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United States Health Missions in Liberia*

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“The financing of health service for Liberia probably offers as great an opportunity to do good as remains in the world . . .” is the conclusion reached by Colonel Leon Fox, Medical Corps of the United States Army.

A rapid survey and casual observation by Colonel Fox in 1942 revealed that malaria was rampant, venereal disease played an important part in both morbidity and mortality, enteric diseases and helminthiasis were rife, and there was no general vaccination program, thus rendering the public susceptible to a smallpox outbreak. In addition, water supply and sewage disposal were individual and primitive. Flies, mosquitoes, and other vectors were abundant. All these findings could but lead to the conclusion that a public health program here would yield at least as much per dollar spent as could be expected in any part of the world.

Stimulated by the realization that all the major problems encountered might well be ameliorated, and some even eradicated, by a modern public health program, William V. S. Tubman, then president-elect, addressed a letter, dated January 31, 1943, to President Roosevelt, requesting such aid as might be made available by the United States. Supporting letters were dispatched by Lester A. Walton (then Minister to Liberia) and in February 1944 these letters, together with an outline of a 5-year plan for public health in Liberia, were submitted to President Roosevelt.

Mr. Roosevelt, in approving the principle of the plan, suggested that the agencies involved, including Lend-Lease, War Department, and the Department of State, confer jointly on the ways and means of implementing the plan. It was finally agreed that the Mission would be assigned from the Office of the Surgeon General of the United States Public Health Service, and on March 28, 1944, the Public Health Service was requested by the United States Department of State to dispatch a medical and public health mission to Liberia.

*Review of 3 years' work in Liberia by the United States Public Health Service Mission and the Department of State Nursing Education Mission.

Under existing legislation, the Mission was authorized only to perform extramilitary sanitation directed at protection of military personnel and promotion of the war effort, and to protect other parts of the world, particularly the United States, from introduction of exotic vectors of disease. This authorization, while understood from the beginning, was not finally worded until November 15, 1944, when Surgeon General Thomas Parran wrote in part, ". . . You are directed to perform extramilitary sanitation in cooperation with the Government of Liberia for the protection of United States military personnel, including such sanitation works as may be necessary in other areas which may affect their health; to render the environs of airports free of exotic mosquito species dangerous to the United States if introduced; to advise the Liberian Government in planning for the sanitation of coastal towns; and to render such aid as may be requested by the Liberian Government in the enlargement of its public health program."

The first officers for this Mission were sworn into the Service in October 1944, and arrived by air in Monrovia in November of the same year. We found no supplies or equipment available for starting our work.

Upon our arrival, we found that to the best of the available knowledge there were six physicians, two dentists and an indeterminate number of nurses practising in Liberia, which has a population estimated at 2 million. There appeared to be some question as to the validity of credentials of one of the practising physicians, and an estimated 25 to 50 percent of the nurses were not graduates of schools with didactic courses in nursing. There were four nurses in Liberia with foreign training in class A schools of nursing.

Hospital facilities were scarce. At Monrovia, the capital of Liberia, there were two general hospitals—the Liberian Government Hospital with approximately 35 beds, and the Carrie V. Dyer Memorial Hospital, operated under the auspices of the Baptist Board of Foreign Missions, with a rated capacity of 25 beds. The Liberian Government Hospital was directed by a graduate, licensed physician of excellent capabilities, and was staffed by one additional physician and a corps of locally trained nurses under the administration of two American-trained nurses. The Baptist Hospital concentrated its efforts in the field of maternity, under the administration of a graduate nurse-midwife trained in the United States. A foreign-trained, capable physician was available for consultation, supervision and surgery.

Both of these institutions were inadequately equipped and staffed, and their supplies were extremely low. These conditions were not the results of delinquency on the part of hospital or staff, but were due to a combination of insufficient funds and difficulty of obtaining personnel, supplies and equipment during war years.

The Firestone Plantations Company operated a modern hospital of approximately 100 beds, adequately staffed and equipped, at Harbel near Roberts Field, and a second smaller hospital at Gedetabo in Maryland County near Cape Palmas.

There was also a small hospital of approximately 25 beds at Grand Cape Mount, operated under the auspices of the Protestant Episcopal Mission, with a physician in attendance, assisted by one American-trained nurse and a small corps of locally trained nurses.

At Harrisburg, approximately 28 miles from Monrovia, there was the Phoebe Lutheran Hospital, operated under the auspices of the Lutheran Mission Board. This hospital was without an attending physician, and during most of the war years was able to obtain the consultation services of either the physician at the 25th Station Hospital at Roberts Field or from the Firestone Plantations Company's Hospital. This concluded the list of available hospital facilities in the Republic of Liberia.

There were two general clinics at Monrovia; one in the Central Province at Ganta, under the Methodist Mission Board; one at Tappeta, in the Central Province, operated by the Liberian Government; one at Salala, operated by the Liberian Government; one at Suoccoco, operated by the Assemblies of God Mission; and Liberian Government-operated clinics at Voinjama in the Western Province, at Cape Palmas in Maryland County, at Marshall in the Marshall Territory, and at Sinoe in Sinoe County. Only three of the clinics had a graduate physician in attendance. Others were operating under the administration of trained dressers or medical technicians, sometimes in combination with locally trained or foreign-trained nurses. Their supplies and equipment were inadequate, as a result of the same problems which faced the hospitals.

There was no pharmacy or supply house for the procurement of pharmaceuticals, biologicals, drugs, and chemicals in Liberia. All medical supplies and equipment had to be purchased from foreign countries by direct orders to the manufacturers. This caused costly delay in the procurement of supplies and was dangerous from the standpoint of emergencies.

The major diseases of Liberia were malaria, helminth infestations, venereal diseases, and, in certain parts of the country, schistosomiasis, filariasis, and trypanosomiasis. It was therefore decided that the major attacks would be concentrated in these fields of epidemiology.

Consultation with the physicians who had practiced in Liberia for varying periods of time, from one to 25 years, indicated the absence of certain diseases. Notable among these absent diseases were typhus fever, cholera, yellow fever, and typhoid fever.

Investigation revealed that the major vector of malaria was the

Anopheles gambiae. The major vector of the enteric diseases was tentatively identified as *Musca domestica*. According to available information the types of glossina responsible for the transmission of trypanosomiasis had not been identified. Species of snails which served as intermediate hosts for schistosomiasis had not been identified up to the time of our arrival, although it was said that certain types of planorbis and bulinus existed in bodies and streams of fresh water in many parts of Liberia. Specific vectors for other diseases had not yet been identified, and it was determined that part of the assignment of this Mission would be to collect evidence and statistics on the epidemiology of the diseases present if funds and personnel were available. It was also decided that this Mission would attempt to assemble meteorological data as it related particularly to the life cycles of the major vectors of diseases in Liberia. A further plan was crystalized for the assembling of a photographic library and collection of laboratory specimens of the diseases indigenous to Liberia.

Malaria Control

A fairly complete survey of Monrovia, Kakata, and Roberts Field indicated that 98.6 percent of the mosquitoes aspirated from inhabited areas were *A. gambiae*, the remaining 1.4 percent being composed of *Anopheles hancocki*, *Anopheles funestus*, *Culex fatigans*, and *Aedes aegypti*. The mosquito population caught in other than inhabited houses was divided into two parts. From crab holes, the aedes species constituted about 60 percent of the entire catch, uranotaenia constituted about 25 percent, culex about 5 percent, and *A. gambiae* approximately 10 percent. From crevices and drains the total group was composed of 70 percent *A. gambiae*, 3 percent other anopheles species, 20 percent aedes species, 2 percent culex species, and 5 percent unidentified.

