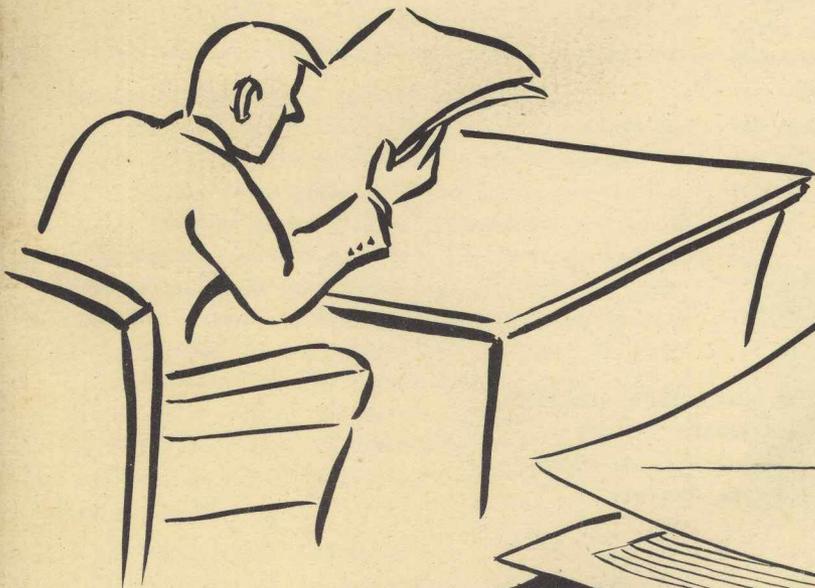
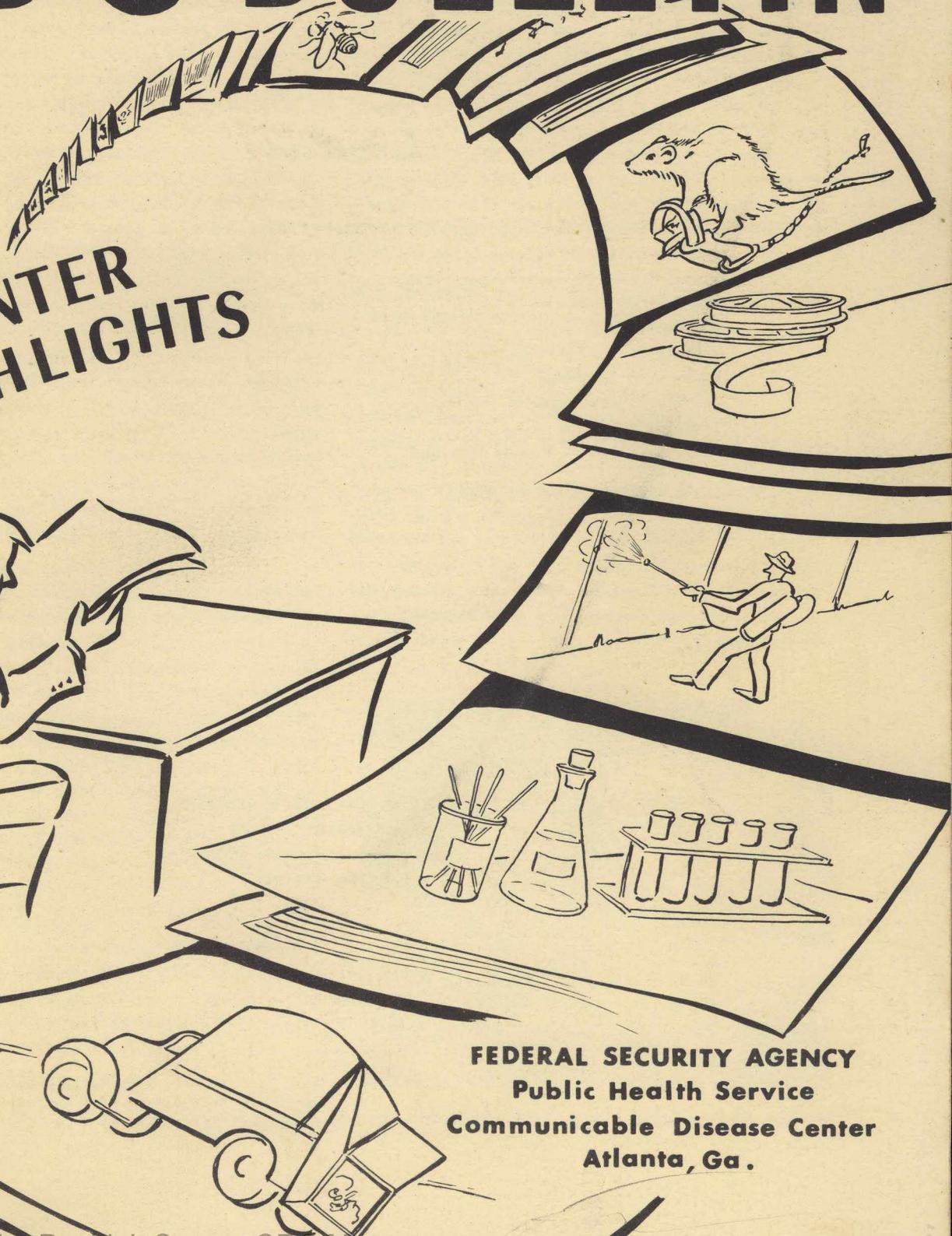


