro person in c.c.	2.5		0.77	
Yaws Cases				
Yaws cases only	31,427		2,346	
Male	15,512		1,249	
Female	15,915		1,097	
Age groups under 2 years	388		19	
3-10 years	5,753		185	
11-18 years	3,912		450	
19 y. and over	21,374		1,692	
Distribution of Yaws Lesions				
1. Initial lesions	243	0.77%	18	0.76%
2. Multiple papillomata	961	3.06%	41	1.74%
3. Plantar papilloma	308	0.98%	26	1.10%
4. Other early skin-lesions	105	0.33%	13	0.55%
5. Hyperkeratosis	25,383	80.78%	1,989	84.78%
6a. Gummata and Ulcers	1,249	3.98%	171	7.29%
6b. Gangosa (Rhinopharyngitis mutilans)	52	0.16%	5	0.21%
7. Bone and Joint lesions	916	2.92%	43	1.85%
8. Latent Yaws (by history)	55	0.17%	0	0.00%
9. Other manifestations	2,155	6.85%	40	1.74%
Total	31,427	100.00%	2,346	100%

team. Occasionally, personal rivalries, religious and social differences have a destructive influence on the team's spirit. These organizational factors should be kept in mind when forming new teams in order to avoid difficulties.

The questions of recruitment and the training of auxiliary personnel are next considered.

Personnel may be recruited in two different ways—recruitment can be freely undertaken, or the government assigns already recruited personnel to the field project.

In the first instance candidates should be sought by means of the local

press, radio, etc. An age limit and minimum required qualifications should be established and only the most successful candidates should be selected after written and oral examinations. The list of trainees selected should be presented to the government for approval, to obtain budgetary provision, etc. The training programme can then begin.

One of the main points to be taken into consideration is the individual reliability of those selected. It is better to have well-disposed people even if a sacrifice has to be made to a certain extent as far as knowledge or intelligence is concerned.

If the government assigns personnel already on its own staff, written and oral examinations might also be held, if possible in the presence of a government representative. The results should be communicated to the government and the trainees selected should be accepted for a probationary period of three months.

New trainees usually lack confidence in themselves and they are not conscious of the important role they will play in a yaws campaign. It should be pointed out to them that they are the "pillars" of the work planned and that its success depends on them and that later on they will be solely responsible for their fellow countrymen; they must be made to understand that they cannot afford to fail.

To encourage the trainee the best way is to express one's satisfaction on encountering goodwill and when observing improvement during training to recognize it. The motto should be "strict but fair".

It cannot be overstressed that administrative training is required. Teams have to complete several different forms during their field work, e.g. daily records and field working sheets, daily work summaries, returns of resurveys, etc. Headquarters staff will subsequently prepare summaries of the results obtained in the field and this can be done only if the field forms have been properly completed. A field team which has been doing good field work but whose forms have been badly completed can provide no record demonstrating their success, and the work done will be little appreciated. To attempt for days and even weeks to teach trainees how to complete forms properly using fictitious numbers is not a waste of time. No one should be sent to the field until he has shown he is able to fill in forms properly.

It should not be forgotten that when dealing with simple people explanations should be given in a simple way. It is of great value to the instructor if he has an understanding of local beliefs, superstitions and tribal laws. In this way he will be better able to discuss general health matters.

One of the main difficulties of the yaws campaign in Liberia lay in the fact that the approach of the teams had to be altered according to the customs and beliefs of practically each province. For instance, it was soon discovered from hearsay as well as from experience that people in the western provinces are rather backward, superstitious and living under the constant control of devils with whom they communicate by means of numerous secret societies. The most influential are the Poro bush society, the Water society and the Crocodile and Snake societies. Each one of them possesses its own particular rules and taboos strictly followed by its members and to which the slightest derogation would undoubtedly entail the death of the member involved. These local laws are kept strictly secret and we could hardly learn of them by means of carefully carried out investigations and gifts. We discovered, for instance, that it was forbidden to enter some of the villages with shoes. In others, it was not allowed to burn palm oil. In Gio country, people do not eat chicken, while in Bassa country where the snake society has its followers, it is strictly forbidden to kill any kind of snakes. Before entering a town, our teams had

TABLE II.

Results of Mass Campaign Against Yaws in Sanniquellie District. Sanniquellie District has Four Chiefdoms Including Twenty-one Clans.

Basic Data	Initial treatment survey 16 October to 8 December 1955		Resurvey 19 September to 12 December 1956	
Total number of huts found	21,270		21,531	
Total population estimated	82.953		86,124	
Total population examined	90,727		100,159	
Yaws cases diagnosed	24,171		1,821	
Yaws cases treated	24,171		1,821	
Contacts protected	66,556		6,364	
Number of injections	90,727		100,159	
Penicillin used in c.c.	203,688		64,291	
Average penicillin pro person in c.c.	2.2 (4)		0.64	
Yaws Cases				
Yaws cases only	24,171		1,821	
Male	11,175		972	
Female	12,996		849	
Age groups under 2 years	232		5	
3-10 years	3,188		141	
11-18 years	3,433		376	
19 y. and over	17,318		1,299	
Distribution of Yaws Lesions				
1. Initial lesions	161	0.67%	5	0.27%
2. Multiple papillomata	873	3.52%	56	3.07%
3. Plantar papilloma	532	2.22%	46	2.52%
4. Other early skin-lesions	247	1.03%	16	0.87%
5. Hyperkeratosis	18,080	74.80%	1,534	84.23%
6a. Gummata and Ulcers	416	1.75%	73	3.18%
6b. Gangosa (Rhinopharyngitis mutilans)	66	0.28%		
7. Bone and Joint lesions	693	2.88%	38	2.86%
8. Latent Yaws (by history)	127	0.53%	0	0.00%
9. Other manifestations	2,976	12.32%	53	2.91%
Total	24,171		1,821	100%

to be necessarily aware of such rules and to follow them in as much as the slightest violation would have frustrated their work.

