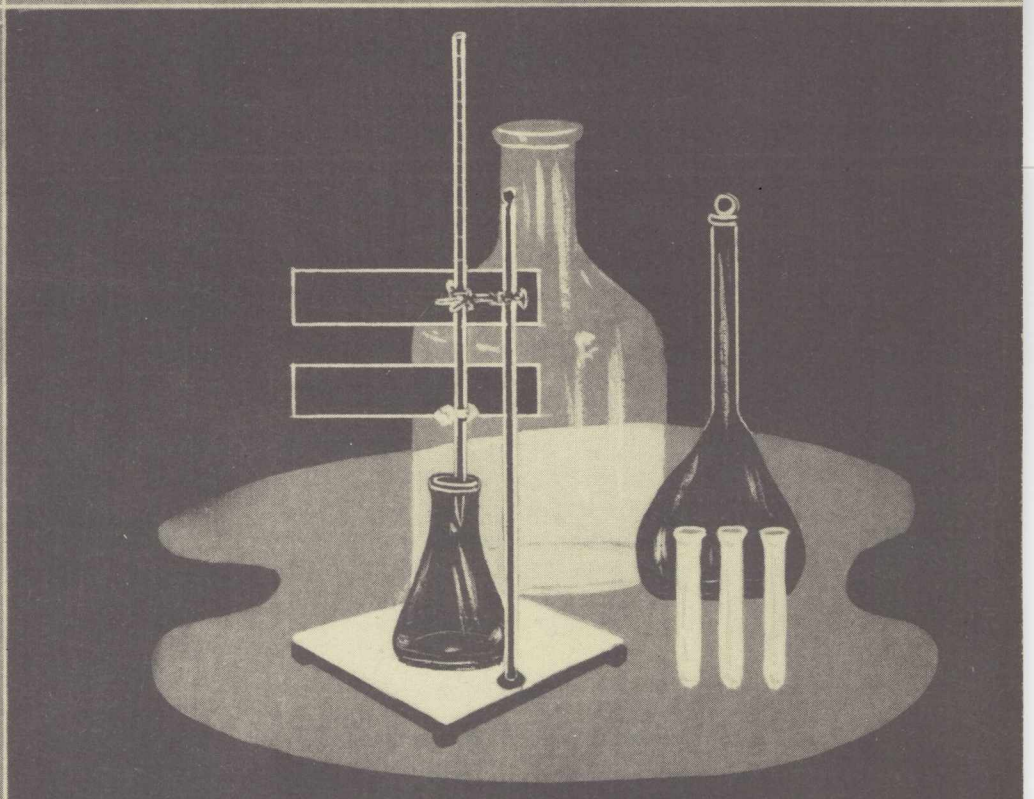
CDC JANUARY - 1951 BULLETIN

IMPROVE TECHNIQUES

INSURE QUALITY



The Public Health Laboratory of the Future

DEVELOP NEW TECHNIQUES

FEDERAL SECURITY AGENCY
Public Health Service
Communicable Disease Center
Atlanta, Ga.

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THE PUBLIC HEALTH LABORATORY OF THE FUTURE*

R. A. VONDERLEHR, Medical Director**

In uncertain times such as these, it is hazardous to predict events even in the near future. To foretell happenings 10 to 20 years hence is even more dangerous. In spite of political changes, however, the human race is certain to require public health services and medical attention, and there is no doubt that public health laboratories will play a great role in providing them.

LABORATORY TESTS CURRENTLY PERFORMED

There is considerable variance in the number and types of laboratory tests performed in health department laboratories. In general, including the activities of the laboratories in the larger States, these may be classified as being in the fields of microbiology including serology, in virology, hematology, and metabolic studies.

The first of these groups embraces tests more commonly performed in health laboratories today. Microbiology, with bacteriology, parasitology, and mycology, is one of the most important of present-day laboratory functions. Numerically, serology is still the leading activity because of the continuing preponderance of serologic tests for syphilis. Virology is an expensive new service that has developed in public health laboratories within the past few years. Hematology, with its morphologic examinations and tests relating to the proper administration of blood banks, is an important field for the future. And no one is now able to foretell the place that metabolic studies, including tests relating to endocrinology and toxicology, will take in the public health laboratory of the future. Indeed, biochemical studies incorporated in multiphase surveys are being done in larger numbers day by day.

Advances in public health practice have eliminated many of the communicable diseases for which extensive public health laboratory work was required in the past. The advent of antibiotics has eliminated the need for extensive bacteriologic study in many cases. This is particularly true in the pneumonias, in gonorrhea, and with certain septicemias where routine blood cultures formerly were done. These advances promise to reduce the need for diagnostic bacteriologic tests to a very few highly standardized and much improved procedures.

The group of viral and rickettsial diseases seems to present an increasing laboratory problem. Unless control methods not now known are developed against this group of diseases, the public health laboratories will be called on more and more to provide diagnostic techniques for their recognition. Because of the great expense of virologic studies at present, considerable effort will be directed toward the development of more rapid, simplified, reliable, and less expensive virus tests. Until such advances are attained, the cost of virologic work will limit these examinations to the more populous States, and to the Federal Government.

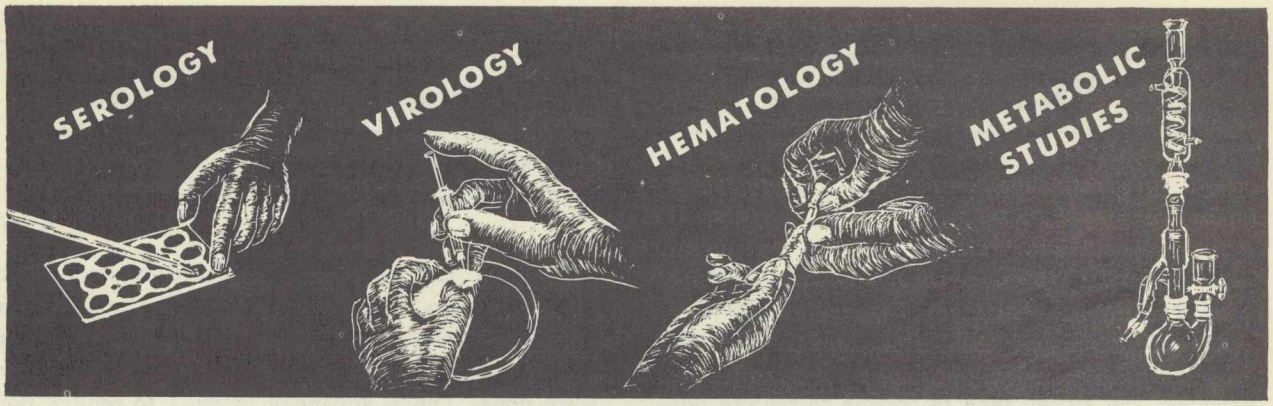
FUTURE RESPONSIBILITIES

Discussions of future responsibilities of the public health laboratory would be incomplete without reference to the possibility that the nuclear fission phenomenon may be adapted to diagnostic tests of the future. At the present time the application of radiation in medicine and public health seems more promising in the research field and in control of neoplastic diseases. Yet, one would be foolish indeed to forecast the limitation of nuclear fission to these fields alone. Valuable laboratory tests likely will be evolved from this new and interesting development.

Those of us who have watched the evolution of the public health laboratory remember well the comparatively inactive days of 15 or 20 years ago. Overnight the promotion of the use of serologic tests for syphilis increased many times the total

*Abstracted from a Presentation before the Conference of State and Provincial Public Health Laboratory Directors, St. Louis, Mo., October 29, 1950.

**In charge, CDC.



load the public health laboratory was carrying. Indeed, the expansion of the entire health program in the last decade and a half has greatly enhanced the position of the public health laboratory. Today, one specimen is submitted each year to a public health laboratory for each 11 people in the United States, and one laboratory test is performed on these specimens for each 7 people in this country. If medical care programs of one kind and another continue to expand, as seems likely, with the tendency toward utilization of multiphase surveys on an ever-increasing scale, and with the expansion of geriatrics, it is reasonable to expect that the next generation may see performance of at least one laboratory test annually, on an average, for each person in the population.

ESTIMATED GROWTH BASED ON VALUE, ACCURACY OF TESTS

This estimated growth of public health laboratory capacity is based upon the assumption that the value and accuracy of laboratory tests will be maintained or even advanced. There is increasing evidence of gross inaccuracy in the work of some laboratories. The story of the improvement in performance of serologic tests for syphilis in the United States is well known. The same degree of reliability has not been proved in the performance of tests for other diseases. In too many laboratories a feeling exists that a given test is specific, is accurate, and is technically efficient, even though nothing is known of the actual ability of the laboratory and its personnel. Blind belief on the part of some that their laboratory work is infallible indicates great need for such facile humility as was shown by the late Dr. Foster M. Johns of New Orleans, La. In the first evaluation studies of serologic tests for syphilis in the United States, this physician participated with his own modification of the complement fixation test. At the conclusion of the study it was proved that the Johns test was one of two least specific tests evaluated, the other being a presumptive flocculation test. The Johns test also was one of the three lowest tests in sensitivity. Faced with these facts, Dr. Johns publicly admitted the inefficiency of the test and advised all of his colleagues not to use it.

No one can foretell the efficiency of a given test or the performance of a given laboratory unless they are subjected to the most rigid scrutiny. In the Communicable Disease Center during the past year, an evaluation program was set up to determine the relative proficiency of State and Territorial laboratories in the detection of *Endamoeba histolytica* and other intestinal parasites. Forty-two laboratories took part in the evaluation and their performances were controlled by three parasitologists designated by the American Society of Tropical Medicine. When the study began it was hoped that the tests would be performed more accurately than actually has proved to be the case. The reports are now being rechecked before they are published without revealing laboratory identities. Tentative analyses show that there is sufficient variance among the different laboratories to cause doubt as to whether the examination for *E. histolytica* by some laboratories is an aid or a handicap in the detection of the parasite. Indeed, there were 12 specimens of the 110 specimens distributed that were excluded from the evaluation since the referee parasitologists could not agree on the presence or absence of *E. histolytica*. From the foregoing, it would seem that in addition to the question of the ability of the technician to recognize intestinal parasites, there must be fundamental deficiencies in the tests which are used to recover the organisms for identification.

Other evaluation studies of laboratory tests have been conducted but they have been more limited in scope. Dr. E. S. Robinson, a former chairman of the Conference of State and Provincial Public Health Laboratory Directors, made a study on a State-wide basis of the performance of laboratory tests other than syphilis more than a decade ago. Massachusetts has been one of the States that has pioneered in this work. Maryland, Michigan, and New York are others that have made intrastate explorations in this field. The Army of the United States has also conducted evaluation studies, one recently being reported for 14 Army and Air Force laboratories in the Third Army area.* Practically all of these studies show marked discrepancy in test performance by the average laboratory.