# CDC

# DECEMBER 1950

# BULLETIN

**CENTER  
HIGHLIGHTS**



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

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**FEDERAL SECURITY AGENCY**  
**Public Health Service**  
**Communicable Disease Center**  
**Atlanta, Georgia**

The printing of this publication has been approved by the Director of the Bureau of the Budget, January 19, 1950.

# Administrative Services

## COMMITTEE ON AWARDS ESTABLISHED

A Board on Employee Awards was established by the Federal Security Agency as part of the Management Improvement Program. This Board has prescribed instructions for the administration of the Incentive Award Program. A committee on awards was established for the Center, its functions being to make investigations to determine the amount and kind of awards to be granted on adopted suggestions and nominations for efficiency awards and to make recommendations to the Bureau of State Services for such awards. The Center will have representation on the Committee on Employee Awards to be constituted in the Bureau of State Services for establishing eligibility of outstanding results.

## ACQUISITION OF COMPETITIVE STATUS

An Executive Order providing for acquisition of competitive status by employees serving continuously in a full-time position for 2 years prior to the date of the order became effective August 28, 1950. It is expected that several CDC employees will be eligible and displacement is deferred for those who meet the length-of-service requirement.

## BOARD ANNOUNCES 348 EXAMINATIONS

The CDC Board of Civil Service Examiners announced 348 examinations through September 30, 1950. Steps were taken to close out the two Nationwide examinations in view of the large number of applications already received. The Training Specialist examination was closed on October 11, 1950, and the Insect and Rodent Control Aid and Specialist examination was closed on November 20, 1950. The majority of the latter applications received through the end of the quarter have been rated, and it is expected that all processing will be completed and names added to the register soon after the examination.

## NEW WAREHOUSE CATALOG

Completion by the Warehousing and Distribution Unit of the new warehouse catalog has been accomplished. This catalog is considered a vast improvement in every way over the former one and should be quite useful to the operating units.

## MOTOR BASE CHANGES LOCATION

The Motor Base was established in larger quarters at 1104 Peachtree Street, N. E. The staff

of this facility was increased by the employment of a new shop foreman. These changes will improve both the quantity and quality of the service rendered. With these and the impending move of many Government agencies to the Peachtree Street Building, requests are being received for the furnishing of vehicle storage, maintenance, repairs and gasoline. It is probable that the personnel of this facility will have to be expanded if all requests are to be met. Work for outside agencies is performed on a reimbursable basis and at considerable saving to the Government.

## REQUIREMENT OF QUARTERLY REPORTS ON USE OF GOVERNMENT-OWNED VEHICLES

The revised procedures for the use of Government-owned vehicles by officers and employees between their domiciles and places of employment require a quarterly report covering such use. These reports are due in the Central Office by the fifteenth day of the month following the close of the quarter. This deadline necessitates receipt of reports in the Office of the Chief, Administrative Services not later than 10 days after the close of the quarter. Of the total number of reports covering the quarter just ended, approximately 70 percent were received after the date set for submission. A memorandum in this connection was dispatched to



New quarters for Motor Base provide increased facilities to improve service rendered.

all persons authorized to use Government-owned vehicles for this purpose, which it is hoped will result in closer observance of the established procedure.

