

Development of the **COMMUNICABLE DISEASE CENTER**

by

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The primary aim of MCWA was malaria prevention; the basic method used was vector control, principally by larviciding.

INTRODUCTION:

MALARIA CONTROL IN WAR AREAS

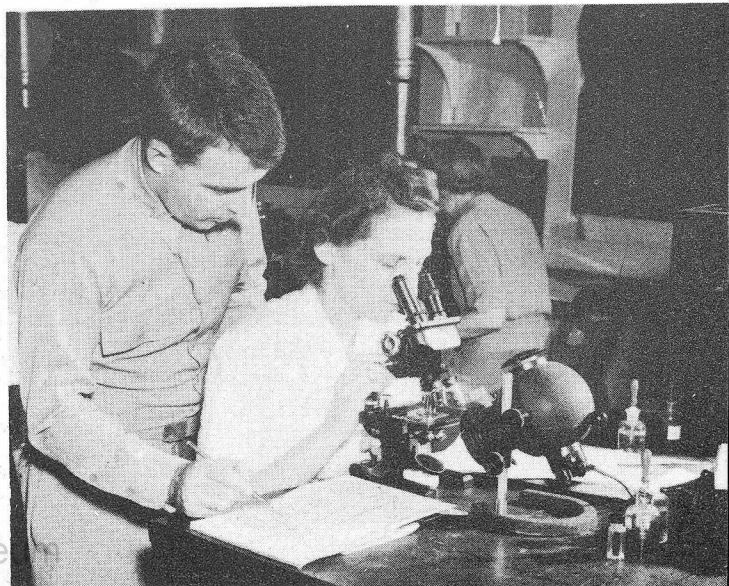
The office of Malaria Control in War Areas was established shortly after the Pearl Harbor episode as the result of negotiations between the War Department and the Federal Security Agency. Its program, developed initially under the direction of Dr. L. L. Williams, Jr., was a cooperative undertaking by the United States Public Health Service and various state health departments.

In 1942 and 1943, the war emphasis was on mobilization, training, and production of military necessities. This involved

mass migration of war workers and inductees, many of them to the South where the climate was favorable for year-round training but where malaria was or had been endemic. The introduction of large numbers of susceptibles into areas where occasional gametocyte carriers still could be found, where effective anophelism and temperatures favorable for anopheline infection existed, created a potential malaria problem of national significance.

The primary aim of MCWA during these two years was to prevent or reduce malaria transmission around Army, Navy, and essential war industry areas by extending the control operations carried on by military authorities within these reservations. This involved not only the utilization of appropriate anti-larval techniques, but the institution of community educational programs and the evaluation of control progress in terms of parasite prevalence and anopheline density. Environmental operations were com-

CDC will expand training in diagnosis, investigation, and control of communicable disease.



menced in 15 Southeastern States and Puerto Rico but were extended later to four more states, including some on the west coast, and the District of Columbia, the Territory of Hawaii, and British Jamaica. Specific insect control measures were aimed not only at anophelines but at the dengue-carrying *Aedes aegypti* and, in cooperation with the Bureau of Entomology and Plant Quarantine, at the vicious dog fly on Florida beaches.

PROBLEM OF RETURNED MALARIA CARRIERS.

In 1944, the numbers of overseas casualties and prisoners of war evacuated to the United States rose to new heights. Many of these individuals had contracted malaria in service. Hospitals and detention camps in which they were confined were scattered throughout the country, thus adding to malaria potentials in endemic areas and creating new ones in marginal sections where conditions for the existence of malaria were present but in which the disease had not been endemic for many years. The facilities of the MCWA extra-cantonment program were brought into play against this hazard in the endemic situations; in the marginal

ones, it was met by commissioning mobile malaria control units which covered circuits of military installations in Northern and Western States and effectively reduced adjacent anopheline breeding.

By 1945, service men were returning to the 48 states in ever increasing numbers. Upwards of half a million of them had contracted malaria overseas and the majority of these had been infected with *Plasmodium vivax*, a parasite species notable for its recurrent and treatment-resisting characteristics. While the armed forces would not release men known to be infected with *vivax* malaria, there was no way of ascertaining that parasites had disappeared completely save by long, continued observation, a procedure which was incompatible with the strong insistence of the American public for the speedy discharge of its veterans. The diffusion of these occasional carriers throughout the land added new possibilities to the national malaria problem. Its significance was admittedly indeterminate but it certainly could not be ignored by public health authorities. To meet this added threat, the so-called extended program of MCWA was activated,



MCWA instructed inexperienced and untrained personnel in the principles and practices of insect and rodent control.

based on the premise that imported malaria would be most likely to establish itself in areas where conditions for transmission were ideal, that is, where they are or have been recently operative. Thus, in important malarious foci, drainage and larviciding activities were intensified by MCWA and upon these reductive measures were superimposed that mighty instrument of insect destruction, residual DDT application on domestic premises. During the same year, 1945, endemic typhus control around areas of military importance was added to the MCWA program.