Study of the habits of *A. gambiae* showed that the male was more prevalent in uninhabited areas, while the female was more numerous in inhabited houses; and, that the *A. gambiae* are most numerous from the middle of April to the middle of July and from the middle of September to the first part of December.

Steps were immediately taken to initiate a DDT spraying campaign which would cover at least 90 percent of the inhabited buildings of Monrovia and Roberts Field, at least once every 4 weeks. Our previous experience with DDT had indicated that its efficiency does not extend beyond 4 weeks in the Tropics, in contrast with the 6- to 10-week effectiveness observed in other zones. Combined survey-DDT crews were formed around a nucleus of Liberians trained in malaria control at Roberts Field. The size of the crews was based

on our property survey of the Monrovia area, which had revealed approximately 1,290 houses in the city.

A rough survey was made of the areas to be controlled in Monrovia and its environs as well as at Roberts Field to determine the extent and location of anopheles breeding areas, and larviciding crews were then formed, based on the findings of the survey. These crews were also formed around a nuclei of Roberts Field-trained malaria control men.

In March 1945, our DDT crews sprayed their first house in Monrovia and our larviciding crews, using a Diesel oil solution of DDT, made their first attack on breeding areas.

There followed drainage ditches, fills, and pumping of casual waters as adjuncts to the basic control program, removing, in the first year of control activities, 480 acres of breeding area. It was our impression that, for temporary control at least, the spraying of DDT in inhabited houses and on breeding areas was more economical than any other method; that ditching and filling, with land reclamation as a sequel, though considerably more expensive, was semi-permanent; and that for permanence of program it would be necessary to construct concrete-lined ditches.

In preparation for the protection of the port then under construction, a similar program was initiated on Bushrod Island, using a one-mile radius from the center of the proposed dock site as the area for control.

Through cooperation of the Liberian Bureau of Public Health and Sanitation, the Liberian Department of Public Instruction, and the Health Education Section of this Mission, a health education program aimed at exclusion of mosquitoes from homes, at destruction of breeding areas around homes, and destruction of adult mosquitoes, was executed as an adjunct to the physical program. Perhaps the most difficult assignment of the Health Education Section was to persuade the residents to accept the application of DDT to their homes. It was generally concluded that if DDT would kill mosquitoes it was also harmful to man. This misapprehension has gradually disappeared from the controlled areas and residents now complain sorely when crews are a day late spraying their homes.

Another problem attacked by the Education Section was screening of houses. In this our success has been practically nil for two reasons. First, there is the irrefutable fact that screening limits the amount of air and light entering houses. It has been impossible to persuade the average citizen of the areas in which we work that the advantages gained in health compensate for the diminution of light and air. The second reason, probably contingent on the first, is that the local merchants have not imported enough screening materials to permit the undertaking of a general screening program.

Medical attack on malaria consisted mainly of distribution of free anti-malarials through existing Liberian Public Health agencies, voluntary medical centers, and our own hinterland and local centers. We were able to obtain for investigation through the National Institutes of Health of the Public Health Service a supply of SN7618-5 (chloroquine) which has been used only under our supervision in the central station at Monrovia.

It has been gratifying to watch, through 3 years of control, the reduction of malaria admissions to the local hospital from 383 in 1945 to 21 in 1947. This resulted even though education programs taught the citizens to seek hospitalization three times as often in 1947 as they did in 1945. The anopheline index has fallen 78.6 percent since 1946 (no personnel available for index surveys in 1944-45). The Bureau of Public Health and Sanitation of the Liberian Government is now dispatching seven technicians trained by this Mission to seven parts of the hinterland and coast to expand the work now being carried on in Monrovia.

Enteric Diseases

Enteric diseases and intestinal helminthiasis have obviously long been high on the list of diseases to which Liberia is heir. In 1946 a survey among 755 school children in Kakata revealed that 735, or 97 percent, showed stools positive for some type of helminth, with 3 percent negative. A survey of 943 adult males and females revealed positive findings in 92 percent, with *ancylostoma* contributing 54 percent, and other helminth infestations, 38 percent.

Of the patients found positive for helminths in Kakata, 67 percent received treatment. Of those patients treated with caprokol, 98.6 percent were cured after one course; of those treated with other vermifuges, 93.4 percent were cured after one course. A second course was prescribed whenever possible.

Undoubtedly, the regular spraying of DDT in our mosquito-control program played an important part in the reduction of fly population, and thus in reduction of the spread of fly-borne enteric diseases. Spraying of latrines with DDT, and education programs for fly-proofing latrines and kitchens also contributed to the reduction. While no statistics are available on the incidence of flies in the areas controlled, it has been observed that the fly population has practically disappeared in the last 2 years, although the prevalence of the indigenous species of flies was tremendous in 1945.

In our attack on enteric diseases and helminthiasis, health education played a very important part. Classes were organized for teachers as well as for students, and this program was extended to the Annual National Teachers' Institute, attended by approximately 80 percent of the teachers of Liberia. Demonstrations of construction of sanitary

privies were conducted by our Sanitary Engineering Section. Motion pictures showing the method of transmission of the enteric diseases and helminths were shown to teachers, parents, and students with moderate success. Boiling drinking water was demonstrated and stressed throughout the program with excellent results. Personnel of this Mission covered more than a thousand miles by car and afoot in the prosecution of this program, and our mobile laboratory covered 10 communities accessible by road.

Venereal Diseases

Venereal diseases most frequently observed in Liberia are gonorrhea, *Granuloma inguinale* and lues. Our primary interest in venereal diseases upon arrival was the protection of United States troops, and our efforts were therefore concentrated in and around the two cities most frequently visited by troops on leave—Monrovia and Kakata. A survey of the two cities revealed that prostitution—both clandestine and professional—was as general as it is in many American population centers. One unusual feature of the practice of this profession in Liberia was the frequency of monogamous prostitution. It was seldom that we found the wholesale prostitution observed so frequently in the United States.

A treatment program followed the initial survey, prescribing sulfa-thiazole for gonorrhea, but with unsatisfactory results. Investigation revealed that sulfa drugs had been distributed through illegal channels for practically all ills, resulting in production of a sulfa-resistant strain of gonococcus. Resurvey after therapy showed a prevalence of gonorrhea only 42 percent lower than the prevalence revealed by the initial survey. Penicillin was then prescribed, with 93 percent reduction of gonorrhea prevalence after the first course. It was impossible to determine whether the remaining positive cases were reinfections or resistant cases. Granuloma and syphilis were treated in accordance with standard therapy, with satisfactory results.

Health-education programs were conducted among prostitutes and general population, including specially prepared literature, motion pictures, lectures, and newspaper articles. The success of this phase of the program is indicated by the increase in the number of patients who sought treatment after the initiation of the program. Unfortunately, more patients sought treatment than could be cared for, overrunning existing treatment facilities. Additional clinics were then established at the Public Health Service Compound, and are still running overloaded. The Liberian Government and Baptist Hospitals expanded their facilities, and all clinics are operating to capacity.

In 1946 the Liberian Congress passed a new venereal disease act—the first step in a national venereal-disease-control program. This act

authorizes and directs the Liberian Bureau of Public Health and Sanitation to perform blood tests for lues and physical examination of all residents of Liberia periodically, and to provide free treatment for all indigents found positive for any venereal disease. This initial step, coupled with the plan to dispatch laboratory technicians to areas where physicians are already stationed, augurs well for the future venereal-disease-control program. Money has been appropriated by the Liberian Government for this program, amounting to approximately \$100,000 per year; and equipment, supplies, and apparatus were ready for the initiation of the program in January 1948. The physical examination and blood-test program was begun first in Monrovia, with all physicians participating in the physical examination program and the United States Public Health Service laboratory accepting responsibility for serology.