NEED FOR IMPROVEMENT IN QUALITY OF TESTS

There is urgent need for sustained, well organized, and intelligent action aimed at improvement in the quality of performance of laboratory tests in the United States. This need has been recognized by the State and Territorial health officers. At the Forty-eighth Annual Conference of State and Territorial Health Officers with the Surgeon General of the Public Health Service, the Communicable Disease Center was requested formally to undertake the evaluation of performance of laboratory procedures other than, and in addition to, the serologic evaluation of tests for syphilis, which that Conference also requested in December 1946. The recent transfer of the Venereal Disease Research Laboratory to the Communicable Disease Center makes available a wealth of experience in laboratory test evaluation, and we are preparing to offer to all State laboratories, on a volunteer basis, the opportunity to study performance efficiency of all laboratory tests for which evaluation methods seem applicable.

CDC IMPROVEMENT PLAN

The Communicable Disease Center plan to improve qualitatively the performance of laboratory tests is substantially the following:

(1) Select and retain only qualified and competent personnel for service in the public health laboratory.

(2) Supplement the experience of capable laboratory personnel by encouraging and organizing:

(a) Formal postgraduate training in appropriate institutions of learning:

(b) Periodic refresher type courses either at headquarters laboratory or in the field;

(c) Laboratory extension and reference service, including detailed consultation on request.

(3) For all State laboratories, establish a periodic evaluation study for each type of laboratory test employed.

(a) In this study, a statistically significant number of specimens will be collected from people known to be free from, and from people known to be suffering with, the specific disease for which the test being investigated is designed.

(b) Some specimens should be taken from persons known to be ill with diseases other than the specific one for which the test under investigation is devised.

(c) Specimens collected and shipped under identical conditions will be in sufficient amount to divide into comparable samples for all participating and control laboratories, but the source of the specimens will not be made known.

(d) If possible, control tests will be performed by the originator of the test under investigation. If the originator is not available, then the control tests will be performed by one or more referees previously agreed upon.

(e) The final evaluation of the test, including the interpretation of statistical data, will be the responsibility of an unbiased and professionally competent group of at least three scientific persons.

(4) A similar intrastate evaluation study should be performed at regular intervals by all local and private laboratories for each specific test performed in such laboratories. The State health department laboratory should direct and be responsible for these intrastate investigations.

FUNCTIONS OF LOCAL, PRIVATE LABORATORIES

In viewing the parts that the Public Health Service and the State laboratories respectively

*Shuey and Cebel: Standards of Performance in Clinical Laboratory Diagnosis, Bulletin of U. S. Army Medical Dept., Washington, D. C., 9:10, 799 (1949).

will play in the provision of public health laboratory services in the future, one should also take into consideration the functions of local public and private laboratories, including State branch laboratories.

Local laboratories constitute the work centers of the national laboratory system. It is in them that all simple, routine, well-established tests should be performed. The State laboratory should be the guardian of this group, should determine the efficiency of their work, and provide consultation for the solution of most common problems. The State not only should encourage these laboratories scientifically, but should provide subsidies in order that laboratory work may be available for persons unable to meet the cost of private laboratory service.

In addition to the above functions, the State laboratory has a responsibility for other aid at the State level that the Communicable Disease Center shares at the interstate or Federal level. It should be responsible in the future for the uniformity and accuracy of laboratory techniques at the local level. It should perform the more difficult, costly, and unusual tests requested at the local level. In addition, the State should provide a reasonably complete intrastate reference service.

The primary function of the Federal Government, acting through the Communicable Disease Center, is that of furnishing consultation to State laboratories and, upon request of the latter, to public and private local laboratories. This broad consultative service should extend to several fields. It should contemplate the development and periodic utilization of methods to insure the quality of laboratory test performance as described above. It should launch a program of methodology research to improve existing techniques and to develop new ones. It should serve as a national reference diagnostic center for the latest information on the examination of difficult and unusual laboratory specimens submitted from State laboratories, and provide also for the performance of more expensive and difficult laboratory tests when requested by State laboratories.

The public health laboratory will continue in the next generation to be one of the most important services offered by the health department. Its individual reports may too frequently be given an inerrant interpretation by the clinician in spite of all reasonable efforts to discourage this practice. The fallibility of laboratory tests must be continually emphasized, yet the State health departments and the U. S. Public Health Service should take every possible step to insure the quality and optimum efficiency of laboratory work.

The provision of competent laboratory service for this Nation in the future is one of the greatest tasks facing organized public health. It will require ample financial support. It will require real team work in a well organized laboratory. And to cover the Nation adequately, it will require a complete and operable liaison of local, State and Federal laboratories.

LEPROSY CONTROL PROGRAM

L. F. BADGER, Medical Director*

HISTORY

Leprosy (Hansen's disease) is one of the oldest diseases known to man. Historians have conceded that the disease was known to the ancient Chinese, Indians, and Egyptians; however, its origin has been lost in antiquity.

Reliable evidence as to when the disease made its first appearance in what is now continental United States is lacking. The earliest available reference to the disease has been found in Romans' *Concise Natural History of East and West Florida* published in 1776, in which reference is made to the occurrence of leprosy in the province as early as 1758. By 1766 the disease had become sufficiently prevalent to cause the Spanish Governor to establish a hospital near the mouth of the Mississippi River for the care of individuals afflicted with the disease..

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From this evidence it may be assumed that Hansen's disease has existed in the United States for 200 or more years. Early cases were introduced principally from Europe and Africa, and later from Asia. However, following the acquisition by the United States of extraterritorial possessions in the Carribean and Pacific, more and more cases have been introduced.

IMPORTED CASES

The majority of the imported cases which have appeared in the Atlantic Coast States entered from Europe, Africa, and the West Indies; in the Gulf States, from Africa, the West Indies, and Mexico; in the West Coast States, from Mexico, the islands of the Pacific, and Asia; and in the North Central States, from Norway. The comparatively few imported cases which have occurred in other sections have entered the United States from various countries.

It must not be assumed that, in each instance, the individual of foreign birth contracted the disease in his native country. It is quite likely that in some instances the disease was contracted from an infected associate after arrival in the United States.

Also, it must be recognized that in some instances the disease may have been contracted in countries other than those of birth. Occasionally an individual has left his native country to live for a time, before entering the United States, in a country in which the disease is endemic.

The number of cases of Hansen's disease imported into the country cannot be determined; but an idea as to the number imported during recent years can be obtained from the records of the National Leprosarium at Carville, La., which was established in 1921. These records contain information only on those imported cases which have been admitted to that institution. Many imported cases have not been admitted.

In addition to these cases which have occurred in foreign-born individuals, cases of Hansen's disease have been noted in persons born in the United States but who contracted the disease outside the country – missionaries, members of the military, and others.

It is thus evident that, over a period of years, a rather large number of cases of Hansen's disease, contracted abroad, have occurred in the United States. Yet, in spite of this large importation, the disease has become established in but four sections of the country to such an extent that it has been considered as endemic in those sections.

INCIDENCE IN UNITED STATES

The extent of the incidence of leprosy at present in the United States is difficult to determine since many cases are not recognized; many recognized cases are not reported; and no country-wide case-finding program has been conducted. Again, we must refer to the records of the National Leprosarium and base any estimate as to the number of cases at present in the country on the number of admissions to that institution during the approximately 30 years that it has been in operation. These admissions are shown in table 1.

It will be noted that a majority – 70.8 percent – of the cases occurring in foreign-born individuals were admitted from the three States of California, New York, and Texas. Of a total of 593 cases occurring in foreign-born individuals, 33.5 percent was in individuals born in Mexico.

Of the 770 American-born individuals admitted to Carville, 650 – 84.4 percent – were admitted from the four States of California, Florida, Louisiana, and Texas. Of those admitted from these four States, 573 – 88.1 percent – were natives of those States. In addition to those admitted from the four States, 62 additional cases, born in those four States, were admitted from other States. Thus 712 – 92.4 percent – of all the cases occurring in American-born admitted to the National Leprosarium, were either born in one of the four States or admitted from one of them. However, it must be recognized that some of these cases, although born in or admitted from one of the four States, contracted the infection from sources of infection outside these States.

With approximately 1,400 cases admitted since 1921, and many cases not admitted, one must recognize that the disease is a public health problem in the United States, particularly in limited areas. One must also recognize the importance of the disease as it relates to the patient and his family.

The current trend of the disease in the country is not known but available evidence suggests that, with the exception of one or two areas, it is downward. It has been felt by those interested in the problem that the apparent downward trend could be accelerated by a well-organized and active control program and that such a program, conducted for

Table 1

ADMISSIONS TO THE NATIONAL LEPROSARIUM*

States from which Admitted	Cases in Foreign-Born	Case in American-Born	Total	States from which Admitted	Cases in Foreign-Born	Cases in American-Born	Total
Alabama	–	2	2	Nevada	–	–	–
Arizona	3	4	7	New Hampshire	–	–	–
Arkansas	–	5	5	New Jersey	6	–	6
California	217	44	261	New Mexico	1	1	2
Colorado	9	4	13	New York	131	17	148
Connecticut	–	–	–	North Carolina	1	1	2
Delaware	–	–	–	North Dakota	1	1	2
District of Columbia	1	6	7	Ohio	5	3	8
Florida	12	82	94	Oklahoma	–	4	4
Georgia	1	6	7	Oregon	4	2	6
Idaho	–	–	–	Pennsylvania	9	2	11
Illinois	22	11	33	Rhode Island	1	–	1
Indiana	3	1	4	South Carolina	–	5	5
Iowa	–	–	–	South Dakota	2	–	2
Kansas	2	3	5	Tennessee	–	3	3
Kentucky	1	1	2	Texas	72	213	285
Louisiana	20	311	331	Utah	–	–	–
Maine	–	–	–	Vermont	–	–	–
Maryland	4	4	8	Virginia	4	1	5
Massachusetts	20	2	22	Washington	9	3	12
Michigan	14	–	14	West Virginia	2	–	2
Minnesota	3	2	5	Wisconsin	2	3	5
Mississippi	3	13	16	Wyoming	1	–	1
Missouri	5	7	12				
Montana	1	2	3	**Total**	593	770	1,363
Nebraska	1	1	2	**Percent**	43.5	56.4	99.9

*Through August, 1950.

a sufficient period of years, would lead ultimately to near-eradication.

CONTROL PROGRAM

There never has been conducted in the United States a well-organized leprosy control program; and, until recently, no attempt had been made to inaugurate a program on a scale extensive enough to cause hope for desired results.

Leprosy is a communicable disease transmitted by contact from infectious cases to well individuals. A control program must be directed toward the prevention of such contact. The prevention of such contact is dependent upon an intensive program of case finding and the protection of well persons from infectious cases of the disease which serve as sources of infection. These measures of control are identical with those of a tuberculosis control program and are not peculiar to Hansen's disease.