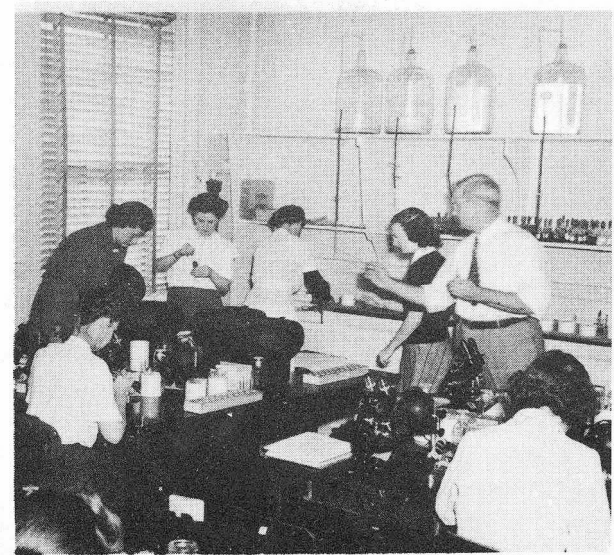
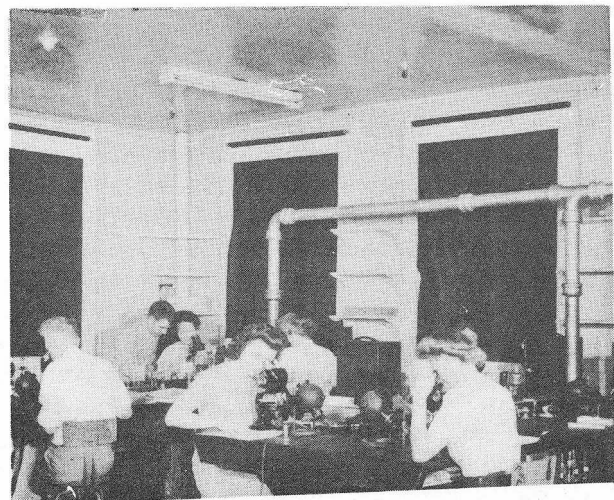
OTHER EXOTIC DISEASES INVOLVED.

The returning overseas veteran was a potential carrier not only of malaria but of numerous other infections, many of which are unknown in the United States. While service men and women benefit by every preventive technique and therapeutic measure known to science before they are discharged or separated from active service, it seemed possible that overt cases of malaria, filariasis, schistosomiasis, leishmaniasis, oriental hookworm infestation, and possibly other parasitoses acquired overseas, might present themselves to practitioners in any state in the union. Special facilities were established, therefore, to aid physicians and medical technicians in the diagnosis of tropical and parasitic diseases and in the recognition of their etiologic agents.

This incomplete works catalogue fails to portray a comprehensive picture of MCWA activities. To support the huge operational program, training, evaluation, and research were necessary.

TRAINING PROGRAM.

The bulk of expenditures — some 70 to 80 percent — has gone for personal services, i. e., labor. These workers numbered upwards of 4,000 at certain seasons of the war years. Together with their supervisors, they had to be recruited largely from personnel ineligible for military service. As the vast majority of technical and professional Americans customarily



CDC offers courses in Laboratory Diagnosis of Parasitic Diseases, where lectures and class supervision are supplemented by actual performance.

concerned with insect control and related activities had been absorbed by the Army and Navy, MCWA was forced to utilize inexperienced and untrained work supervisors and technical directors. To instruct these individuals in the principles and practices of insect and rodent control, a large in-service training program was instituted, and to do it quickly audio-visual teaching methods and materials were employed. Since the materials available were inadequate in scope and quality it was necessary to produce new ones. For the guidance and evaluation of MCWA operations, epidemiologic, entomologic, parasitologic, and technologic field and laboratory facilities of considerable magnitude were maintained. This involved the collection, staining, and examination of thousands of thick blood films, the regular searching for and counting of anophelines and aedines, adult and larval, from a wide range of resting and breeding places, and the development of improved methods and equipment for the application of insecticides and rodenticides.

INVESTIGATION PROGRAM.