#### DECENTRALIZATION OF FISCAL ACCOUNTING

In line with the decentralization of fiscal accounting to various accounting points throughout the country, effective July 1, 1950, this office has discontinued processing all types of documents for San Francisco, Calif.; Little Rock, Ark.; Austin, Tex.; Midwestern CDC Services at Kansas City, Mo.; Puerto Rico; and the FSA Regions.

#### VOLUMES RECEIVED FROM MARINE HOSPITAL MEDICAL LIBRARY

Four hundred and twenty-four volumes have been received from the Marine Hospital Medical Library, Staten Island, N.Y. Titles received include Journal of the American Medical Association, American Journal of the Medical Sciences, Journal of Experimental Medicine, and Centralblatt für Bakteriologie (new title).

#### SOME CURRENT BOOKS RECENTLY ADDED TO THE LIBRARY

With these and other additions the library's collection now totals approximately 9,000 volumes:

Allee, W. C.: Principles of animal ecology, 1949.  
American Management Association: The human relations job of personnel management, 1950.  
American Public Health Association: Control of communicable diseases in man, 1950.  
American Statistical Association: Acceptance sampling, 1950.  
Arley, Niels: Introduction to theory of probability and statistics, 1950.  
Berg, L. S.: Natural regions of the U. S. S. R., translated from the Russian by O. A. Titelbaum, 1950.  
Best, C. H.: Physiological basis of medical practice, 1950.  
Boyd, A. M.: U. S. Government publications, 1949.  
Chemotherapy of tuberculosis; the experimental approach, 1949.  
Chu, Pao: How to know the immature insects, 1949.  
Clinical ACTH Conference. Proceedings. 1st., 1949.  
Cochran, William: Experimental designs, 1950.  
Comroe, J. H.: Physiological basis for oxygen therapy, 1950.  
Craighead, F. C.: Insect enemies of eastern forests, 1950.  
Dahir, James: Communities for better living, 1950.

DeBeer, E. J.: Place of statistical methods in biological and chemical experimentation, 1950.  
Deming, W. E.: Some theory of sampling, 1950.  
Dublin, Louis: Health progress, 1936 to 1945, 1948.  
Fister, H. J.: Manual of standardized procedures for spectrophotometric chemistry, 1950.  
Fonseca, Flavio da: Monograph of the genera and species of Macronyssidae Oudemans, 1948.  
Guthrie, Andrew: Vacuum equipment and technique, 1949.  
Haemoglobin, a symposium based on a conference held at Cambridge in June 1948 in memory of Sir Joseph Barcroft, 1949.  
Hamblin, E. C.: Endocrinology of woman, 1950.  
Haurowitz, Felix: Progress in biochemistry, 1950.  
Index to the dental literature in the English language, 1945-1947, 1949.  
Industrial Hygiene Foundation of America: Transactions of conference on industrial wastes, 1949.  
Jolliffe, Norman (ed.): Clinical nutrition, 1950.  
Kirk, Hamilton: Index to treatment in small-animal practice, 1948.  
Lawrence, C. A.: Surface-active quaternary ammonium germicides, 1950.  
Leahy's hotel guide and travel atlas to U. S., Canada and Mexico, 1949.  
Lutz, Louis: Traite de cryptogamie, 2d ed. rev. and corrected, 1948.  
Marriott, H. L.: Water and salt depletion, 1950.  
Maurello, S. R.: The technique of scratchboard drawing, 1949.  
National Foundation for Infantile Paralysis: Annual report, 12th, 1949.  
New York (State) Department of Health. Division of Laboratories and Research: Studies from ... collected reprints, v.13, 1948-49.  
Newburgh, L. H.: Significance of the body fluids in clinical medicine, 1950.  
Peltier, George: Laboratory manual of microbiology, 2d ed., 1950.  
Powell, J. H.: Bring out your dead, 1949.  
Recent progress in hormone research, v.5, 1950.  
Snapper, Isidore: Medical clinics on bone diseases, 1949.  
Tennessee Valley Authority: The Douglas project, 1949.  
Tennessee Valley Authority: The Fort Loudoun project, 1949.  
Thornton, Horace: Textbook of meat inspection, 1949.  
Towne, C. W.: Pigs, from cave to cornbelt, 1950.

Trautman, Alfred: Lehrbuch der histologie und vergleichenden mikroskopischen anatomie der haustiere, 1949.

U. S. Atomic Energy Commission: Handling radioactive wastes in the atomic energy program, October 1949.

U. S. Scientific Laboratory, Los Alamos, N. Mex.: The effects of atomic weapons, 1950.

U. S. Veterans Administration: Technical bulletins, series 10. v.2, 1948 (pub. 1949) and v.3, 1949 (pub. 1950).

Wells, Benjamin: Clinical pathology, 1950.