The first step in a leprosy control program is, therefore, that of case finding. The object of a case-finding program is not only that of finding the cases, but of finding them early. When detected early, many cases are bacteriologically negative with very slight clinical manifestations. Treatment at this stage may prevent such cases from becoming bacteriologically positive and progressing clinically. Other cases detected early may be bacteriologically positive and yet have but slight clinical manifestations. Treatment of these cases may cause a remission from positive to negative and arrest of clinical activity.

It is believed that, if such a program of early

case finding and early treatment had been conducted in the past in certain areas of the country, it would not have been necessary for some of the patients now at Carville to be admitted to that institution.

The objects of a case-finding program are: (1) identification of possible sources of infection, (2) early detection, and (3) early treatment. For such a program to be productive, thorough cooperation must be established among the health authorities, the practicing physicians, and the patients at Carville and members of their families. The cooperation of the patients and their families is most important. By withholding information, they may be indirectly responsible for a case progressing to such an extent that it is sent to Carville. By cooperation they may be responsible for getting a patient under treatment early and preventing the disease from progressing. Early diagnosis and early treatment are important in the control of leprosy.

The second step in a leprosy control program is the prevention of the contact of well persons with open (bacteriologically positive) cases. Such contact can be prevented by (1) isolation of all open cases, (2) follow-up of arrested and negative cases for early detection of reversion from negative to positive bacteriologically, (3) treatment of arrested cases; such treatment may prevent reactivation, and (4) follow-up of doubtful cases for early detection of definite signs that may appear.

Treatment may be considered the third step in a control program. The importance of treatment has increased since the use of the sulfone drugs which are the most efficient therapeutic agent at present available. In addition to active open cases, closed and arrested cases should be treated. Numerous cases have become bacteriologically negative or clinically arrested under the accepted methods of treatment; however, a number of these cases have later reactivated. Continuation of treatment while the disease is arrested may prevent reactivation.

Current control measures are influenced by the accepted beliefs relative to the epidemiology of leprosy, and some of those accepted beliefs appear to be hypotheses not based on unquestionable proof. A control program should include investigations which might lead to better knowledge of the epidemiological factors of the disease.

Laboratory investigations, which might lead to diagnostic, immunologic, and therapeutic measures, also are considered as part of an organized control program.

A limited control program has been activated in three of the States in which definite leprosy problems exist and has been organized on a cooperative basis with the State boards of health, the Public Health Service, and the Leonard Wood Memorial.

During 1950, a survey was made in Florida to determine the extent of the problem in that State. The survey was conducted by a commissioned officer of the Service, trained in leprosy, who was detailed by the Communicable Disease Center to the Florida State Board of Health for that purpose.

In October 1949 a physician of the Leonard Wood Memorial, a special consultant of CDC, was assigned to the State Board of Health of Texas for the purpose of supervising control activities and epidemiological investigations in that State.

A Public Health nurse, trained in leprosy, was detailed by CDC to the Louisiana State Board of Health in August 1948 to assist in the leprosy activities of that State. During the previous year this nurse had been detailed to Louisiana by the Hospital Division of Public Health Service. In addition to this nurse, CDC recently detailed an officer of the Service, experienced in leprosy, to the State to supervise the leprosy activities within the State.

THE ROLE OF THE LOCAL PUBLIC HEALTH NURSE IN HANSEN'S DISEASE CONTROL

L. DOROTHY CARROLL, Senior Nurse Officer*

The role that local public health nurses will play in Hansen's disease control programs will depend on a variety of factors. These include the extent of the problem in the area, the health department's control program, and the attitude of the entire health department staff toward the disease. The history of handling recognized cases in the local area, local facilities for diagnosis, care and follow-up, and the interest and attitudes of local private physicians will also be important factors. The degree of the professional staff's understanding of the various ramifications of the disease – particularly the impact the diagnosis will have on the patient, the family, and the community – will play an important part in determining the nurses' functions and effectiveness.

The local public health nurse may do much or little toward an understanding of the epidemiology of the disease in the area, and if the disease is endemic, toward its eventual eradication. She can function at her highest level only if she is a well-informed member of a well-informed community team which has definite, clear-cut objectives and an understanding of the role each team member plays in working toward these objectives.

Nursing responsibilities in a Hansen's disease control program are no different from those in any other communicable disease control program. They include case finding, epidemiologic investigation, nursing care, and education. To carry out her functions effectively, the public health nurse must have a working knowledge of the epidemiology and clinical manifestations of the disease, the period of communicability, currently accepted treatment, and the State and local regulations pertaining to control. Intimate knowledge of local, State, and Federal resources for the care of Hansen's disease patients is necessary. A real understanding of what the disease may mean psychologically, economically, and socially to the patient and his family, and an understanding of her own emotional attitude toward the disease are essential for the nurse to function effectively in a control program.

A public health nurse working in a local area where Hansen's disease is an endemic problem should be Hansen's disease conscious. Knowing what to suspect and how to confirm her suspicions are her major responsibilities prior to the establishment of a diagnosis of Hansen's disease. Every suspicious case should be carefully followed until the disease is definitely ruled out or definitely diagnosed. A patient with a history of suggestive symptoms and/or lesions should receive a medical examination and supervision. If the patient does not have his own physician, the health officer should be consulted as to whether or not the examination should be carried out in any one of the routine health department clinics or whether the patient should be referred to a special clinic set up for this purpose.

In planning clinic sessions and the attendance of the patient at a clinic, two principles should always be kept in mind: (1) That the patient is a person with a potentially serious problem who may or may not understand the implications of a diagnosis of Hansen's disease. (2) That the management of the first examination he receives may determine whether or not he remains under supervision, and if a diagnosis is established whether he and his family accept and carry out the physician's recommendations.

Preparation of the patient for examination will help him to participate in a positive way and may determine to a large extent his "cooperativeness" in future contacts. Provision should be made for privacy in the dressing room, the examining room, and during the patient-physician interview. The patient should completely undress and be adequately draped. An examination table placed in good light is essential. The nurse should understand that an adequate examination includes nose and throat examination, a complete physical inspection of all skin areas for lesions, bacteriological

*Executive Office.

examination of any suspicious lesions, and a neurological examination. The physician should be provided with the necessary equipment. Before the patient leaves the clinic, he should have an opportunity to talk over his condition with either the physician or the nurse. At this time arrangements should be made for the next follow-up examination, if indicated.

If the patient is to return for future diagnostic examinations, it would seem important for the public health nurse to become better acquainted with his family and his home situation. If it seems indicated, she should start to build a sound working relationship with the family in whatever way seems desirable. This may well take the form of helping the family solve other health, social, or economic problems by referring them to the agency set up for this purpose in the community.

Hansen's disease has been described by Dr. Fite (1) as a "fiercely chronic disease." Until the factors influencing transmission are determined, isolation of the patient with active disease, and concurrent disinfection, are the safest measures for control.

If the presence of active disease is established, it usually means that the right to maintain active control in planning one's life is taken away. Treatment generally requires a long period of isolation, usually many miles from the patient's home and family. No specific permanent cure has been developed, although new chemotherapeutic agents, the sulphones, show promising results in arresting the disease and in eliminating complications and intercurrent infections (2). Regulations regarding quarantine restrict activity and cause frustration and resentment.

The disease is dreaded, and fear, expressed or concealed, seems to be a universal concomitant. When active disease is discovered, the understanding and support the patient is given at the time he is advised of his diagnosis are extremely important factors in determining the frame of mind he develops. Future problems may be avoided if time is taken to explain to him the nature of the illness, the treatment plan as it applies to his individual circumstances, and the help available to him in dealing with his problems.

The nurse may play an important part in helping the patient and his family in their psychological and emotional acceptance of the disease and its

Occupational therapy is used at Carville National Leprosarium to help prevent a feeling of idleness and frustration among the patients during their confinement.

Photo courtesy of U. S. Marine Hospital, Carville, La.

treatment. What she tells the patient and her attitude toward the patient as a person may play a big part, not only in his acceptance of his illness and the long indefinite period of separation, but also in his attitude toward other professional individuals who will work with him in the future. The patient's ability to accept and adjust to the disease will depend upon the strength of his personality at the time of the onset of symptoms and of diagnosis of the disease. The emotionally unstable or maladjusted person will have difficulty in coping with the problems and adjustments as the disease develops. The mature, emotionally stable individual probably will be better able to accept more easily the confinement, changes, and separation from family and home.

The effects of the disease upon the personality are probably numerous. Anxiety and fearfulness, depression, preoccupation with self, fatigue, hypersensitivity to the stigma of the disease, and feelings of persecution may occur at any stage. Loss of social and economic security, separation from and possible rejection by family and friends, the fear of physical damage, and the social and personal consequences of isolation may result in a bitter, hostile individual. Patients who are demanding and uncooperative may be wrestling with deep-seated emotional problems.

If indicated, the nurse will help the family make arrangements for hospitalization of the patient and secure adequate care for him prior to hospitalization. The process of enabling the patient to accept the diagnosis can be furthered by helping him to make preparations for entering the hospital and by informing him of the advantages of hospital care and the general plan of hospital living. The family's reactions and attitudes toward the patient's disease may have a decided effect upon this process. The members of the family as well as the patient need to be informed regarding the disease and the advantages of hospitalization. They should be made aware of their part in helping the patient to accept his illness and the necessarily long period of separation and hospitalization. Hansen's disease places a heavy burden on the patient and his family, and the strain on interpersonal relationships may be exceedingly great. If the patient is the head of the family, the standards and patterns of living may be jeopardized and a plan for supporting the family must be developed.

Contacts of patients with active Hansen's disease, that is, intimate and household contacts, should remain under medical and nursing supervision indefinitely. The nurse may have many opportunities in follow-up visits to strengthen family and patient attitudes that may greatly influence their future welfare and well-being.

If the local health officer is notified when the patient is discharged or released for a visit at home, the public health nurse can help plan for the patient's care and comfort and the family's protection. In order to give intelligent service, she must be provided with authoritative information on the clinical status, the patient's condition at time of discharge, the prognosis, treatment, and recommendation for medical supervision. It will be impossible for her to give sound assistance without this information.

In the past, one of the major problems in working with cases and with household and intimate contacts has been the desire of the patient and his family to become and to remain "lost". When they are found, their resentment and hostility to official agency personnel is expressed over and over again in a variety of ways. Many of the patients admitted to the U. S. Marine Hospital at Carville, La., change their names. Following admission and/or discharge of the patient, the families move, leaving no forwarding address. Family physicians treating patients at home are reported to be reluctant to report cases diagnosed because they are afraid of the social and economic hazards that might occur if a case is investigated by official health agency personnel.

The experience of patients and their families when a case has developed has been interpreted by them as "persecution and social ostracism". Although some of the experiences as related by the patient and his family may be exaggerated as they are retold, there have been enough instances of unwarranted publicity and unintelligent handling to point up the need for health department personnel to scrutinize the policies, methods, and record systems used in working with suspected or diagnosed Hansen's disease patients.

If the patients and their families are treated humanely and sympathetically; if medical records and reports are handled as confidential information; and if common sense is applied in evaluating the individual situations in planning care, treatment, and follow-up, the control of Hansen's disease in endemic areas will be greatly facilitated.