Special investigations of operational significance have been or are being carried on in association with the National Institute of Health of the United States Public Health Service, the Health and Safety Division of the Tennessee Valley Authority, the Bureau of Entomology and Plant Quarantine of the United States Department of Agriculture, and various university and state health departments. Research subjects include the determination of whether or not foreign strains of malaria parasites are readily transmitted by native vectors, epidemiologic and entomologic evaluation of DDT domestic spray applications as used by MCWA, reasons for occasional failures of DDT as a residual larvicide, the design and testing of hand and power spraying equipment, the insecticidal durability of DDT under various conditions and on various surfaces, improvement in aerosol methods of dispersing DDT, anopheline host-preference studies, the

effect of destruction of the rat-flea on human typhus prevalence, the significance of flies in the transmission of diarrheal diseases, and many others.

Termination of War Area Program

With the inactivation in 1945 and 1946 of numerous military establishments in this country and the rapid demobilization of the armed forces, the MCWA extracantonment program of malaria control is being rapidly liquidated. After 1946, it will remain only in such areas as have been specially requested by the Army and where state and local health resources are inadequate to supply the services required. The extended program will be continued for one or two more years.

Thus, the war-connected operations of MCWA are rapidly diminishing, as indeed they should. The basic organization, however, of physicians, engineers, and biologists skilled and experienced in the control of insect- and rodent-borne diseases remains and, in the opinion of many, should be continued (1) as a safeguard against a recurrence of that unfortunate state of affairs which prevailed in 1942, when this nation could not find enough competent malaria control teams to service the Army and Navy overseas and to protect the health of its

Collection and examination of thousands of blood films was an important part of the MCWA program in endemic communities.



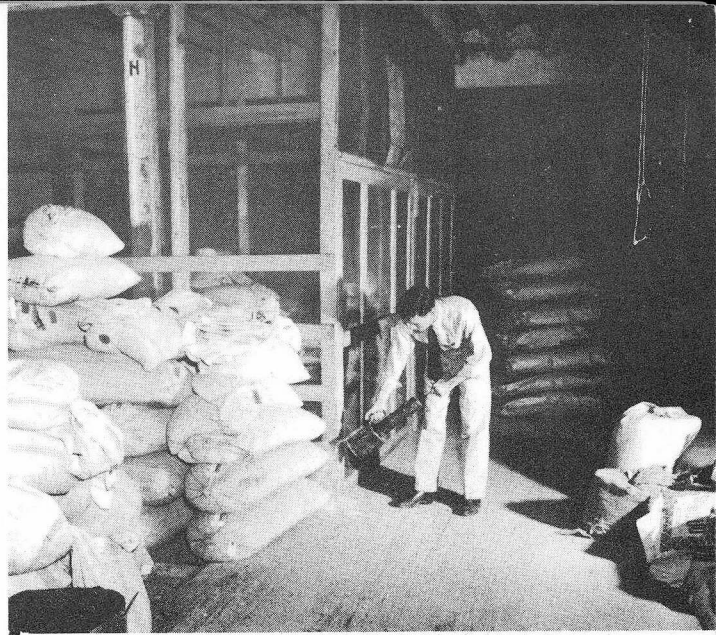
civilians at home; (2) as a prevention against the establishment of exotic infections introduced into this country by returning veterans, occupational troops, or as a result of constantly increasing global air traffic; and (3) to combat certain endemic infections, notably murine typhus, sylvatic plague, and insect-borne virus infections, which are progressively infiltrating and entrenched themselves in new sections of the United States.

COMMUNICABLE DISEASE CENTER

The Communicable Disease Center of the United States Public Health Service was inaugurated officially on July 1, 1946, for the field investigation and control of communicable diseases. The Center, located in Atlanta, Ga., will continue certain training and investigation functions of the Office of Malaria Control in War Areas, which it replaces, and in addition will deal with a special phase of communicable disease prevention not now provided as federal services.

While the majority of the infections to be encompassed by the Center for the present occur either exclusively or more intensively in the tropics or subtropics and are transmitted by insects, the feature truly common to the proposed

MCWA personnel assisted actively in *Aedes aegypti* control campaigns.



Typhus control, one of many "special" activities in which MCWA participated, will be continued under CDC.

group is that the etiologic agent, vector, or reservoir of infection is known or suspected to be zoological. This would include all diseases of protozoan and helminthic origin, the most prominent of which are malaria, amebiasis, the schistosomes, hookworm disease, filariasis, and similar diseases; and certain infections of bacterial or viral etiology, such as yellow fever, dengue, certain neurovirologic disorders, the various forms of typhus and plague, sandfly fever, diverse diarrheas and dysenteries, and possibly other diseases. While such a consolidation may be considered heterogeneous from clinical and nosologic points of view, it is eminently sound, sensible, and workable from the standpoints of laboratory diagnosis, epidemiologic investigation, and control operations.