Again, the work of this Mission has played a part in stimulating interest in control of a group of communicable diseases and our laboratory has taken the spotlight in training personnel for the laboratory phases of the control program. It is common opinion, too, that our educational and survey programs have stimulated public interest in and knowledge of the importance of such a program.

Trypanosomiasis

Trypanosomiasis, a major disease in northern sections of Liberia, has not yet claimed direct action. A plan has, however, been submitted to the Liberian Government for the establishment of quarantine stations in strategic towns along the main highway for inspection and, if necessary, fumigation of vehicles en route from the sleeping sickness belt to the coast. Specimens of sleeping sickness vectors are now being collected preparatory to study of necessary control procedures.

Library and Specimens

In our program for the collection of a photographic library and specimens of tropical diseases, we have to date returned to the United States over 10,000 slides of malarial parasites, trypanosomes, filaria (*Wuchereria bancrofti* and *Acanthocheilonema perstans*) and *Bacillus leprae*. We are now attempting to return to the United States viable specimens of *Planorbis pfeifferi*, the intermediate host of *Schistosoma hematobium* in Liberia. One shipment of these snails has already been forwarded to the United States, and the second is now ready for shipment.

A basic library of framboesia is now in process, consisting of 58 pictures and three 50-foot rolls of motion pictures of primary, secondary

and tertiary yaws in natural colors. These photographs were taken at our substation at Ganta which is operating under the administration of Dr. George W. Harley. A similar basic library of leprosy in colors has reached the same stage of development.

Plans projected for this phase of our work include a basic library of craw-craw, dermatophytosis, ancylostoma, tropical ulcer, smallpox, *G. inguinale*, dracunculosis and such other diseases as may be seen in sufficient variations to produce an adequate library. Vectors of the various diseases of Liberia are also being collected and forwarded to Washington for the same purpose.

Census

The first census of any part of Liberia was undertaken by this Mission in Monrovia in October 1945, and completed in December of the same year. The area covered was bounded by the St. Paul River on the north, including Bushrod Island, the Atlantic Ocean on the south and west and Sinker Road on the east. Statistics do not include such transients as personnel of the foreign legations, the port-construction company, United States Armed Forces and the United States Public Health Service Mission.

Large age grouping was necessary, due to the fact that the average citizen does not know his birth date or age, and estimates, with incident-memory associations, were used as a basis of grouping.

Statistics on pregnancies, stillbirths and infant mortality are not accurate, and do not relate to any year. Each female in the child-bearing age group was asked how many pregnancies she had experienced up to the time of the interview, how many had been interrupted, how many had resulted in stillbirths and how many had died "before they had seen one rice season," which is the native method of determining the duration of one year.

While statistics for the incidence of specific diseases and disease groups were not considered reliable, the ten most frequently reported are listed here in order of their reported frequency:

1. Malaria, including fever of undetermined origin.
2. Enteric diseases.
3. Helminthiasis.
4. Tropical ulcer.
5. Treponemiasis.
6. Respiratory diseases, exclusive of tuberculosis and pneumonia.
7. Rheumatism.
8. Gonorrhea.
9. Cardio-renal disease.
10. Pneumonia.

Of 5,540 reported pregnancies, 4,669, 86 percent, were reported as having resulted in viable births, with 670, or 12 percent, interrupted

pregnancies and 101, or 2.5 percent stillbirths. The stillbirth rate computed from these figures was 22 per 1,000 live births.

Infant morbidity and mortality were not computable due to unreliability of time and diagnosis reports, but the leading five reported causes of infant mortality are here recorded in order of their reported frequency:

1. Malaria, including fever of undetermined origin.
2. Enteric diseases.
3. Respiratory diseases.
4. Prematurity.
5. Helminthiasis.

While our census of Monrovia has not been followed by any additional census either by this Mission or by the Liberian Government, we believe its results were instrumental in increasing interest in statistical tabulations, and we have seen the statistical section of Liberian Bureau of Public Health and Sanitation grow in the last 2 years, with two of this Mission's personnel temporarily assigned to aid in the Bureau's reorganization of its statistical section. Due to the decrease in our budget, it has been necessary to withdraw the two personnel assigned to this section, and the Bureau now carries on alone.

Rat Control

No steps have been taken yet to control rats, due to limitation of personnel and funds; but a program of control is now being planned by the Bureau of Public Health and Sanitation of the Liberian Government in cooperation with this Mission. The first step in the program, which is planned for use of the rodenticide, ANTU, is a health education program to discourage natives from eating rats. This is a common protein food among certain Liberian tribes, and the ingestion of animals poisoned by ANTU is detrimental and sometimes fatal to human beings. It therefore becomes necessary to precede the campaign by education.

Laboratory

One of the most popular phases of our work, second only to mosquito control, is the diagnostic laboratory, which has provided Liberia with its most modern facilities and best-trained personnel for complementing physical diagnosis. As has often been said, the laboratory is the heart of tropical disease diagnosis, and the laboratory of this Mission has proved invaluable to the work of the private practitioner, the Liberian Public Health Service, the hospitals and clinics of Liberia and to the survey and clinic work of the Mission. Further, the laboratory, under the able administration of Senior

Surgeon (R) Hildrus A. Poindexter, is conducting experiments and investigations on diseases present in Liberia.

In token of the recognition won by this phase of the Mission's work, the Liberian Government is this year allocating \$15,000 to the Clinical Laboratory in addition to its own public health allocations, and a special over-all allocation to the work of this Mission. Further indication of their recognition of the importance of this phase of public health work in the Tropics is found in their present plan to dispatch seven United States Public Health Mission trained technicians to cover the laboratory work of seven sections of the hinterland and coast.

In their recognition of the value of mosquito control and laboratory diagnosis the Liberians and their government are not dissimilar to our population and government. They recognize the value of mosquito control because mosquitoes no longer bite them. They recognize the importance of laboratory work for they can see and read the results. But they, like the average citizen of any other part of the world, find it difficult to visualize the importance of control of diseases as projected into the future by public health and preventive programs. It is our opinion that education on this point will be as difficult here as it has been and is in other countries.

Education and Training

Education and training of Liberian personnel to carry on the work of this Mission when it is withdrawn from Liberia has played a prominent role in our activities. It is our conviction that the most lasting impact this Mission can make on the health conditions of Liberia is in the field of technical training. Toward this end, we obtained from the Division of Cultural Cooperation of the United States Department of State in 1944 a grant of \$30,000 toward the organization of a school of nursing for Liberia. Two American-trained graduate nurses were employed by the State Department to organize and direct this school, and in April 1945 the school, tentatively named the "Joint School of Nursing" was inaugurated at the Liberian Government Hospital at Monrovia, with 28 student nurses and a faculty composed of representatives of this Mission, the Liberian Government, and the Carrie V. Dyer Memorial Hospital.

Students for the school were drawn from the Government Hospital, Carrie V. Dyer Memorial Hospital, and from other institutions sufficiently close for affiliation. Obstetrical affiliation was through facilities of the Carrie V. Dyer Memorial Hospital, an institution established mainly for maternal care. Laboratory training and public health were taught at the central administration building of the Mission. Adequate facilities for class and laboratory work were not available, and classes were and still are conducted in quarters

unsuited to the purpose, but the best available. Equipment, materials and supplies for the school were purchased from the funds made available by the United States Department of State, supplemented by an annual grant of \$5,000 allocated by the Liberian Government.

The first class of nurses partly trained under this school was graduated in 1946, and the first class completely trained will be graduated in 1948. There are at present 33 student nurses in the school.