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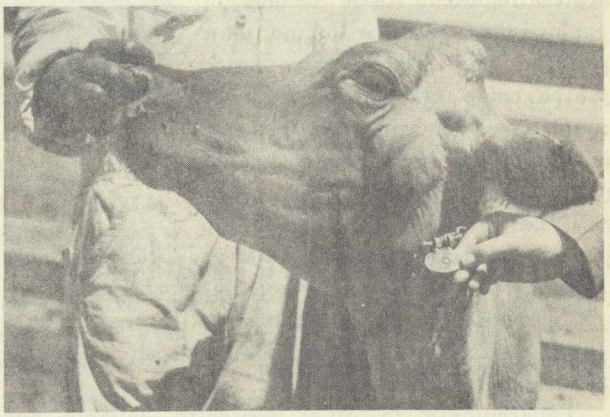
BOVINE TUBERCULOSIS IN THE UNITED STATES

JAMES H. STEELE, Veterinary Director*

Tuberculosis in cattle has continued to decline, except during World War II, since the inauguration of the Federal control program known as the Accredited Herd Plan of Bovine Tuberculosis Eradication in 1917. In 1917 it was officially estimated that 5 percent of the cattle of the Nation were infected with most of the animal infection concentrated in the Northeast and Midwest dairy States. In some of the older dairy sections, 50 to 100 percent of the cattle were infected. By 1934 the infection rate had dropped to 1.1 percent and by November 1940 all the counties of the United States had become modified accredited areas with less than one-half of 1 percent of the cattle reacting. It was estimated that less than 0.4 percent of the dairy cows and 0.05 percent of the beef cattle were infected in 1940.

The U. S. Department of Agriculture, Bureau of Animal Industry, reports that for the 12-month period ending June 30, 1950 there were more than 9,000,000 cattle tested of which 0.19 percent or 17,733 were reactors. This is practically the same percentage found during the past two years but lower than 1945 – 1947 when the rate rose to over 0.2 percent.

The Meat Inspection Division of the Bureau of Animal Industry reports all cases of animal tuberculosis to the Federal and State tuberculosis control officials. This enables these officials to locate centers of infection especially in those areas where little testing is being done. Even though only 25 percent of the cattle found to be tuberculous can be traced to the farm of origin, during the past year, according to reports of the Meat Inspection Division, State officials were



Animal which showed a positive reaction to a tuberculin test. Note tubercular lesion under left eye.

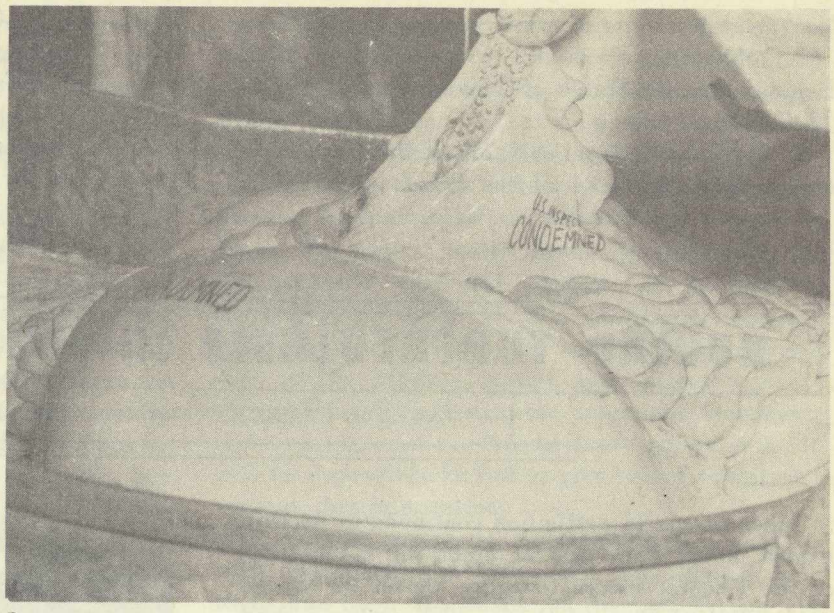
Photo courtesy of Georgia Department of Agriculture.

able to locate 300 additional tuberculin reactors on farms from which infected animals had gone to market. Most local health departments have cooperated by reporting cases of bovine tuberculosis when they are found in animals slaughtered under their supervision. All local health authorities should be concerned with this problem and the follow-up of infected cases. This is especially true in regard to milk producing herds. It is recommended that all local health departments report evidence of animal tuberculosis to the State health agency for transmittal to the State livestock sanitary board or State veterinarian.

Beginning January 1, 1951, the requirements of Accredited Herd Plan will prescribe that all animals except range animals be tested once every 6 years in order to be reaccredited as tubercu-

*Chief, Veterinary Public Health Services.

losis free. In some cases it will also be necessary for the reactors to be less than 0.2 percent instead of 0.5 percent as was formerly required. The requirement for testing of all animals every 6 years is a big step toward eradication, but the 6-year testing period will not be acceptable to all health departments and officials charged with milk sanitation enforcement. Many communities will continue with their present policies of annual or biannual testing. Naturally, milk sheds which import a large number of replacement cows will find their reactor rate higher than areas which raise all of their replacement cows or which import few cows. Most health departments will find that an intelligent study of the previous records on bovine tuberculosis testing will give them valuable facts on which to base their future retesting requirements. Some communities will find annual testing still justified while others can wait 2 or 3 years between tests.



Tubercular lesions in lymph gland of condemned meat.

Photo courtesy of Georgia Department of Agriculture.

Tuberculosis in other domestic animals has also declined in the past 30 years but not as significantly as in cattle. The rate among the swine inspected at abattoirs under Federal supervision has declined from 15 percent to 10 percent. Most of the present infection in swine is attributed to the avian type of infection which is common in central United States. Occasionally bovine and human types of infection are found in swine, but the former has declined with the lowered incidence in cattle, and the human type has seldom been found except in hogs fed on raw garbage from sanatoriums. Fortunately, avian tuberculosis rarely if ever causes disease in man. It will cause disease in swine and will sensitize cattle to react to the tuberculin test. Among old poultry flocks, rates of infection will run very high, sometimes all the birds over 2 years of age being infected. Dogs, horses, cats, goats, and sheep are susceptible to tuberculosis but in the United States these animals are seldom reported as being infected.

The incidence of bovine tuberculosis is much higher in countries other than the United States except Sweden, Norway, and Finland. In Great Britain it is estimated that 15 percent of the cattle are reactors. In 1945, in British abattoirs, 32,822 cattle were found to have generalized tuberculosis and were condemned. On the Continent the tuberculosis rate in animals is even higher. In Germany it is stated that 35 percent of the cows are infected. The highest rate is reported in Poland and Eastern Europe. No real efforts have been made to carry on an eradication program on the Continent because of the alleged economic cost. Considerable time has been devoted to vaccine research without successful results except in herds where the infection rate is over 50 percent.

The United States is fortunate to have brought the disease under control and so close to eradication. The economic and public health losses in Europe, South America, and Asia provide a good yardstick to measure our good fortunes. The effort to eradicate this disease will require the cooperation of everyone who is concerned with the disease: boards of health, departments of agriculture, and livestock sanitary boards. Complacency will defeat the campaign. Alertness will be rewarded with success.

DISTRIBUTION OF DOMESTIC RATS WITH MURINE TYPHUS ANTIBODIES IN THE UNITED STATES

CARL O. MOHR, Scientist (R)* and NEWELL E. GOOD, Scientist (R)**

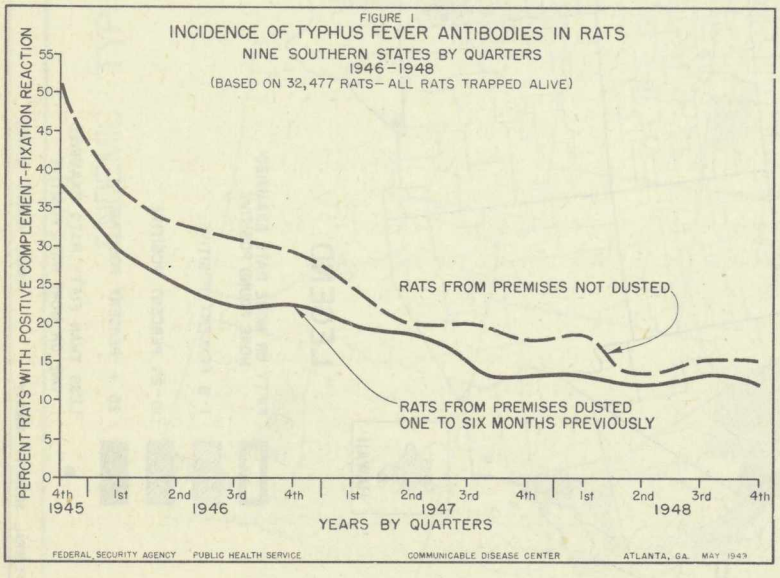
When cooperative State-Federal DDT dusting programs were initiated in the southeastern States for control of murine typhus fever, an evaluation program also was initiated to measure results. On these State programs, rats were caught, and blood was drawn from them and tested for the presence of murine typhus fever antibodies. This testing was done by the complement fixation method in all States except one in which the less reliable Weil-Felix method was used. The tests showed that the incidence of typhus antibodies was noticeably less in areas where ectoparasites were controlled than in areas where they were not (figure 1), and that in the former the number of human typhus cases was reduced remarkably. The tests also revealed many facts relative to the percentage of rats with murine typhus antibodies in various parts of the United States.

Four general types of areas are apparent with respect to the geographic or climatic distribution of rats (*Rattus norvegicus* and *Rattus rattus*) in which murine typhus fever antibodies are found.

1. Very favorable. A high percentage of rats from farms and sheds as well as those from towns and/or heated buildings with typhus antibodies.
2. Favorable. A large percentage of the rats from many types of establishments with typhus antibodies, but rats living on farms and/or outdoors generally without antibodies.
3. Marginal. Occasional colonies of rats infected in sheltered places such as particularly favorable buildings.
4. Unfavorable. Few, if any, rats with typhus antibodies (figure 2).