The consequences of negligence and disregard in these matters reveal themselves in such episodes as the following:

In 1930, *Anopheles gambiae* was discovered to have invaded Brazil, presumably from West Africa. Before this vicious malaria vector had been exterminated in 1942, thousands of persons had died of malaria, hundreds of thousands had been incapacitated temporarily by it, and millions of dollars had been spent in its control—and all because of the importation of a foreign vector of the disease.



In 1933, this country was confronted suddenly with a nation-wide epidemic of amebic disease originating in Chicago. Physicians, laboratorians, and health engineers were totally unprepared to cope with it, and unnecessary losses of life and health resulted.

The onset of World War II found the United States Army virtually without personnel skilled in the diagnosis, management, and prevention of such diseases as malaria, dengue, schistosomiasis, filariases, Japanese B. encephalitis, and others. It was necessary to rob federal and state health services for cadres in these specialties —and these nuclei were pitifully small and all too few.

Insofar as such situations are preventable, they should not be allowed to develop. The best way to forestall them is to foster training, investigations, and control technology as continuing and permanent elements under federal auspices.

In meeting these problems, practicing physicians and local health departments will constitute the main line of defense. Upon them will fall the task of recognizing and treating tropical and related infections and of instituting local preventive and suppressive measures to preclude the spread of these diseases. But these hazards have certain extraterritorial

and interstate aspects which make them matters of federal concern as well. It is the responsibility of the United States Public Health Service to assist in the sensitization of local medical practitioners so that they will remain alert to alien disease hazards, and to provide for the states the specialized assistance not otherwise available for the control of these diseases. The Center will furnish these aids in addition to conducting essential research and developing new equipment, materials, and techniques.

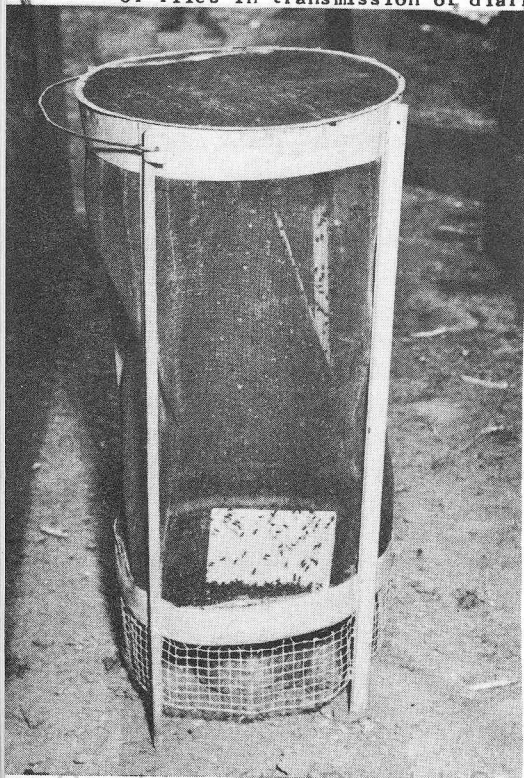
Aside from the administrative mechanism necessary for the existence of such an organization, its functional development can be summarized under three categories corresponding, respectively, to the types of services rendered. Many of these are already established under the auspices of MCWA.

Training and Training Aid Production

IN-SERVICE TRAINING.

Employees entering the Center, either as commissioned officers or as civil servants, will continue to receive orientation training in respect to the United States Public Health Service and the Communicable Disease Center. Specialized

(Left) Fly trap. (Right) Fly census. CDC's study of the significance of flies in transmission of diarrheal diseases.



technical instruction is given in the units to which trainees are detailed.

SPECIAL TRAINING COURSE.

Training in effective control practices for special diseases, such as malaria, typhus, and plague, is being offered to representatives of state and local health departments and to those of other federal agencies concerned in the prevention of these diseases. Similarly, courses in the laboratory diagnosis of infections not now endemic in all parts of the country, but which may be introduced by returning overseas servicemen or as a result of global air transportation, are being given to technicians from public health and clinical laboratories.

VOCATIONAL HEALTH TRAINING.

CDC is to establish a pattern for vocational health training which, presumably, will be carried on in various regionalized centers throughout the country. This activity is already under way. It includes orientation in public health

(Right) Fly insectary maintained for studies in transmission of diarrheal diseases. *(Below)* The effectiveness of DDT in fly control being tested in cow pasture.

viewpoints, definition of federal, state, and local public health relationships, basic field training in public health practices, observation of all types of local health department activities and actual work participation by trainees in the field of their own specialties under training supervisors.