#### MANUSCRIPTS EDITED, CLEARED

Twenty-nine manuscripts as follows were edited and cleared for presentation and/or publication:

Ajello, Libero, Grant, V. Q., and Gutzke, M. A.: The use of mineral oil in the maintenance of cultures of fungi pathogenic for humans.

Andrews, J. M.: Book Review, *Microbiology*, by Florence C. Kelly and K. Eileen Hite. pp.XV plus 592. Appleton-Century-Crofts, Inc. New York, 1949.

Andrews, J. M.: Control or eradication?

Atchley, F. O.: A survey of blood parasites in domestic animals in South Carolina.

Buck, R. W.: Securing better housing sanitation.

Donaldson, A. W., Steele, J. H., and Scatterday, J. E.: Creeping eruption in the Southeastern United States.

Ewing, W. H., and Kauffmann, F.: A new coli O-antigen group.

Galton, M. M., McElrath, H. B., Stucker, C. L., and Hardy, A. V.: Salmonellosis in dogs.

Gordon, M. A., and DuBose, H. M.: Anorectal actinomycosis with extensive gluteal and thigh involvement.

Jensen, J. A., Sumerford, W. T., and Fay, R. W.: The use of pine gum rosin as an adhesive in outdoor DDT residual sprays.

Kohler, C. E., and Fox, Irving: The relative attractiveness of New Jersey light traps painted (a) green and (b) yellow to Puerto Rican *Culicoides* (Diptera: Ceratopogonidae (Heleidae)).

Maldonado, J. F., Acosta-Matienzo, Josefina, and Velez-Herrera, Freddy: Biological studies on the miracidium of *Schistosoma mansoni*. Part IV. The role of pH in hatching and longevity.

Melvin, Irene, Klein, G. C., Jones, Warren, and Cummings, M. M.: An evaluation of media for diagnostic cultures of tubercle bacilli (a study based on 7,362 specimens of sputum).

Mohr, C. O.: Entomological background of the distribution of murine typhus and murine plague in the United States.

Parsons, E. I., and Frobisher, Martin, Jr.: Differentiation of *minimus* type *C. diphtheriae* by slow fermentation of dextrose.

Pratt, H. D., and Lane, J. E.: *Hoplopleura oryzomydis* new species, with notes on other United States species of *Hoplopleura* (Anoplura: Haematopinidae).

Pratt, H. D., and Seabrook, E. L.: The occurrence of *Culex iolambdis* Dyar in Florida and Puerto Rico, with a description of the larva (Diptera, Culicidae).

Quinby, G. E.: Progress report of epidemiological appraisal of reported malaria in the United States from 1947 through 1949.

Richmond, Lea, and Cummings, M. M.: An evaluation of methods of testing the virulence of acid-fast bacilli.

Schubert, J. H., and Herndon, J. F.: A catalase liver extract as a growth stimulant for *Brucella* cultures.

Schubert, J. H., and Kelly, M. H.: The precipitin technique for determining species of host blood in mosquitoes—modifications and improvements.

Schubert, J. H., Stanford, S. M., and Tiffany, E. J.: Comparative evaluation of several complement fixation techniques for laboratory diagnosis of the rickettsioses.

Spangler, C. D., Clapp, R. F., and Clark, G. J.: Field test for efficiency of detergents.

Steele, J. H., and Emik, L. O.: Brucellosis incidence in the United States.

Stoenner, H. G.: Experimental Q fever in cattle—epizootiological aspects.

Stoenner, H. G.: Isolation of *Brucella abortus* from sheep.

Tisdale, E. S.: Field training of sanitation personnel.

Thurman, E. B., and Winkler, E. C.: A new species of mosquito in California, *Aedes (Ochlerotatus) bicristatus* (Diptera, Culicidae).

West, Mary G.: Differentiation of paracolon bacteria.

Manuscripts, 1942-1949. A "List of Manuscripts Prepared for Presentation and Publication by MCWA-CDC Personnel, 1942-1949," was issued. Copies are available from the Technical Reports and Library Section upon request.