In southern United States conditions very favorable to favorable for typhus infection in both rats and humans exist throughout the greater part of the region in which the average January temperature is above 40°F. and the average relative humidity, noon, July, is above 37 percent. These two areas include the region south and east of a line drawn from Norfolk, Va., through Charlotte, N. C.; Chattanooga and Nashville, Tenn.; Little Rock, Ark.; and Lubbock, Tex. An isolated section of these areas lies in the coastal region of southern California. In Georgia and Alabama the observed dividing line between very favorable and favorable areas is fairly well established along a line drawn through the cities of Augusta, Macon, and Columbus, Ga.; and Montgomery, Ala. In the above two areas the percentage of rats from undusted premises observed with murine typhus complement fixation antibodies was higher than 30 percent in 1946, gradually dropping to 13 percent in 1949 as more and more of the foci of infection were eliminated or modified by DDT dusting. As would be expected,

FIGURE 1
INCIDENCE OF TYPHUS FEVER ANTIBODIES IN RATS
NINE SOUTHERN STATES BY QUARTERS
1946–1948
(BASED ON 32,477 RATS—ALL RATS TRAPPED ALIVE)



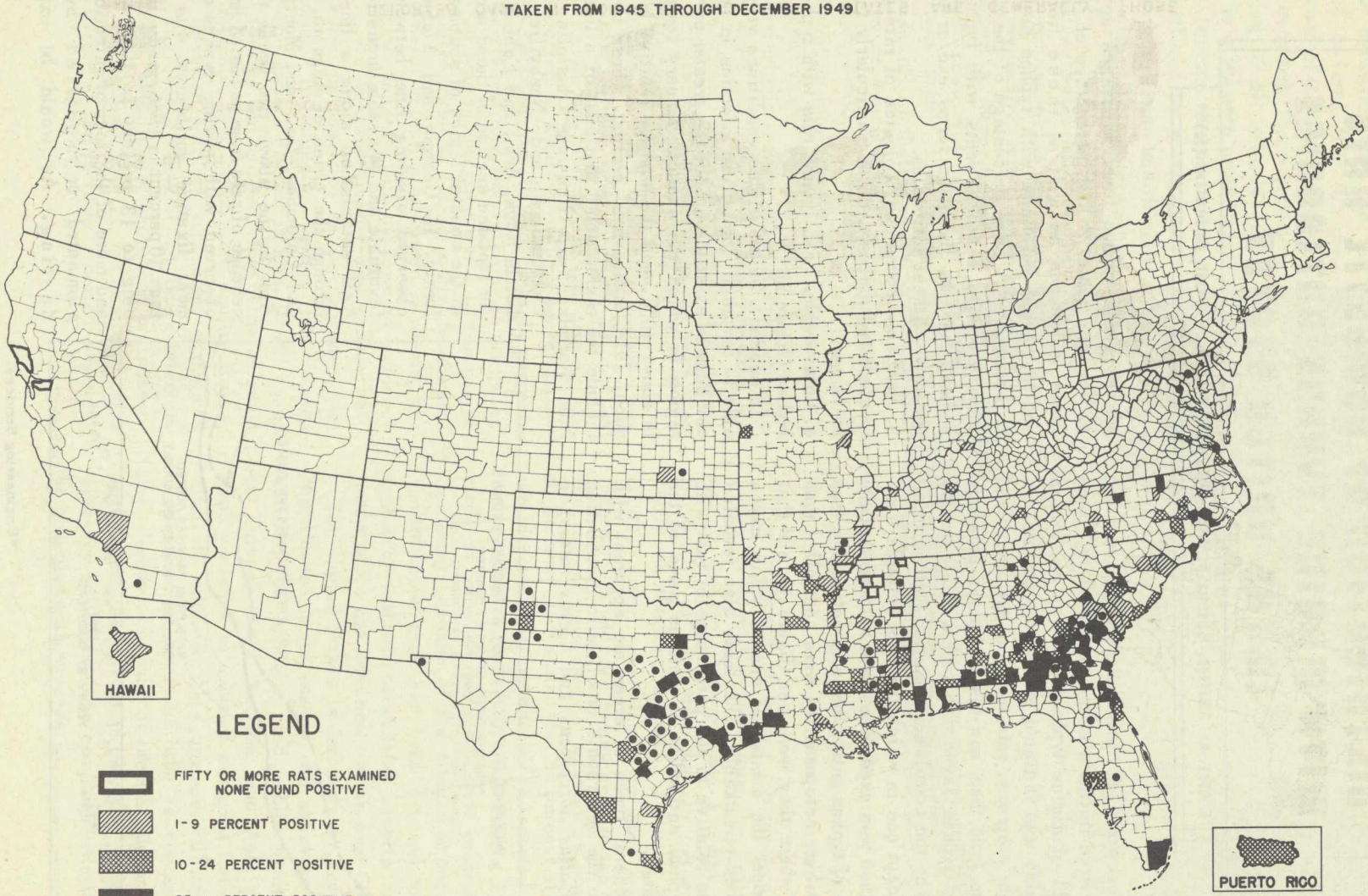
*Engineering Services.

**Entomologic Services.

FIGURE 2

INCIDENCE OF MURINE TYPHUS FEVER ANTIBODIES IN NORWAY AND ROOF RATS

TAKEN FROM 1945 THROUGH DECEMBER 1949

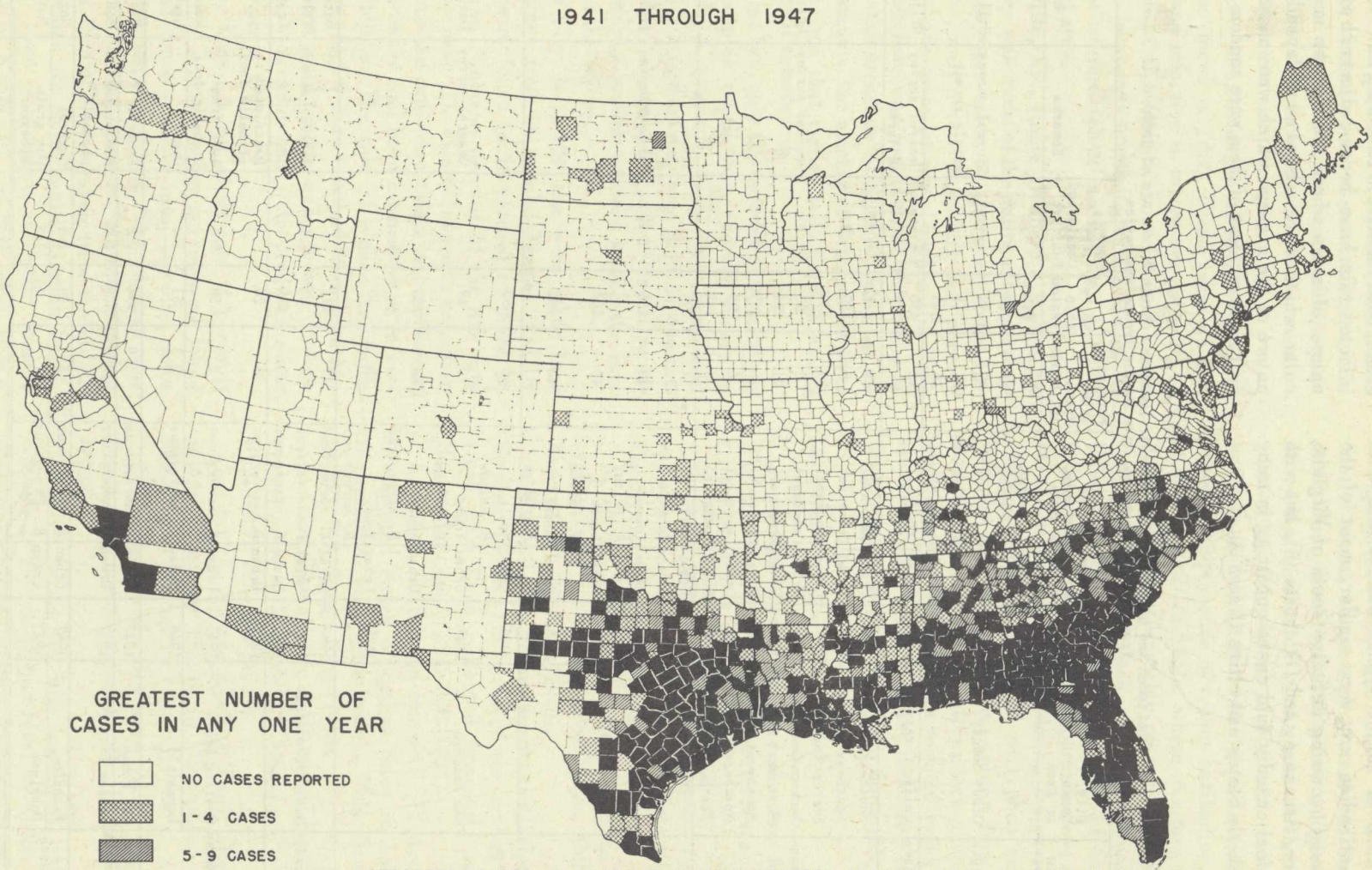


FEDERAL SECURITY AGENCY PUBLIC HEALTH SERVICE COMMUNICABLE DISEASE CENTER ATLANTA, GEORGIA DECEMBER 1950

FIGURE 3

ENDEMIC TYPHUS FEVER IN THE UNITED STATES

1941 THROUGH 1947



FEDERAL SECURITY AGENCY PUBLIC HEALTH SERVICE COMMUNICABLE DISEASE CENTER ATLANTA, GA. MAY 1950

the geographical distribution and incidence of human cases of murine typhus and of rats with typhus antibodies are very similar, most of the human cases occurring in States south of Virginia, Tennessee, Arkansas, and Oklahoma (5), but with isolated foci or individual cases occurring in many more northerly States and cities (figure 3).

The third catergory, which includes the marginal areas, is of interest in revealing how widely typhus-infected rats have become distributed and the nature of areas where the disease may exist. Results which were obtained depended upon the nature of the surveys which were made by the several authors. Most of them were random and general,

TABLE 1

Published and Other Data for Specific Locations on the Percentage of Rats, from Undusted Premises, with Murine Typhus Antibodies