It is not intended for this venture to infringe in any way upon the prerogatives or fields of endeavor of schools or teach-





The CDC mobile laboratory provides rapid field diagnosis under epidemic conditions.



CDC facilities are available for performance of complement-fixation tests, which are highly specific for endemic typhus fever. (Above) Serologist extracts blood for test from rat by heart puncture.

DEMONSTRATION MATERIAL.

State and local health laboratories are being provided with various series of protozoologic, helminthic, bacteriologic, entomologic, and other specimens to assist in the training of technicians, as a reference museum, and for circulation to local clinical laboratories.

Operational Service

EMERGENCY EPIDEMIC CONTROL ASSISTANCE.

As the neurovirological diseases assume a constantly greater importance and as some of these have been shown to be transmitted by insects, it is likely that the United States Public Health Service may be called upon to provide emergency suppressive measures against these as well as other insect-borne diseases. It is proposed that the necessary equipment and materials for such purposes be stock-piled and that a cadre of trained

operatives, regularly employed on other operational details, be kept available for use in dealing with these situations.

ENDEMIC DISEASE CONTROL.

As a major and continuing activity of the operational organization of the Communicable Disease Center, it is planned that demonstrations of insect-borne endemic disease control be undertaken in strategic areas. A model is under way in the Center to demonstrate control of malaria, murine typhus, dengue, filariasis, schistosomiasis, or other control programs. Projects will be established in places where justification for such operations is based upon high disease rates and assurance that preventive measures will be carried on by local authorities after the demonstration phase has been concluded by the Center.

FIELD TESTING.

The facilities of the Communicable Disease Center provide excellent opportunity for the controlled field testing of new or improved materials and equipment designed for communicable disease control.

IMPOUNDED MALARIA CONTROL.

In the past, MCWA engineers have functioned to assist other federal agencies by making surveys and submitting reports, including recommendations, regarding impoundment construction and maintenance and for the purpose of minimizing malaria hazards. This service has been rendered in conjunction with the public health engineers of the states concerned.

Similarly, MCWA engineers have assisted certain state health departments in formulating impounded-water regulations and have thus been in position to set high standards for the design, construction, and maintenance of these structures as far as malaria control is concerned.

These advisory and service functions in connection with impounded water will be continued by the Center and to them will be added investigation activities necessary for the improvement of malaria control practice in impoundments.

EVALUATION OF VECTOR CONTROL.

The results of disease control efficiency are frequently attested more promptly by reduction in vector densities than in specific disease prevalence. Thus it is desirable for operational control groups to have quantitative methods available for the enumeration of vectoral populations as control activities proceed. Such investigations will be maintained in the Center.

EQUIPMENT DESIGN AND TESTING.

Control measures, especially against insect- and arthropod-borne diseases, tend to become more and more mechanized. The present activities of MCWA in designing new control equipment and in testing both new and old will be continued in the Center.

INSECTICIDE AND RODENTICIDE RESEARCH.

The advent of DDT wrote a new chapter in the history of insect control, yet the surface of this important subject is barely scratched. Already isomers of DDT are being subjected to laboratory and field testing, and other entirely new types of allegedly insecticidal compounds are available for investigation. Similarly, in rodent control the development of ANTU and sodium fluoroacetate offer new and unexplored horizons in the reduction of rodent populations. Laboratory and field studies will continue with the objectives of improving and defining the limits of current and new methods of poisoning vectors, and of lowering animal reservoirs of disease.

RELATED BIOLOGIC STUDIES.

The use of insecticides, larvicides, and rodenticides is attended by certain hazards to living creatures other than disease-transmitting insects and rodents. Extensive drainage interferes with the propagation of aquatic and semiaquatic forms of life that concern nature lovers and sportsmen. It behooves the professional sanitarian to keep himself well informed regarding these dangers and to take every precaution consistent with health objectives to avoid interference with wild-life and agricultural interests. Critical ecological studies have been initiated in MCWA to provide first-hand knowledge of the harmful effects of control practices on the biological associates of vectors and reservoirs of disease.

These are the functions to be undertaken by the Communicable Disease Center. Collectively, they exceed the resources and facilities of individual states. They are concerned to a large degree with interstate and extracontinental health hazards. They can be most economically and effectively administered by a single, coordinated agency, since the supporting activities necessary for the productive conduct of the operations indicated above utilize common and interchangeable personnel and equipment.

The scope and magnitude of this enterprise remain to be defined by future events. It is hoped earnestly that the peacetime Communicable Disease Center will merit and receive the same, or greater, support and cooperation from state health departments as did the war-related Office of Malaria Control in War Areas.