# Audio-Visual Production Services

## MAJOR PRODUCTIONS RELEASED DURING THE QUARTER

### Motion Pictures

- 4-088.0 Laboratory Diagnosis of Diphtheria - Part I, Microscopic Study and Isolation of *C. diphtheriae*. 16mm, sound, B&W, 13 minutes, 480 feet.
- 4-088.2 Laboratory Diagnosis of Diphtheria - Part II, Determination of Types of *C. diphtheriae*. 16mm, sound, B&W, 12 minutes, 420 feet.
- 4-099.0 Sanitary Milk Production. 16mm, sound, B&W, 14 minutes, 500 feet.
- M37b Rat Control Series: Habits and Characteristics of Rats. Part I - The Norway Rat. (Army - CDC Cooperative Project). 16mm, sound, B&W, 27 minutes, 1001 feet.
- M37c Rat Control Series: Habits and Characteristics of Rats. Part II - The Roof Rat. (Army - CDC Cooperative Project). 16mm, sound, B&W, 13 minutes, 488 feet.

### Filmstrips

- 5-176.0 Laboratory Diagnosis of Diphtheria - Part II, Determination of Types of *C. diphtheriae*. 35mm, sound, color, 7 minutes, 53 frames.
- F13d Histopathology of Human Fungus Infections - Part IV, Systemic Infections. 35mm, sound, color, 60 frames.

### 2x2-Inch Slide Series

- S25 Sanitary Landfill. B&W, 31 slides.

## MAJOR PRODUCTIONS COMPLETED AND AT COMMERCIAL LABORATORY AWAITING RELEASE PRINTS AT END OF THE QUARTER

### Motion Pictures

- 4-101.0 Laboratory Diagnosis of Influenza.
- M37a Rat Control Series: The Rat Problem.

### Filmstrips

- 5-137 The Electrocardiograph.

## OTHER PRODUCTIONS COMPLETED AND RELEASED DURING QUARTER

### Utilization Guides

- G 5-127.0 Laboratory Diagnosis of *Tinea capitis* in Children - Microsporium Infection.
- G 9-033.0 Municipal Sewage Treatment Equipment and Structures.

## PRODUCTION SELECTED FOR SHOWING AT EDINBURGH FILM FESTIVAL

The CDC film "Life Cycle of *Diphyllbothrium latum*," has been accepted for showing at the Edinburgh Film Festival. As yet no word has been received as to the outcome of the showings, but other professional evaluations of this film indicate

that it will stand high in presentation as a scientific film. The film was scheduled to be shown also at the Fourth Congress of the International Scientific Film Association at Florence, Italy, in October.

## STEREOSCOPIC PICTURES FOR CERTAIN SUBJECTS

Preliminary experiments during the quarter indicate that a modern application of an old idea - stereoscopic pictures - may prove to be in great demand for the visual presentation of certain types of subjects. Initial experiments were made for the Venereal Disease Division, and the pictures show primary syphilitic lesions in three dimensional color. The viewers are pocket size and the cost is low enough so that individual students can use the pictures for home study.

## RAT CONTROL FILMS

The series of films on Rat Control, being produced cooperatively with the Army Pictorial Services, neared completion during the quarter. Release prints of two of the films - Habits and Characteristics, Parts I and II, were received from the Army. Duplicating negatives are being provided and sufficient release prints were scheduled to be on hand early in November. Release of the other subjects in the series should follow at intervals of approximately one month.

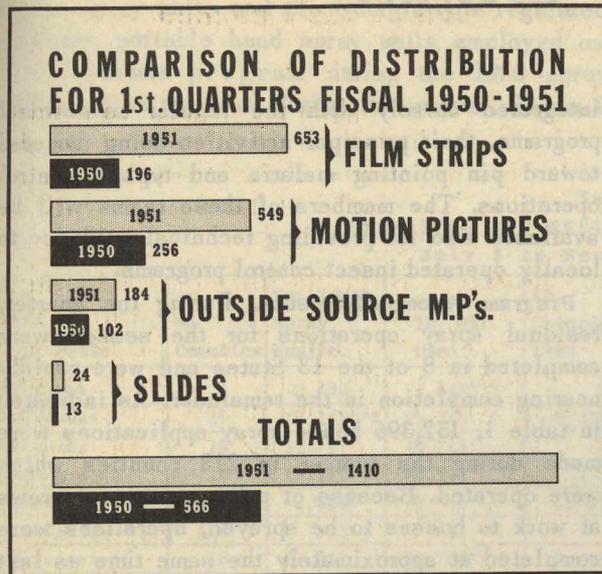
## UTILIZATION

Chart 1 compares distribution by the film library for the quarter with that for the corresponding quarter last year during the summer or slack periods of film use. Nevertheless, the total distribution of 1,410 films and slides for the quarter is 249 percent of that for the corresponding quarter of fiscal year 1950.