Early in the life of the nursing school it was apparent that the need for nurses was no greater than the need for other categories of trained personnel, including physicians, dentists, malaria control technicians, and laboratory technicians. Toward the end of meeting this requirement in part at least, the faculty of the school met and planned to expand the activities of the nursing school to include the technical training for the additional personnel. This plan as related to physician and dentist training was to be patterned after the work of Lambert in that it would matriculate graduates of the highest local schools of learning and offer, over a four-year period, training which would graduate them as sub-professional medical and dental practitioners. It was realized that these graduates would not fill the need completely, but we were certain that they would be a stepping stone between witchcraft and native medicine on the lower level and modern medicine on the upper.

The program as outlined by the faculty was presented to President Tubman, who approved the plan and authorized the inauguration of the Tubman National Institute of Medical and Allied Arts at Monrovia. This Institute was organized in 1945 and began operating with six medical students and two dental students among the enrollees. At the present time four of the medical students and one of the dental students continue in the Institute; the others (medical and dental students) having been dropped for various reasons, mainly poor scholarship. While it was originally planned to matriculate additional medical and dental students each year, the reduction of Public Health Service budget and the termination of the State Department Cultural Cooperation budget for education in Liberia prevented the execution of this program, and the first class matriculated has been the only one for which funds were available. In fact, in 1946-47, when the State Department was forced to withdraw all financial support, the Institute was compelled to seek support from private philanthropy. Through the generosity of three American philanthropists the Institute was able to raise \$20,000, to which the Liberian Government added \$5,000. from which total the Institute is still in operation. It is doubtful that the funds still available will carry the Institute completely through its next year. To date, there is no adequate teaching facility for the Institute and equipment is also inadequate, though the United States

Department of State has contributed generously to the support of the program. It is hoped that through an as yet unseen source of support, a modern, small teaching facility may be built and adequately equipped.

The faculty of the Institute now consists of personnel drawn from every available local source, including the Liberian Government Hospital, the Bureau of Public Health and Sanitation and Department of Public Works and Utilities, private practitioners, local nurses, the Liberia College faculty, and personnel of this Mission. Its administration is under a joint board on which all institutions concerned are represented.

To date this Institute has graduated 12 laboratory technicians, of whom 3 are already employed by the Liberian Government and 7 more are to be employed this month in their public health expansion program; 5 malaria control technicians and 6 food inspectors, employed by the Liberian Government; 8 sanitary inspectors, and 29 maintenance artisans. The total student body now consists of 33 student nurses, 4 medical students, 1 dental student, 6 laboratory technicians, 5 malaria control technicians, 6 subprofessional sanitary engineering students, for a total of 55 students.

It is now proposed that the key officials in the present Liberian Government health program will matriculate at American medical schools for postgraduate training in public health, and seven Liberian students including the Director of Public Health and Sanitation are now in the United States preparing for service with the Liberian Bureau of Public Health and Sanitation.

Engineering Work

In 1945 the Mission engineers undertook a topographic survey of Monrovia and its environs preparatory to planning for a municipal water supply for the city and the proposed port. This work was compiled into a topographic map of the area, and a further survey was then made to determine the most suitable source of water for the proposed municipal supply. Numerous sites were investigated, and it was finally determined that the best source was the Saint Paul River at Harrisburg, about 15 miles from Monrovia. Further topographic survey produced a profile map of the right-of-way for the water main from Harrisburg to Monrovia. This work was completed in 1946. The report was then forwarded to Washington for further action.

Evaluation

In evaluating the over-all program of this Mission and the success it has attained, one outstanding factor is the increased interest, both

administrative and financial, shown by the Liberian Government in the three years during which this Mission has been assigned in Liberia. In 1944 the Liberian Government allocated \$72,000 to public health and medical care; in 1945 the allocation rose to \$103,000; in 1946, to \$150,000; and, in 1947, to \$400,000. In 1947 the health appropriation stood first in the budget, indicative of the increased interest in this phase of national improvement.

The number of doctors has increased from 6 in 1944 to 23 in 1947, of whom 14 are employed by the Liberian Government in its medical program. Seven new hospitals are in varying stages of completion; 16 clinics now serve the population as compared with 10 in 1944, with 7 more clinics proposed for the next year. Undoubtedly, the government and people of Liberia are doing all they can to raise the health standards of their nation, and we feel that the plans initiated by the United States Public Health Service Mission have not only reduced disease, but have played some part in increasing the interest of the Liberian people and their government in public health. With this increased interest, it is our belief that the Public Health Service of Liberia will constantly improve.

Q Fever: Three Cases of Laboratory Infection¹

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Public Health Service

Several reports of Q fever in laboratory workers have previously been published (1, 2, 3, 4, 5). Three additional cases are herein reported, involving two employees of the Rocky Mountain Laboratory and one visitor. Work with Q fever was continuously in progress in the laboratory during the period when the cases occurred.

In the first case, diagnosis was delayed because complement-fixing antibody did not appear in the blood until about one month after onset of illness. In the third case, the illness was mild and Q fever was not suspected until after recovery.

CASE 1. M. H., female, 24, was employed in a unit engaged in the production of rickettsial vaccines, including Q-fever yolk-sac vaccine. The illness began Aug. 10, 1947, with aching of the back, neck, and lumbar region, malaise, and weakness of the legs. During the next four days, headache appeared and became increasingly severe. M. H. experienced a chill on the third day. She had daily fever, more pronounced at night. After the initial chill on the third day there

¹ From the Rocky Mountain Laboratory (Hamilton, Mont.) of the Division of Infectious Diseases, National Institutes of Health.

were intermittent chills, sweating periods, and fever for the next 2 days. Influenza was suspected early. When the fever and chills continued, associated with severe headache and malaise, the patient was admitted to the hospital on the evening of Aug. 14 (the fifth day) with complaints of chills, fever, malaise, and photophobia.

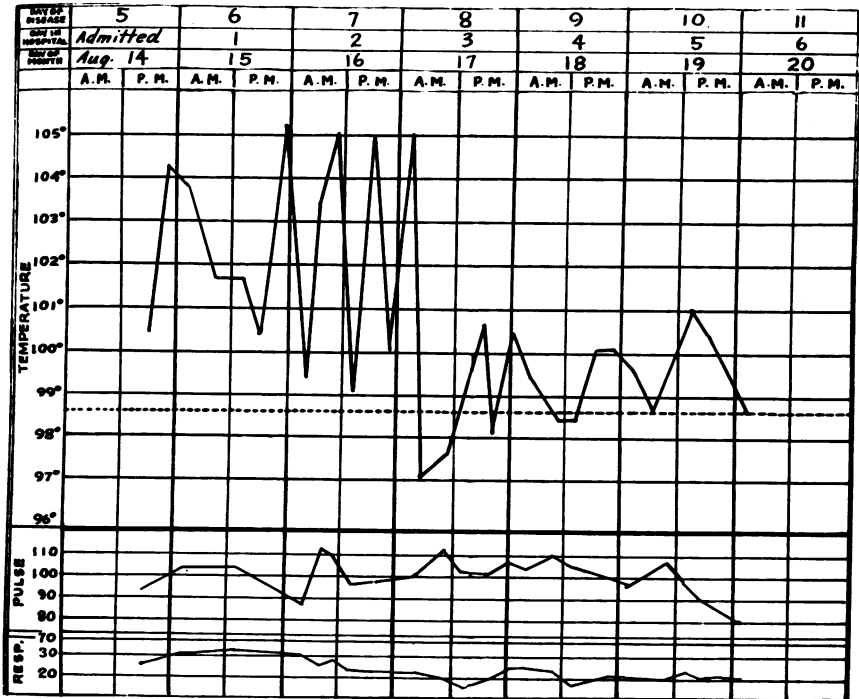


FIGURE 1. Case 1, M. H.