Type of Area	State	City, County, or Area	Year	Urban or Rural	Species (and age) of Rats	Percent with Typhus Antibodies	No. of Rats Tested	Lowest Titer Considered Positive	Remarks	Reference
Very Favorable	Georgia	Grady County	1945	Rural	*R. rattus*	47	241			
			1946-47	Rural	*R. rattus*	42	929			
			1947-48	Rural	*R. rattus*	35	1428	1:4	General survey, mainly rural	Hill and Morlan 1948
			1946-47	Rural	*R. norvegicus*	38	311			
			1947-48	Rural	*R. norvegicus*	38	645			
	Alabama	Coffee County	1944	Rural	Commensal*	42	430	Not Stated	General survey on farms	Hill and Ingraham 1947
	Mississippi	Southeast Quarter	1946	Urban	Commensal	23	448			
		Southeast Quarter	1946	Rural	Commensal	6	298			
		Forrest County only	1946	Urban	Commensal	39	133			
		Jackson County only	1946	Urban	Commensal	0	93	1:8	General survey	Gray and Kotcher 1947
		Southwest Quarter	1946	Urban	Commensal	21	262			
		Southwest Quarter	1946	Rural	Commensal	15	149			
		Northern Half	1946	Urban	Commensal	6	209			
		Northern Half	1946	Rural	Commensal	0	142			
	Texas	Lavaca County	1945	Urban	Adult *R. rattus*	71	307			
			1945	Urban	Young *R. rattus*	43	165	1:10	General survey	Irons, et al. 1948
			1945	Rural	Adult *R. rattus*	48	367			
			1945	Rural	Young *R. rattus*	40	161			
		San Antonio	1945	Urban	Adult *R. rattus*	48	52			
			1945	Urban	Young *R. rattus*	12	49		General survey	Davis 1948
			1945	Urban	Adult *R. norvegicus*	66	88	Not Stated		
			1945	Urban	Young *R. norvegicus*	38	40			
Marginal	Texas	Brownfield Area	1946-47	Rural	*R. norvegicus*	19	191			Data by Miles,
			1948	Rural	*R. norvegicus*	14	263	1:10	General survey	Wilcomb, and
			1949	Rural	*R. norvegicus*	10	185			Irons.
	Kentucky	Bowling Green	1947	Urban	*R. norvegicus*	50	24		Restricted to probable foci	
			1947	Urban	*R. norvegicus*	2	50	1:8	Away from probable foci	Hardin 1948
		Louisville	1948	Urban	*R. norvegicus*	0.3	351	1:8	General	Good and Kotcher 1949
	Missouri	St. Louis	1947	Urban	*R. norvegicus*	0.9	904	1:8	General	Not Published
		Kansas City	1947	Urban	*R. norvegicus*	19	378	1:8	Restricted to probable foci	Buhler and Mueller 1948
	Kansas	Wichita	1947	Urban	*R. norvegicus*	5	99	1:8	General	Not Published
		Douglass	1947	Urban	*R. norvegicus*	67	6	1:8	One grain elevator	Not Published

*Includes both *R. rattus* and *R. norvegicus*.

hence quite comparable in nature. Some, however, were selective, having been made in a few buildings, garbage dumps, or other selected places in which the level of typhus incidence would be quite atypical of the area in general. These reveal a spotty distribution in marginal areas.

In Baltimore, Md., evidence of murine typhus in rat fleas was found in 1930. Fleas taken in that city were found infective to laboratory animals (4). No great amount of transmission to humans occurs in Baltimore but cases occur frequently enough to indicate that murine typhus continues to exist in this marginal area.

In Louisville, Ky., (table 1) where a general rat typhus survey was made of the entire city and tests of rat serums were made by the complement fixation process, only 1 rat out of 351 (0.3 percent) appeared to have or to have had typhus (6). However, the titer here was low (1:8) so there may be doubt about the presence of murine typhus at the time of the survey. The number of Oriental rat fleas present indicates that typhus will flourish among domestic rats if introduced.

In St. Louis, Mo., only 0.9 percent of 904 Norway rat blood samples taken in a general survey in 1947 reacted positively. The titers were low, ranging from 1:8 in seven rats to 1:32 in one rat. Apparently this is strong enough evidence to indicate that murine typhus existed among the rats at the time of the survey.

In Kansas City, Mo., 378 rats were taken in a selective survey from 86 establishments, and infected rats were found in 16 percent of these 86 establishments. Nineteen percent of the 378 rats taken were positive (1). This survey was selective in that most of the rats were taken in premises in which human cases had been contracted or in surrounding buildings. The rate of typhus incidence was, therefore, higher than it would have been had the survey been more random and general. Typhus is nevertheless present and widespread in some sections of Kansas City.

In Wichita, Kans., 5 out of 99 rats (5 percent) taken in 1947 in a more random survey were found positive; 3 of these positive rats, however, were taken from the same building. The highest titer in one rat was 1:256. However, all rats showing titers greater than 1:8 were taken from the single building in which the three positives were found. At the nearby town of Douglass in Butler County, Kans., 4 out of 6 rats (67 percent) taken from a grain elevator were positive for typhus at titers of 1:8, 1:128, 1:256, and 1:512 respectively.

Unpublished data obtained in a cooperative State-Federal plague-typhus study in the Brownfield, Tex., area 1946–1949 show a high incidence of typhus antibodies in the rats of that area. In 1946–1947, 19 percent of 191 rats tested proved positive, and in 1948–1949, 12 percent of 448 rats showed the presence of typhus antibodies.

In southern California, where exists a small but rather uniformly favorable area for typhus among rats, positive reactions also were found. In the three southern coastal counties of San Diego, Orange, and Los Angeles, approximately 5 percent of 163 rat serums tested during the period 1948–1950 showed the presence of typhus antibodies. With the exception of two rat serums from Alameda County (Oakland and vicinity) which gave very low, inconclusive reactions, no serums positive for murine typhus were obtained from 286 other rats taken in various sections of the State (2).

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A METHOD FOR RAPID IDENTIFICATION OF MOSQUITOES FROM LIGHT TRAP COLLECTIONS

GEORGE A. THOMPSON, JR., S. A. Sanitarian*

The method of rapid identification of mosquitoes from light trap collections, employs a foot-operated device for focusing a dissecting microscope and an especially constructed trough for holding mosquitoes within the field of vision on the microscope stage. By the use of these aids, the identification of large numbers of mosquito specimens is greatly expedited. Both hands remain free for manipulations on the microscope stage, and the eyes need not be shifted constantly between the oculars of the microscope and the specimens being identified. The focusing device also has been found useful in the preparation of mounts of larvae and of male terminalia, and for other items requiring a considerable amount of manipulation under magnification.

The foot-operated focusing device consists of a treadle assembly which rests on the floor and is connected by a lever and a rod to a clamp fastened around the focusing knob of the microscope. Figure 1 presents a diagram of the apparatus. Materials needed for construction are as follows:

Treadle: wood, 1 by 4 inches, 14 inches long, with the fulcrum 10½ inches from the point of connection to the lever. A small cleat may be added to prevent the foot from slipping off the treadle.

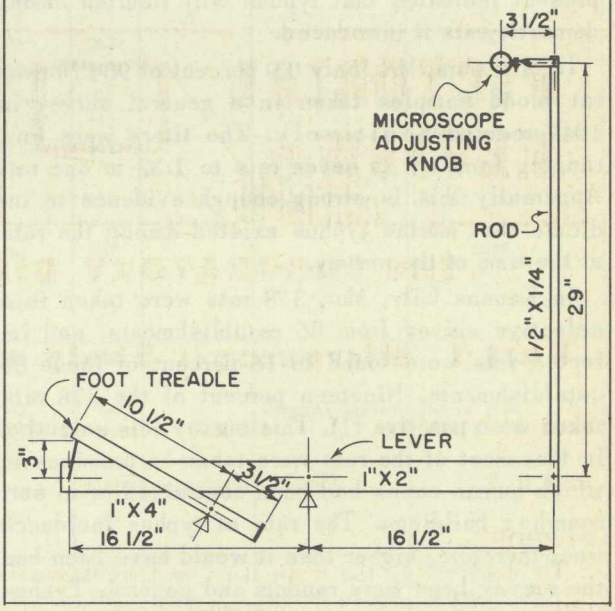
Lever: wood, 1 by 2 inches, the flucrum 16½ inches from the connection to the treadle and 16½ inches from the connection to the rod.

Rod: wood, ½- by ¼-inch, 29 inches between connection with lever and clamp.

Clamp: metal, fashioned from an automobile radiator hose clamp, of sufficient length to permit attachment of the rod at a point 3½ inches from the center of the microscope adjusting knob.

Figure I

FOOT–OPERATED DEVICE FOR FOCUSING A DISSECTING MICROSCOPE



Fulcrums of the treadle and lever are 8-penny common nails, fitting snugly into drilled holes.

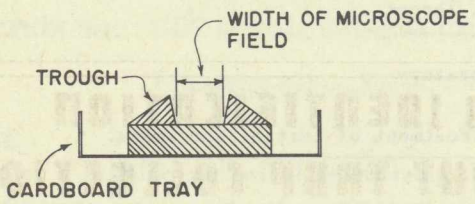
Connector between the treadle and lever is of No. 12 iron wire, crank-shaped, the parallel sections being about 3 inches apart. One end fits snugly into a drilled hole in the lever and the other is held snugly to the treadle by staples.

The rod is connected to the lever and clamp by

*Midwestern CDC Services, Kansas City, Mo.

Figure 2

MOSQUITO SORTING TROUGH



¼-inch stove bolts fitting drilled holes. The arm of the clamp is twisted 90 degrees so that it fits against the side of the rod.

With the foot device the microscope can be focused satisfactorily through a field ¼-inch deep for magnifications up to about 50X. Focusing at higher magnifications is not sufficiently exact for practical use.

The trough, shown in cross-section in figure 2, has a width equal to the diameter of the field of the microscope at low power and is ¼-inch deep. It can be of any convenient length. The trough sets in a shallow cardboard tray made the same length as the trough and about 1 inch wider.

In use, the focusing device permits the microscope to be kept in focus while one hand is used to slowly move the trough across the stage and the other is used to manipulate the specimens. For sorting, one species may be left in the trough, a second placed in one compartment of the tray, while a third species may be placed in the other compartment. Rarer species may be set aside for later attention.

A design for a chin-operated device was described by E. S. Hegre and R. F. Blount, Science, 101: 126–127 (1945).

A SERIES OF FOUR MOTION PICTURES AND TWO FILMSTRIPS

THE LABORATORY DIAGNOSIS OF DIPHTHERIA

Part I Microscopic Study and Isolation of C. Diphtheriae

PRODUCTION NO.: CDC 4-088.0, Released 1950

DATA: Motion Picture; 16mm, Sound, Black and White, 13 Minutes, 480 Feet

PURPOSE

To depict: (1) the collection and treatment of initial specimens; (2) microscopic examination of initial cultures for presumptive evidence of diphtheria; (3) isolation of pure cultures; and (4) microscopic examination of these pure cultures.

AUDIENCE

Diagnostic laboratory technicians (bacteriology); public health and diagnostic laboratory directors; physicians; medical students; and nurses.