When the administrative training has been successfully completed, the health education aspects should be considered.

Medical training comprises two parts. The first is technical; how to sterilize instruments; how to give an injection, etc. Too many things should not be taught at the same time and only the elementary principles should be part of the training. Staff should not be sent to the field until their basic knowledge results in a sort of conditioned reflex action.

The second part of medical training is diagnosis. Projection of slides and pictures is the best way of teaching how to recognize the disease to be attacked in the yaws campaign. Preferably, coloured slide pictures should be projected showing activities of the local people (African people training Africans). The trainees should be taught to recognize quickly the disease and its different stages for classification purposes. Later on, pictures might be projected showing different diseases (diseases already known to the trainees and others "unknown" to them) and the trainees should be asked to identify the diseases they know. For each of the "unknown" diseases, they should only have to say that it is not the disease with which they will be dealing. The main purpose of this "negative method" of teaching is to secure the concentration of the trainees on yaws.

A few fundamental objectives should be established before field operations are undertaken. A major point is to make sure that at least 95% of the population will be examined during the course of the mass campaign. A plan to approach administrative units (tribes, clans, etc.) rather than geographical areas is highly desirable, since this is the only way in which the necessary co-operation of all the chiefs concerned can be obtained.

The tax assessment list should be made available in advance and is usually obtained from the revenue collector or from the government if a proper census system is in operation. Such lists should give names of towns, villages, and farms, and the number of houses in a given locality, from which an estimate can be made of the population figures. Such a system is the only way of discovering whether 95% of the population have been seen in the mass campaign. Those figures are sometimes inaccurate since in many cases the population is constantly migrating. In such circumstances, the number of people living permanently in their respective villages should be determined, but this can be achieved only when a proper census is available. However, it is wise to send someone to a village in advance of the team's arrival to study the size of the village population.

It is essential to stress the importance of supervision during field work. Supervision should in the last instance be undertaken by the programme director or supervisor or the national adviser working with the campaign. It must be recognized that supervision may have to be provided in the face of many difficulties including bad weather, inadequate living quarters, etc., and these factors may hamper the work of the supervisor.

The decrease in clinically active cases of yaws and in the number of seroreactors (or in average titres) should give the necessary basis for the evaluation of the effectiveness of the mass campaign. The further success of the work can be judged by the reliability, conscientiousness, and enthusiasm of the field staff. A campaign should indeed be a double success. When the international staff leave the host country a double achievement should at least be in sight: (a) the elimination of yaws as a public health problem, and (b) a responsible and reliable local staff should have been trained enabling efficient work to be continued in the future.

The results obtained in the yaws controls in three districts in Liberia following the above plan are summarized in Tables I, II, and III, and may be of interest to public health workers.

We summarize our results as follows:

From January 1, 1955, till December 15, 1956, 701,661 people were seen and treated in three districts in Liberia. The attendance of the population reached the desired 95%. From the above-mentioned figures, 435,723 people

TABLE III.

Results of Mass Campaign Against Yaws in Tappita District.
There Are Four Chiefdoms Including Nine Clans in the Tappita District.

Basic Data	Initial treatment survey 20 November to 23 December 1955		Resurvey 16 November to 7 December 1956	
Total number of huts found	6,116		6,636	
Total population estimated	23,850		24,544	
Total population examined	25,720		31,453	
Yaws cases diagnosed	7,526		347	
Yaws cases treated	7,526		347	
Contacts protected	18,194		1,760	
Number of injections	25,720		31,453	
Penicillin used in c.c.	58,802		19,283	
Average penicillin pro person in c.c.	2.2 (8)		0.61	
Yaws Cases				
Yaws cases only	7,526		347	
Male	3,591		179	
Female	3,935		168	
Age groups under 2 years	70		8	
3-10 years	1,103		31	
11-18 years	1,224		64	
19 y. and over	5,129		244	
Distribution of Yaws Lesions				
1. Initial lesions	63	0.84%	4	1.15%
2. Multiple papillomata	280	3.72%	32	9.22%
3. Plantar papilloma	65	0.86%	5	1.44%
4. Other early skin-lesions	72	0.96%	4	1.15%
5. Hyperkeratosis	5,684	75.53%	256	73.77%
6a. Gummata and Ulcers	264	3.51%		
6b. Gangosa (Rhinopharyngitis mutilans)	41	0.54%	14	4.03%
7. Bone and Joint lesions	246	3.27%	11	3.17%
8. Latent Yaws (by history)	21	0.28%	0	0.00%
9. Other manifestations	788	10.49%	21	6.05%
Total	7,526	100.00%	347	100%

were seen during our initial treatment survey and 265,938 people were seen during our resurvey. The attendance during the resurvey reached also the desired 95%.

Generally the total yaws cases dropped from 60-70% to 1.5-3%. The infectious cases from 2-4% to 0.2-0.4%. The hyperkeratosis (most important) from 50-60% to 1-3%.