Hospital course. Physical examination was negative except for fever. The intermittent chills, fever, and sweating continued for 3 days. Severe headache was frequently complained of, and aspirin and codeine were given. The appetite was poor. Nausea and vomiting were frequent. Penicillin was given intramuscularly, 50,000 units every 3 hours, beginning the morning after admission, and continued for eleven doses without apparent benefit. Due to dehydration and inability to retain food, 1,000 ml. of amigen was given intravenously on Aug. 16. On Aug. 17 the morning temperature fell to 97° and did not afterward rise beyond 102°. Concurrently, the appetite began to improve and the headache and malaise subsided. The temperature was normal on Aug. 20 (tenth day) and thereafter. The patient was discharged on Aug. 22, 8 days after admission, with no complaints other than weakness. Loss of weight during the illness was about 16 pounds.

Blood. Aug. 16. W.B.C. 13,600. Percentages (100 cells)—Eos. 1, juveniles 5, stabs 23, segs. 50, lymphs. 13, monos. 8.

Aug. 18. W.B.C. 8250; Eos. 3, juveniles 7, stabs 24, segs. 53, lymphs. 11, monos. 2.

Urine. Aug. 15. Sp. gr. 1.016, albumen 2+, acetone 0, diacetic 3+, W.B.C. 1-2/H.P.F.

Sputum. Aug. 16. Large numbers of extremely small, short, gram-negative rods were found.

X-ray. Aug. 15. A P.A. film of the chest showed a marginal triangular area of pneumonic infiltration in the left lung at the level of the third and fourth ribs. The area was mottled and semi-opaque.

Aug. 18. A P.A. chest film showed partial resolution of the pneumonic process.

Aug. 30. A P.A. chest film still showed a residual infiltration of the left lung.

Sept. 26. The infiltration of the left lung had completely disappeared.

Serum agglutination tests. Rocky Mountain spotted fever or Q fever was suspected at the time of hospitalization. Repeated agglutination and complement-fixation tests were made during and after the stay in hospital. Agglutination tests with *Pasteurella tularensis* and *Brucella abortus* were consistently negative. Partial agglutination in low dilutions with *Proteus OXK*, *OX2*, and *OX19* was present in tests during hospitalization and one month following.

CASE 1. Complement fixation

Date of specimen	Antigen	1:8	1:16	1:32	1:64	1:128
8-15-47	Epidemic typhus.....	4	4	4	0	-----
	Endemic typhus.....	1	0	0	0	-----
	Rocky Mountain spotted fever.....	0	0	0	0	-----
	American Q fever.....	0	0	0	0	-----
8-19-47	Epidemic typhus.....	4	4	0	0	-----
	Endemic typhus.....	0	0	0	0	-----
	Rocky Mountain spotted fever.....	2	0	0	0	-----
	American Q fever.....	0	0	0	0	-----
8-30-47	Epidemic typhus.....	4	4	4	0	-----
	Endemic typhus.....	2	0	0	0	-----
	Rocky Mountain spotted fever.....	4	0	0	0	-----
	American Q fever.....	0	0	0	0	-----
9-8-47	Epidemic typhus.....	4	4	1	0	-----
	Endemic typhus.....	1	0	0	0	-----
	Rocky Mountain spotted fever.....	0	0	0	0	-----
	American Q fever.....	3	4	4	2	0
	Rickettsialpox.....	0	0	0	0	-----
11-21-47	Q fever (9 Mile).....	4	4	4	4	0
	Q fever (Henzerling).....	4	3	2	0	-----

Complement fixation. Low titers with epidemic typhus and Rocky Mountain spotted fever antigens were found. The patient had previously been vaccinated against these diseases and the positive re-

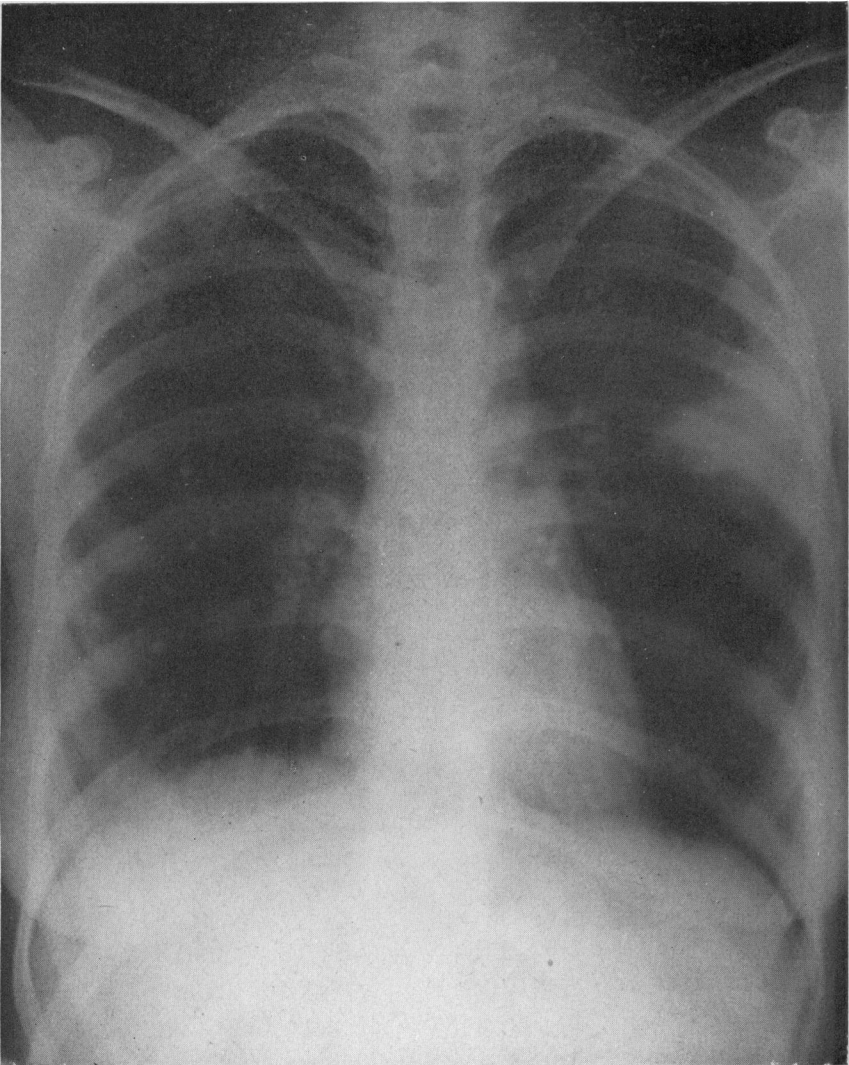


FIGURE 2. Case 1, M. H., sixth day. Pneumonic area left lung at level of third rib. Multiple small calcified areas showed no change during illness.

actions were considered due to the vaccines. As shown in the preceding table, complement-fixing antibody for Q fever was first found in a blood specimen taken on Sept. 8, the twenty-ninth day after onset.

Animal inoculation. Guinea pigs were inoculated with blood specimens obtained on Aug. 15 and 19. None of the animals showed evidence of illness. The inoculated animals were subsequently challenged, half with Rocky Mountain spotted-fever rickettsiae, half with Q-fever rickettsiae, and none were immune.