CONTENT

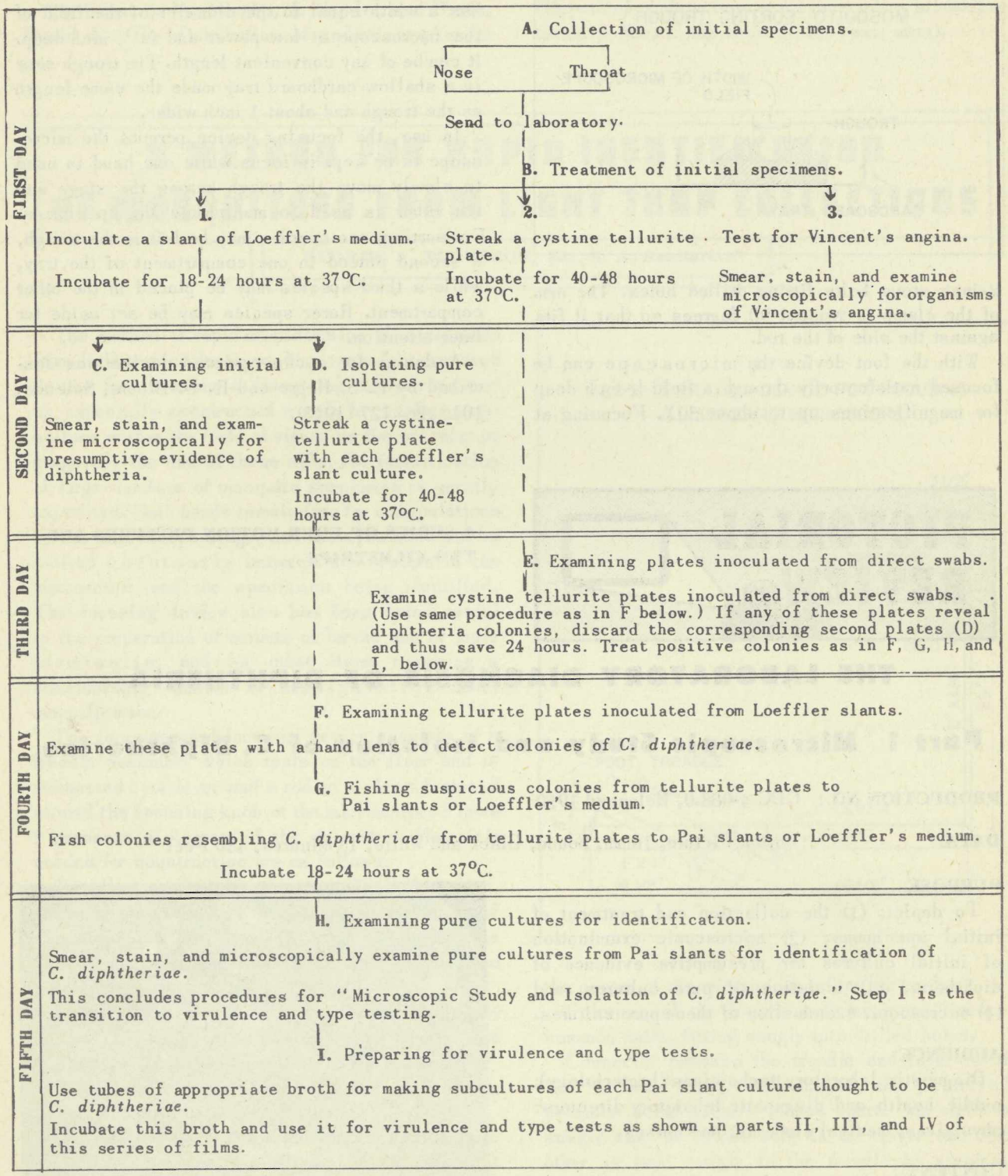
See Chart 1

C. diphtheriae colony — gravis strain on a cystine tellurite plate.

CHART 1

CONTENT OF THE FILM

"PART I - MICROSCOPIC STUDY AND ISOLATION OF C. DIPHTHERIAE"



Part II Determination of Types of C. Diphtheriae

PRODUCTION NO.: CDC 4-088.2, Released 1950

DATA: Motion Picture; 16mm, Sound, Black and White, 12 Minutes, 420 Feet

PRODUCTION NO.: CDC 5-176.0, Released 1950

DATA: Filmstrip; 35mm, Sound, Color, 7 Minutes, 53 Frames

PURPOSE

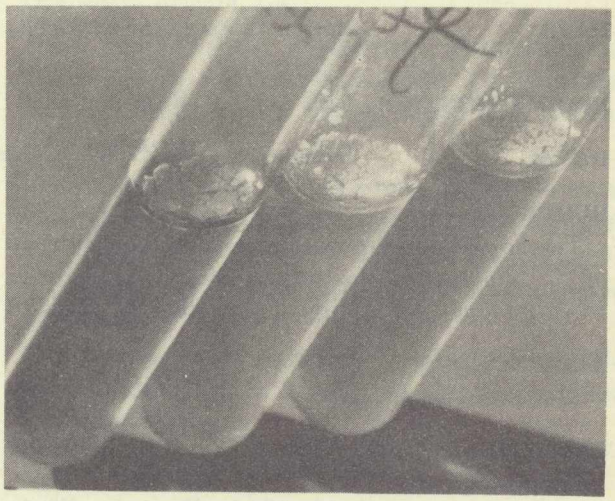
To depict a reliable method of determining the types of pure cultures of *Corynebacterium diphtheriae.*

AUDIENCE

(Same as for Part I, above.)

CONTENT

Because type data are of clinical and epidemiological importance, it is often desirable to determine the biochemical type of specimens of *C. diphtheriae.* In order that results may be comparable and reliable, the methods of determining these types should be uniform with all workers. These films show the preliminary procedures and final observations by which technicians may identify types of *C. diphtheriae* by observing: (1) colony formations on McLeod chocolate-tellurite plates; (2) pellicle formation on broth; (3) fermentation of dextrose, starch, and glycogen; and (4) production of soluble hemolysins in broth.



Pellicle formation.

Part III Testing for Virulence in Animals

PRODUCTION NO.: CDC 4-088.1, Released 1950

DATA: Motion Picture; 16mm, Sound, Black and White, 13 Minutes, 477 Feet

PURPOSE

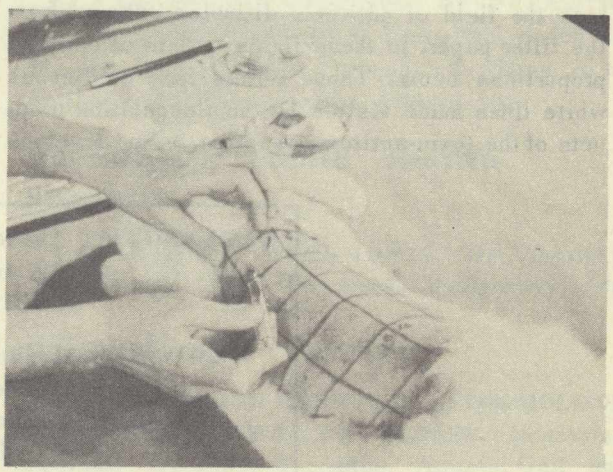
To depict procedures by which the virulence of pure cultures of *C. diphtheriae* may be determined by animal inoculation.

AUDIENCE

(Same as for Part I, above.)

CONTENT

The only dependable proof of the virulence of a diphtheria bacillus is the ability to produce diphtheria toxin. To be reliable, therefore, a "virulence" test must demonstrate the ability of the suspected organism to produce this toxin. This film shows how a technician may test for this ability in the organism by preparing a pure, 48-



Multiple inoculation of rabbit for virulence test.

hour, sugar-free broth culture of a morphologically suspicious organism, and injecting it into a rabbit, a guinea pig, or a chick along with a suitable control injection. The procedures, theory, and observations enabling a technician to perform and understand these tests are shown in the film.

Part IV The In Vitro Virulence Test for C. Diphtheriae

PRODUCTION NO.: CDC 4-106.0, Released 1950

DATA: Motion Picture; 16mm, Sound, Black and White, 11 Minutes, 411 Feet

PRODUCTION NO.: CDC 5-163.0, Released 1950

DATA: Filmstrip; 35mm, Sound, Color, 7 Minutes, 53 Frames

PURPOSE

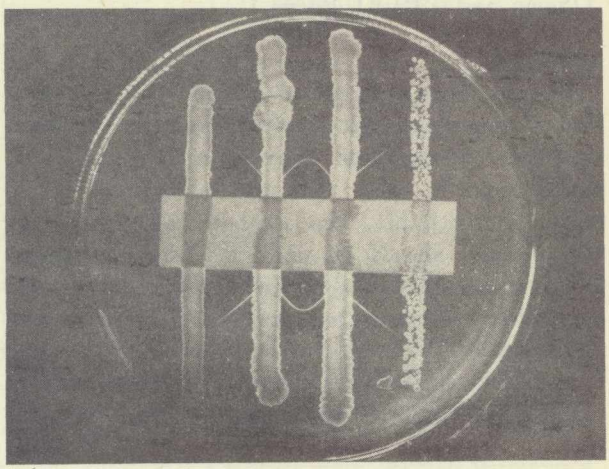
To show in detail how to determine the virulence of *C. diphtheriae* by means of an inexpensive *in vitro* test and without inoculating animals.

AUDIENCE

(Same as Part I, above.)

CONTENT

Morphologically, virulent and avirulent *C. diphtheriae* may appear identical. From Loeffler's discoveries in 1882 to recent times, the only known way of testing these organisms for virulence has been through animal inoculation. Recently, an inexpensive yet reliable *in vitro* test is routinely replacing use of animals except for an occasional normal rabbit to furnish serum. Filter paper saturated in antitoxin is embedded in agar medium containing this serum in a petri dish. Pure cultures of *C. diphtheriae* are streaked across the agar surface perpendicular to the embedded filter paper. Toxin, diffusing outward from the inoculum overlaps the field of antitoxin diffusing outward from the filter paper. In these fields, points of optimum proportions occur. These points form continuous white lines made visible by the flocculation products of the toxin-antitoxin reaction. A line develops



In vitro test.

in each of the four quadrants between inoculum and filter paper at angles which make the four lines resemble two arrowheads directing observation to the point where each virulent culture crosses the filter paper.

The materials, procedure, theory, and observations enabling a technician to perform and obtain valid results from this practical yet delicate test are shown in the film.

AVAILABILITY: These six films were produced by and are available free on short loan from:

Medical Director in Charge
Communicable Disease Center
U. S. Public Health Service
50 Seventh Street, N. E.,
Atlanta 5, Ga.

CDC TRAINING COURSES

Listed below are some training courses sponsored by the Services of the Communicable Disease Center. Further information on the courses may be obtained from the *Bulletin of Field Training Programs* issued by the Center.

Training Services

1. **ENVIRONMENTAL SANITATION FIELD TRAINING.** February 26 to May 18, 1951. Twelve weeks. Amherst, Mass.

2. **ENVIRONMENTAL SANITATION FIELD TRAINING.** February 26 to May 18, 1951. Twelve weeks. Bloomington, Ill.

3. **ENVIRONMENTAL SANITATION FIELD TRAINING.** February 5 to April 27, 1951. Twelve weeks. Columbus, Ga.

4. **ENVIRONMENTAL SANITATION FIELD TRAINING.** February 19 to May 12, 1951. Twelve weeks. Topeka, Kans.

5. **SPECIAL TRAINING PROGRAM IN MILK PLANT SANITATION.** February 12–16, March 12–16, May 7–11, and May 14–18, 1951. One week. Columbus, Ga.

6. **SPECIAL TRAINING PROGRAM IN RESTAURANT SANITATION.** February 5–10, 1951. One week. Pittsburgh, Pa.

7. **TOPICAL SHORT COURSES – MILK – LABORATORY PROCEDURES.** February 5–9, 1951. One week. Amherst, Mass.

8. **FIELD SURVEY AND EVALUATION METHODS IN HOUSING SANITATION.** March 19 to April 21, 1951. Five weeks. Atlanta, Ga.