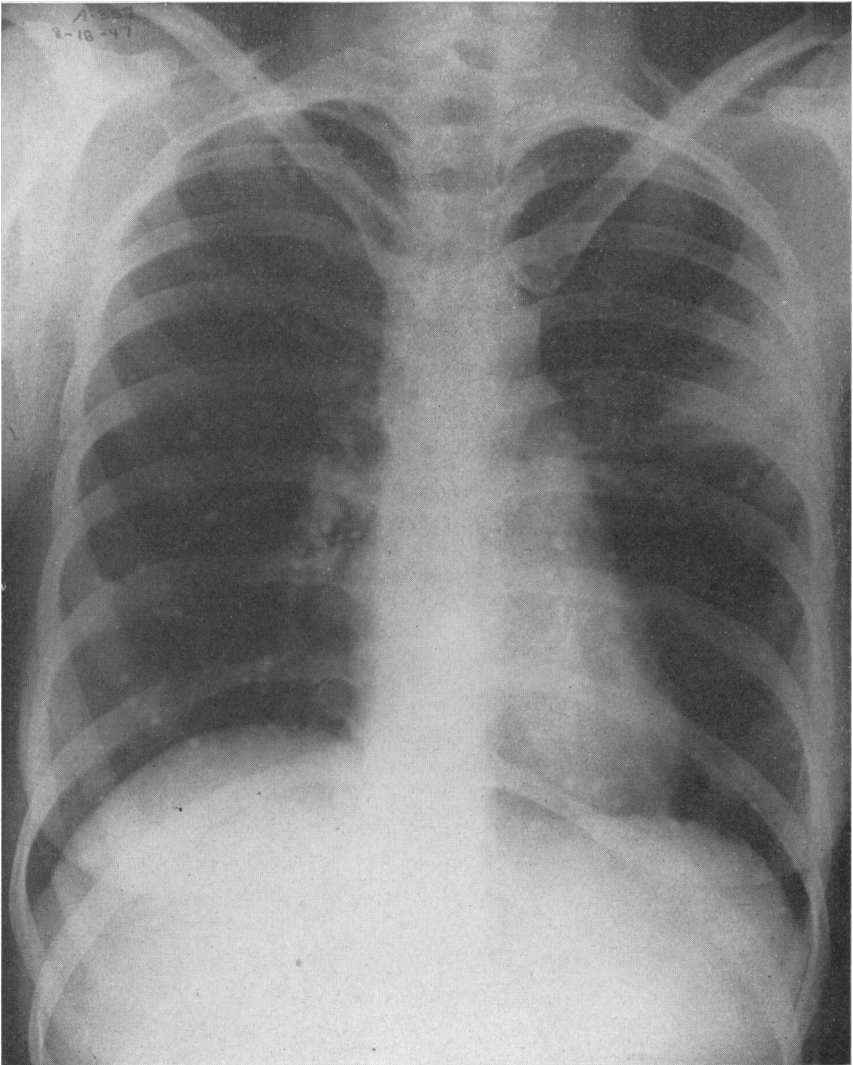


FIGURE 3. Case 1, M. H., ninth day. Shows partial resolution of pneumonic process.

CASE 2. D. E., male, 20, was employed in a unit in which animal-inoculation studies with Q fever and other rickettsial diseases were in progress. Onset—evening of Jan. 23, 1948, with severe headache at vertex, and fever. D. E. felt much improved the following morning. At noon the headache reappeared, but was not so severe. He had intermittent chilly sensations that afternoon and evening. He went to work the morning of Jan. 24 but soon developed fever, headache, and weakness. He returned home and had fever and chilly sensations

that afternoon. There was slight dry cough, and aching between the shoulder blades and in the lower left back. There was moderate smarting and watering of the eyes. He was seen by a physician at 7:30 p.m. and was given penicillin in oil intramuscularly, and pills of undetermined nature. He then sweated most of the night. He remained in bed until the afternoon of Jan. 25. He then got up, but felt weak, feverish, and had intermittent chills. He slept well that night. On Jan. 26 he got up at 9 a.m., felt "groggy and half sick," but did not return to bed. On Jan. 27 he felt well, but the temperature varied from 101–102° F. Jan. 28 the temperature was 99.6°. On Jan. 29 the temperature was normal and there were no complaints except that he tired easily. He felt well after Jan. 30.

CASE 2. Complement fixation

Date of specimen	Antigen	1:8	1:16	1:32	1:64	1:128
1-27-48	Endemic typhus.....	0	0	0	0	0
	Rocky Mountain spotted fever.....	1	0	0	0	0
	Q fever.....	3	0	0	0	0
2-6-48	Epidemic typhus.....	3	0	0	0	0
	Rocky Mountain spotted fever.....	tr	0	0	0	0
	Q fever 102 (Henzerling).....	4	4	4	4	4
	Q fever 99 (Henzerling).....	4	4	3	0	0
	Q fever 108 (9 Mile).....	4	4	4	4	4

Animal inoculation. A strain of Q fever rickettsiae was recovered in guinea pigs inoculated with blood obtained on the fourth day of illness. These animals exhibited typical febrile reactions, and complement-fixing antibodies were found in their sera.

CASE 3. V. P., female, 52, frequent visitor to the laboratory offices. On Feb. 13, 1948, there was severe frontal headache and generalized muscular aching, but no fever. Feb. 14, aspirin and codeine were taken at 1 p.m. and 12 p.m. for headache and malaise. Feb. 15, in morning "just felt limp." In the early evening headache and muscular aching recurred, temperature 99.5° F.; Feb. 16, a.m., temperature 99.2°; p.m., temperature 100.5°. Still had muscular aches but no headache. Feb. 17, a.m., temperature 98.6°; p.m., 99.2°, some malaise; 11 p.m. felt better, temperature normal; Feb. 18, temperature normal.

Complement fixation. A blood specimen obtained on Mar. 10 (26 days after onset of illness) gave the following titers: Endemic typhus negative; Rocky Mountain spotted fever 4+ at 1:8; Q fever (9-Mile strain) 4+ at 1:32, 2+ at 1:64; Q fever (Henzerling strain) 4+ at 1:64.

Previous Infections

Studies of Q fever have been carried on more or less continuously at the Rocky Mountain Laboratory since the original isolation of the

Rickettsia from spontaneously infected ticks in the spring of 1935 (6). During the subsequent 13-year period there have been three sporadic cases among the laboratory employees prior to the three reported here: (a) a laboratory assistant in January 1941; (b) a switchboard operator in April 1941; (c) an electrician in March 1942.

Only the first of these three early cases actually worked with the disease. The second worked in the administration building and there was an intervening building between her post of duty and the nearest point where Q fever studies were being made. The duties of the third person were such that he had frequent occasion to visit laboratories where work with Q fever was being done. In each instance the diagnosis was established by positive rickettsial agglutination tests and the recovery of a strain of Q fever rickettsiae in guinea pigs injected with the patient's blood.

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Poliomyelitis in England and Wales in 1947

Additional information regarding the epidemic of poliomyelitis in England and Wales in 1947, based on notifications, has recently been reported by A. H. Gale, D.M., D.P.H., of the British Ministry of Health.¹ Data are given for the total notifications for poliomyelitis and polioencephalitis combined, and some data are included from the Hospital Survey² where comparisons with the national figures seemed desirable.

Incidence rate—The civilian notification rate (7,671 cases) was 18 per 100,000 population. The highest rate previously recorded was 4 per 100,000 population in 1938.

¹ Monthly Bulletin of the Ministry of Health and the Public Health Laboratory Service, **7**: 127-132 (1948).

² *Pub. Health Rep.*, **63**: 397-400 (1948).

Mortality—Of 696 civilian deaths reported, 408 were of males and 288 of females, giving a total death rate of 1.7 per 100,000 population—2.1 for males and 1.3 for females. The respective mortality rates for poliomyelitis in 1938 were 0.6, 0.7, and 0.6.

Age distribution of cases—The following table shows the age distribution of cases for which that information was available.

Notifications			Hospital survey		
Age	Number	Percent	Age	Number	Percent
All ages.....	7, 585	100	All ages.....	4, 717	100
Under 1 year.....	303	4. 0	Under 1 year.....	181	3. 8
1-4.....	2, 088	27. 5	1-4.....	1, 235	26. 2
5-9.....	1, 610	21. 2	5-9.....	1, 658	35. 1
10-14.....	1, 112	14. 7	10-14.....		
15-24.....	1, 218	16. 1	15-24.....	853	18. 1
25-34.....	1, 254	16. 5	25-34.....	525	11. 2
35-44.....			35-44.....	216	4. 6
45 and over.....			45 and over.....	49	1. 0

The close agreement of these figures from two different sources of data would indicate that they probably represent fairly accurately the age of distribution of cases.

Age distribution of deaths—Deaths from poliomyelitis by age were available only for the period July to December 1947 for notifications and from January 1 to October 11 for the Hospital Survey. Of the total of 715 deaths for the entire year, 649 occurred during the period July to December.

Total deaths registered			Hospital survey		
Age	Number	Percent	Age	Number	Percent
All ages.....	649	100	All ages.....	360	100
Under 1 year.....	39	6. 0	Under 1 year.....	10	2. 8
1-4.....	88	13. 6	1-4.....	40	11. 1
5-14.....	149	23. 0	5-14.....	77	21. 4
15-24.....	151	23. 3	15-24.....	88	24. 5
25-34.....	138	21. 3	25-34.....	88	24. 5
35-44.....	60	9. 3	35-44.....	40	11. 1
45 and over.....	24	3. 7	45 and over.....	17	4. 7

The age distribution of mortality from the two sources does not agree so closely as that of notifications; 58 percent of total deaths registered and 65 percent of the fatal hospital cases were of persons over 15 years, whereas only 33 percent of the notifications and 35 percent of the hospital cases were in persons over 15. It was pointed out

in the Hospital Survey report that the disease appeared to become progressively more dangerous as the age of the patient increased.

Form of epidemic wave—On the basis of the weekly notifications the rise began early, about 6 weeks before the usual time of the summer rise in England and Wales, and the incidence remained higher than usual throughout the winter and spring. In the 1938 epidemic a second peak came during the week ended October 22, somewhat later than the smaller second peak in 1947—week ended September 6. In London the form of the curve was somewhat different from that for the country as a whole. There was a relatively rapid rise in the weekly notifications from the beginning of June until the third week in August, followed by an almost equally rapid fall.

Geographical distribution—The disease was widespread, and at least one case was reported in every county. The extreme rates, high and low, were for counties with small populations. The epidemic began in a number of widely separated areas at about the same time. In the early period of the epidemic there was some evidence of concentric spread from these centers. The early distribution gives the impression rather of an endemic disease becoming epidemic than the result of infection by a recently imported strain of virus, but it was stated that this matter requires more detailed examination. It appears that there was no very marked difference between urban and rural incidence; but on the whole the rates in urban districts tended to be a little higher than those either of the county boroughs or of the rural districts. In the years of previous highest incidence, 1926 and 1938, however, the rural districts had the highest rates.

There was little difference between the age distribution of cases in the different aggregates, but there was a suggestion that children under 5 were less liable to attack in Greater London and in the rural districts than in the county boroughs and urban districts. A preliminary examination of the figures for different quarters for the country as a whole suggests that there was no marked change in the age distribution as the epidemic progressed.

The principal points of interest in the 1947 epidemic in England and Wales are:

1. Its size. The epidemic was about four and a half times greater than any previous experience. The death rate was about three times that of 1938. Case fatality was 9 percent in 1947 and 16 percent in 1938, but one is cautioned with respect to comparisons of these rates.

2. Its widespread distribution.

3. The relatively high age distribution of cases and deaths, a feature stated to have marked recent epidemics in civilized countries.

INCIDENCE OF DISEASE

No health department, State or local, can effectively prevent or control disease without knowledge of when, where, and under what conditions cases are occurring

UNITED STATES

REPORTS FROM STATES FOR WEEK ENDED SEPTEMBER 25, 1948

Summary

The incidence of poliomyelitis decreased from 1,840 cases reported last week to 1,608 for the current week, as compared with 1,425 for the corresponding week of 1946 and a 5-year (1943-47) median of 881 (reported last year). Of 30 States reporting currently 10 or more cases (last week 35 States), 9 showed a total increase of 39 cases (459 to 498), while 19 reported a decline (1,246 to 1,006), and 2 (Kentucky and Alabama) reported 11 and 13 cases, respectively, for each week. The 20 States reporting more than 14 cases currently are as follows (last week's figures in parentheses): *Increases*—New Jersey 81 (71), Minnesota 116 (115), Iowa 91 (90), Missouri 31 (28), North Carolina 86 (76), Texas 48 (42), Washington 21 (19); *decreases*—New York 104 (115), Pennsylvania 68 (74), Ohio 58 (149), Indiana 25 (42), Illinois 94 (99), Michigan 64 (71), Wisconsin 40 (46), South Dakota 23 (55), Nebraska 58 (60), Kansas 26 (32), Virginia 39 (41), Tennessee 22 (38), California 310 (326).

Since March 20 (average date of seasonal low incidence) a total of 17,302 cases has been reported (5,886 last year, 16,739 in 1946, 5-year median 8,485), distributed by geographic groups as follows (corresponding figures for 1946 in parentheses); New England 291 (376), Middle Atlantic 1,888 (1,115), East North Central 2,583 (3,676), West North Central 2,593 (5,218), South Atlantic 3,591 (884), East South Central 733 (781), West South Central 1,949 (1,590), Mountain 472 (1,288), Pacific 3,203 (1,811).

One case of smallpox was reported, in Mississippi, and 1 case of psittacosis, in Oregon, in a California resident.

A total of 8,029 deaths was recorded during the week in 93 large cities in the United States, as compared with 8,179 last week, 8,173 and 8,186, respectively, for the corresponding weeks of 1947 and 1946, and 8,186 for the 3-year (1945-47) median. The total for the year to date is 360,363, as compared with 359,238 for the corresponding period last year. Infant deaths for the week totaled 643, as compared with 607 last week and a 3-year median of 649. The cumulative figure is 26,024, as compared with 28,987 for the same period last year.

Telegraphic case reports from State health officers for week ended September 25, 1948

(Leaders indicate that no cases were reported)

Division and State	Diphtheria	Encephalitis, infectious	Influenza	Measles	Meningitis, meningococcal	Pneumonia	Polio-myelitis	Rocky Mt. spotted fever	Scarlet fever	Small-pox	Tularemia	Typhoid and paratyphoid fever a	Whooping cough	Rabies in animals
NEW ENGLAND														
Maine.....	1			41		3	2		4				7	
New Hampshire.....				6			2		1					
Vermont.....				7			2							
Massachusetts.....	7			31	1	7	11		29			1	58	
Rhode Island.....		1		3			3		1				3	
Connecticut.....			1	3		21	6		2				11	
MIDDLE ATLANTIC														
New York.....	5		b 2	62	4	104	104		29			3	101	5
New Jersey.....			1	15		34	81		8			2	54	
Pennsylvania.....	5	1	(b)	31	1		68		39			5	80	4
EAST NORTH CENTRAL														
Ohio.....	5		2	9	1	28	58		45			6	41	8
Indiana.....	6	2	1	1		3	3		16			2	27	10
Illinois.....		4	10	8		55	64	1	35			2	33	2
Michigan *.....	4	1	2	48	2	47	64		41			3	33	3
Wisconsin.....	1		1	48	1	4	40		3				22	
WEST NORTH CENTRAL														
Minnesota.....				2	1	6	116		14			2	7	1
Iowa.....	2	6		2	4		191		8				2	1
Missouri.....				4	4	9	31		12			4	16	
North Dakota.....	2	1		23	2		9		4				6	
South Dakota.....				2			23		1					
Nebraska.....	1		2	1			58		6				3	
Kansas.....	4	3		10		4	26	2	14			5	8	
SOUTH ATLANTIC														
Delaware.....				15		18	2		14			2	1	
Maryland.....	2			6		10	16	1	14				16	
District of Columbia.....				17		28	39		15				2	
Virginia.....	9		212	17			5	1	11			5	13	5
West Virginia.....	1		8				5		10			2	4	7
North Carolina.....	12			1	2		186	2	12			4	12	
South Carolina.....	25		174	5		64	14		3			2	40	
Georgia.....	13		12	6	1	6	10	1	15			1	4	3
Florida.....	1			1	1	2	6						10	