9. **FIELD SURVEY AND EVALUATION METHODS IN HOUSING SANITATION.** February 19 to March 24, and April 30 to June 2, 1951. Five weeks. Syracuse, N. Y.

10. **FIELD SURVEY AND EVALUATION METHODS FOR MEASURING QUALITY OF HOUSING ENVIRONMENT.** March 12–16, and April 21–26, 1951. One week. Syracuse, N. Y.

11. **SPECIAL TRAINING PROGRAM IN HOUSING SANITATION.** March 5–9, 1951. One week. Denver, Colo.

12. **RAT-BORNE DISEASE PREVENTION AND CONTROL.** March 12–31, 1951. Three weeks. Atlanta, Ga.

13. **ADMINISTRATION OF A PUBLIC HEALTH AUDIO-VISUAL PROGRAM.** February 12–16, and March 12–16, 1951. One Week. Atlanta, Ga.

14. **FUNDAMENTAL METHODS IN PUBLIC HEALTH FIELD TRAINING.** February 2–16, 1951. Two weeks. Atlanta, Ga.

15. **ADVANCED COURSE IN PUBLIC HEALTH FIELD TRAINING METHODS.** March 2–9, 1951. One week. Atlanta, Ga.

16. **ADVANCED SANITARY ENGINEERING TRAINING IN WATER POLLUTION ABATEMENT PROGRAMS.** March 12–23, 1951. Two weeks. Cincinnati, Ohio.

17. **ADVANCED TRAINING COURSE FOR STATE BACTERIOLOGISTS CONCERNED WITH THE EXAMINATION OF MILK, DAIRY PRODUCTS, AND FOOD UTENSILS.** February 5–16, 1951. Two weeks. Cincinnati, Ohio.

18. **BASIC RADIOLOGICAL HEALTH TRAINING.** February 26 to March 9, 1951. Two weeks. Cincinnati, Ohio.

Laboratory Services

1. **LABORATORY DIAGNOSIS OF SYPHILIS.** February 12–13, March 12–23, and April 16–27, 1951. Two weeks. Atlanta, Ga.

2. **MICROBIOLOGY FOR PUBLIC HEALTH NURSES.** February 26 to March 2, 1951. One week. Atlanta, Ga.

3. **LABORATORY DIAGNOSIS OF BACTERIAL DISEASES, GENERAL BACTERIOLOGY.** Part 1, February 26 to March 9, and Part 2, March 12–23, 1951. Two weeks. Atlanta, Ga.

4. **LABORATORY DIAGNOSIS OF PARASITIC DISEASES.** Part 1, Intestinal Parasites, March 5–23, and Part 2, Blood Parasites, March 26 to April 13, 1951. Three weeks. Atlanta, Ga.

Veterinary Public Health Services

LABORATORY DIAGNOSIS OF RABIES. May 14–18, 1951. One week. Montgomery, Ala.

Epidemiologic Services

FIELD TRAINING COURSE IN EPIDEMIOLOGY FOR PUBLIC HEALTH NURSES. Beginning February 19, 1951, 3 months, Atlanta, Ga., and Mississippi.

MEDICAL ENTOMOLOGY with Special Reference to the Health and Well-being of Man and Animals, by William B. Herms, Sc.D. Fourth edition, pp. i–xvi and 1–643, 1 plate and 191 text figures, 9½ x 6, Cloth. 1950, The MacMillian Company, New York, N. Y.

This book is a complete revision of the author's well known text which was published originally in 1915, and of which revised editions were presented previously in 1923 and 1939. It is dedicated to his ". . . .former graduate students of the University of California, more than fifty of whom served during World War II. . . .in the mammoth struggle to protect our fighting forces against the ravages of arthropod-borne tropical diseases, particularly malaria."

The period since the publication of the third edition of this work has been one of remarkable expansion in the field of medical entomology, both in knowledge pertaining to arthropods as vectors of human diseases and in methods of vector control. The essence of the vast literature dealing with these advances has been integrated into the former text in a remarkably able manner. Throughout the book emphasis is placed on ". . .biology (life history and ecology) as fundamental to rational control and as basic to sound epidemiological procedures." Attention is called to the fact that the use of new insecticides such as DDT has increased rather than decreased the need for this biological knowledge, and it is pointed out significantly that the use of "shotgun" insect control methods only can lead to failure in the long run.

The plan of the book is essentially the same as was followed in the former editions. An historical introduction to the science of medical entomology is followed by chapters dealing with scope and methodology, parasites and parasitism, how arthropods carry diseases, the structure, development and classification of insects and arachnids, and the mouth parts of insects and arachnids. The next thirteen chapters deal with the various disease-carrying groups of insects. These are discussed in taxonomic order, beginning with the cockroaches and ending with the fleas, except that beetles are included with cockroaches for convenience. One chapter on the ticks, one on the mites, and one on venomous and urticarial arthropods complete the volume. The discussions of these subjects are clear and concise, and usually embody the latest generally available information. Each chapter is followed by a list of references to the important source material. The figures are mainly those used previously, but many, particularly the line drawings, have been enlarged with the result that they are greatly improved in appearance and clarity. This is true particularly of those in the chapter on mouth parts to which an excellent line drawing of tick mouth parts has been added. Thirty–three orders of insects are recognized as compared to the 23 listed in the former edition. Systematists will be interested to note that a new tribe, The Aedini, is proposed for mosquitoes of the genus *Aedes*.

There is little to detract from the over-all excellence of the text. It is noted that New Orleans is cited (p.1) as the residence of Josiah Nott, who early published his belief that mosquitoes carried malaria and yellow fever; history records Dr. Nott as a resident of Mobile, Ala. In discussing some subjects the author has given disproportionate emphasis to pertinent situations most familiar to him. Thus, in the discussion of murine typhus fever (pp.437–438), an entire paragraph is given to the occurrence of this disease in California, where it is of minor importance, and mere mention is made that the disease has been reported in the Southern States. It is in the South, of course, that typhus is most prevalent in this country, and where it constitutes a considerable problem about which much has been written. The potentiality of house-frequenting flies as disease carriers is taken up in some detail, but no mention is made of the work of Watt and Lindsay in Texas (Public Health Reports 63:1319, 1947) which actually demonstrated that morbidity and mortality from dysentery (shigellosis) could be greatly reduced by controlling flies. Considering the immense size of the field covered, and its variety of subjects, instances such as the foregoing are remarkably few. The volume is an authoritative work on medical entomology. It is written in an interesting manner, is well illustrated, and has an attractive appearance. It undoubtedly will be well received by all who have an interest in the field of medical entomology and will remain a valuable and stimulating textbook and reference for a long time to come.

G. H. Bradley

Recent Publications by CDC Personnel

Andrews, J. M., Quinby, G. E., and Langmuir, A. D.: Malaria eradication in the United States. Am. J. Pub. Health 40(11): 1405-1411 (1950).

Fox, Irving, and Kohler, C. E.: Distribution and relative abundance of species of biting midges or Culicoides in Eastern Puerto Rico, as shown by light traps. Puerto Rico J. Pub. Health & Trop. Med. 25(3): 342-349 (1950).

Frobisher, Martin, Jr., and Parsons, E. I.: Studies on type-specific immunization with somatic antigens of *Corynebacterium diphtheriae*. Am. J. Hyg. 52(2): 239-246 (1950).

Howitt, B. F.: Isolation and differentiation of the Coxsackie group of viruses. Federation Proc. 9(3): 574-580 (1950).

Johnson, P. T., and Thurman, E. B.: The occurrence of *Aedes (Ochlerotatus) pullatus* (Coquillett), in California (Diptera: Culicidae). Pan-Pac. Ent. 26(3): 107-110 (1950).

Link, V. B.: Plague. J. A. M. A. 144: 375-377 (1950).

Maldonado, J. R., Matienzo, J. A., and Herrera, F. V.: Biological studies on the miracidium of *Schistosoma mansoni*. Puerto Rico J. Pub. Health & Trop. Med. 25(4): 359-366 (1950).

Parsons, E. I., and Frobisher, Martin, Jr.: Studies of the somatic antigens of *Corynebacterium diphtheriae*. Am. J. Hyg. 52(2): 247-250 (1950).

Robinson, J. H., Cummings, M. M., and Patnode, R. A.: Comparison of two solid media for testing sensitivity to streptomycin. Am. Rev. Tuberc. 62(5): 484-490 (1950).

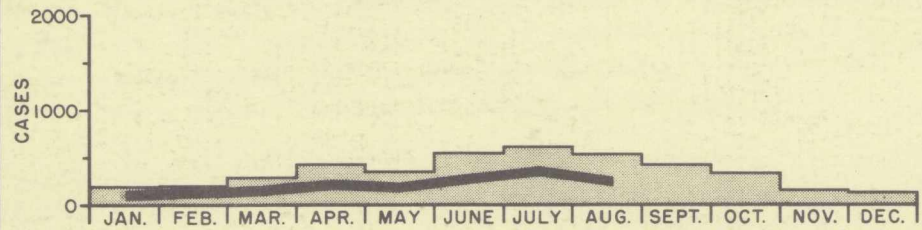
Spangler, C. D., Clapp, R. F., and Clark, G. J.: A field test for efficiency of detergents. Am. J. Pub. Health 40(11): 1402-1404 (1950).

MORBIDITY TOTALS FOR THE UNITED STATES *
MALARIA, POLIOMYELITIS, TYPHUS

1949 - COMPLETE 1950 - AS REPORTED

TOTAL INCIDENCE THROUGH AUG. 1950 1,698

MALARIA
(TENTATIVE DATA)

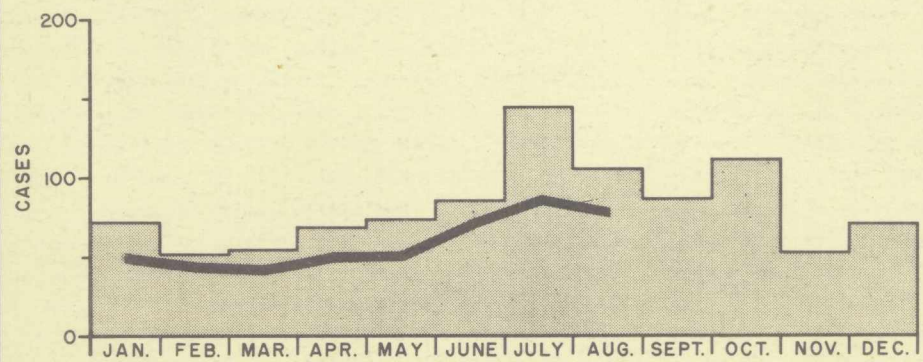


TOTAL INCIDENCE THROUGH AUG. 1950 12,712

POLIOMYELITIS

TOTAL INCIDENCE THROUGH AUG. 1950 469

TYPHUS



FSA-PHS-CDC ATLANTA, GA.

* SOURCE OF DATA: NATIONAL OFFICE OF VITAL STATISTICS