DEATHS DURING WEEK ENDED SEPT. 18, 1948

[From the Weekly Mortality Index, issued by the National Office of Vital Statistics]

	Week ended Sept. 18, 1948	Correspond- ing week, 1947
Data for 93 large cities of the United States:		
Total deaths	8, 179	8, 269
Median for 3 prior years	8, 246	
Total deaths, first 38 weeks of year	352, 334	351, 065
Deaths under 1 year of age	605	743
Median for 3 prior years	701	
Deaths under 1 year of age, first 38 weeks of year	25, 380	28, 340
Data from industrial insurance companies:		
Policies in force	70, 883, 745	67, 141, 685
Number of death claims	12, 808	10, 939
Death claims per 1,000 policies in force, annual rate	9. 4	8. 5
Death claims per 1,000 policies, first 38 weeks of year, annual rate	9. 4	9. 3

TERRITORIES AND POSSESSIONS

Panama Canal Zone

Notifiable diseases—July 1948.—During the month of July 1948, certain notifiable diseases were reported in the Panama Canal Zone and terminal cities as follows:

Disease	Residence ¹									
	Panama City		Colon		Canal Zone		Outside the zone and terminal cities		Total	
	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths
Chickenpox	12				4		3		19	
Dengue							² 1		² 1	
Diphtheria	7				1		3		11	
Dysentery:										
Amebic	1						1		2	
Bacillary			2		1		1		4	
Hepatitis, infectious					2		1		3	
Influenza		1								1
Malaria ³	4		5		23		26	1	58	1
Measles	2				2		14		18	
Meningitis, meningococcus	1	1	2		3				6	1
Mumps							9		9	
Paratyphoid fever					1				1	
Pneumonia		8			26			4	⁴ 26	12
Relapsing fever							2		2	
Tetanus							1		1	
Tuberculosis		12		3	6	2		7	4	24
Typhoid fever							1		1	
Whooping cough					3				4	3

¹ If place of infection is known, cases are so listed instead of by residence.

² Reported as "Dengue and dengue-like fevers."

³ 2 recurrent cases.

⁴ Reported in the Canal Zone only.

FOREIGN REPORTS

CANADA

Provinces—Communicable diseases—Week ended September 4, 1948.—During the week ended September 4, 1948, cases of certain communicable diseases were reported by the Dominion Bureau of Statistics of Canada as follows:

Disease	Prince Edward Island	Nova Scotia	New Brunswick	Quebec	Ontario	Manitoba	Saskatchewan	Alberta	British Columbia	Total
Chickenpox.....		10		31	41	13	27	8	32	162
Diphtheria.....		1		7		1		2		11
Dysentery, bacillary.....				1		6				7
Encephalitis, infectious.....						1				1
German measles.....				5	7	1	1	5	10	29
Influenza.....		32				3				35
Measles.....			27	52	51	20	10	10	15	185
Mumps.....				13	19	26	19	8	10	95
Poliomyelitis.....		2	2	1	26	15	4	36	5	91
Scarlet fever.....				11	10	1	1	2	1	26
Tuberculosis (all forms).....		4	3	64	18	31	6		42	168
Typhoid and paratyphoid fever.....			1	2	2		8		4	17
Undulant fever.....					2		1	4	4	11
Veneral diseases:										
Gonorrhoea.....		19		75	87	36	19	28	38	302
Syphilis.....		18	1	65	34	8		7	9	142
Whooping cough.....		15		81	11	10	4	5		126

NOTE.—No report was received from Prince Edward Island for the above period.

FINLAND

Notifiable diseases—July 1948.—During the month of July 1948, cases of certain notifiable diseases were reported in Finland as follows:

Disease	Cases	Disease	Cases
Cerebrospinal meningitis.....	10	Paratyphoid fever.....	98
Diphtheria.....	146	Poliomyelitis.....	4
Dysentery.....	10	Scarlet fever.....	185
Gonorrhoea.....	1,157	Syphilis.....	214
Malaria.....	15	Typhoid fever.....	22

JAMAICA

Notifiable diseases—4 weeks ended August 28, 1948.—For the 4 weeks ended August 28, 1948, cases of certain notifiable diseases were reported in Kingston, Jamaica, and in the island outside of Kingston, as follows:

Disease	Kingston	Other localities	Disease	Kingston	Other localities
Cerebrospinal meningitis.....	1	1	Erysipelas.....	1	1
Chickenpox.....	2	6	Tuberculosis (pulmonary).....	50	52
Diphtheria.....	1		Typhoid fever.....	5	78
Dysentery, unspecified.....	1		Typhus fever (murine).....	4	1

STRAITS SETTLEMENTS

Singapore—Poliomyelitis.—Information dated September 3, 1948, states that only one case of poliomyelitis was reported in Singapore during the week ended August 28, and that the total reported for the period April 17–August 28 is 128 cases with 20 deaths.

REPORTS OF CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER RECEIVED DURING THE CURRENT WEEK

NOTE.—Except in cases of unusual incidence, only those places are included which had not previously reported any of the above-mentioned diseases, except yellow fever, during recent months. All reports of yellow fever are published currently.

A table showing the accumulated figures for these diseases for the year to date is published in the PUBLIC HEALTH REPORTS for the last Friday in each month.

Cholera

India.—Cholera has been reported in India as follows: In Jodhpur, for the week ended September 18, 1948, 50 cases (imported); in Madras, for the week ended September 11, 1948, 31 cases with 4 deaths, and for the week ended September 18, 35 cases.

India (Portuguese).—For the week ended August 21, 1948, 16 cases of cholera with 4 deaths were reported in Portuguese India.

Indochina (French)—Annam State.—For the week ended September 11, 1948, 6 fatal cases of cholera were reported in the State of Annam, French Indochina.

Plague

Burma.—During the week ended September 4, 1948, 27 cases of plague with 20 deaths were reported in Burma.

Ecuador—Loja Province.—During the period August 1–15, 1948, plague was reported in Celica Canton, Loja Province, Ecuador, as follows: In Rota 1 case, 1 death; in Quillusaro 1 case, 1 death; in Sauce 1 case.

Smallpox

British East Africa—Nyasaland.—For the week ended September 4, 1948, 112 cases of smallpox with 10 deaths were reported in Nyasaland, British East Africa, including 52 cases, 7 deaths in Blantyre.

Gold Coast.—During the week ended September 4, 1948, 65 cases of smallpox with 30 deaths were reported in the Gold Coast, and 68 cases with 4 deaths were reported for the week ended September 11.

Nigeria.—Degema Abonnema.—During the week ended July 3, 1948, 3 cases of smallpox with 1 death were reported in Degema Abonnema, Nigeria.

Syria—Lattakieh.—For the week ended August 21, 1948, 6 cases of smallpox were reported in Lattakieh, Syria.