## NEW CATALOG

The new CDC Catalog of Motion Pictures and Filmstrips for Professional Use was distributed in response to requests. The larger CDC Film Catalog - Utilization Guide now is being sent only to agencies where it will be used for instructor guidance. Special notices No. 11 and No. 12, and two new utilization guides were mailed to approximately 1,500 agencies holding copies of the Film Catalog - Utilization Guide, to keep the latter up to date.

Chart 1



**AUTOMATIC CONTINUOUS PROJECTOR**

Two automatic continuous motion picture projectors were sent to Charleston, W. Va., and used there in a Fly Control Week program September 18-23.

**TECHNICAL REVIEW COMMITTEES**

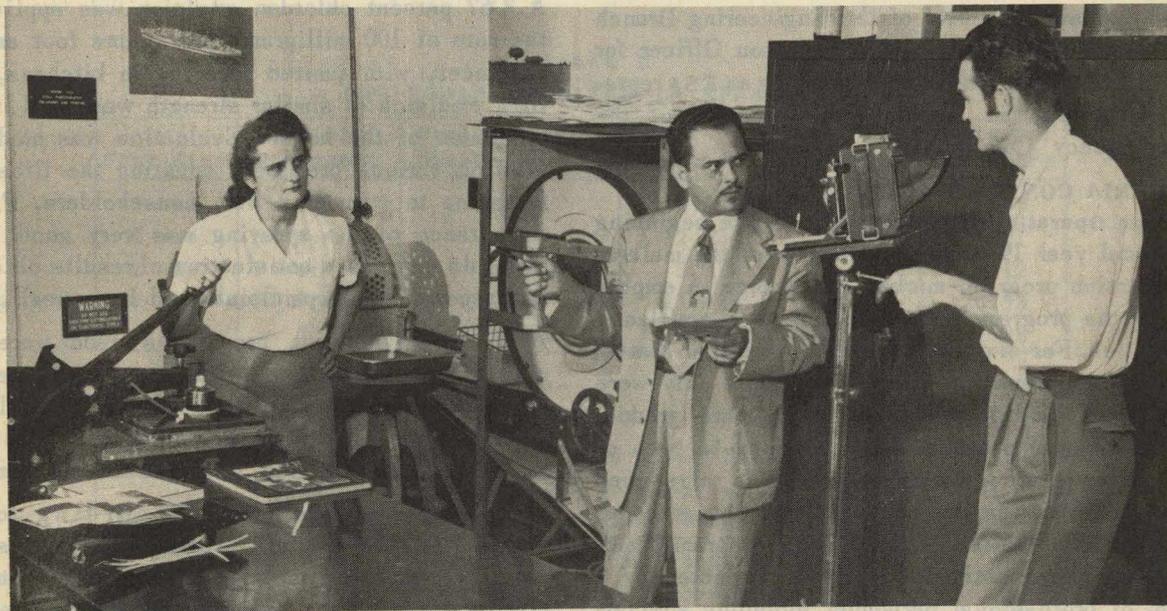
Technical Review Committees were appointed in each of the CDC Services concerned with utiliza-

tion of CDC films. The functions of these committees are: (1) to screen CDC films which have been released for a considerable time and for which evaluation and distribution data have indicated a need for re-examination; (2) to examine all evaluation data compiled for each film; and (3) to make recommendations relative to the need for withdrawal, revision, and replacement.

**ORIENTATION COURSES**

Other utilization and evaluation activities for the quarter were orientation courses in audio-visual education varying in length from part of a day to several weeks. The majority of those receiving instruction were health specialists from foreign countries. Countries represented for the quarter were Argentina, Austria, Brazil, Canada, Ceylon, China, Colombia, Formosa, Germany, Greece, Japan, Norway, Okinawa, Philippines, and Switzerland.

An example of orientation in the production and use of audio-visual aids is the 8-week course being given a representative of the Malaria Division of Public Health Audio-Visual Aids Production in Venezuela. He was assigned the project of producing a filmstrip entitled, "How to Make a Filmstrip - Basic Procedure." Thus he not only learned the theory of filmstrip production but also gained actual practice in the procedures.



A cameraman under the supervision of a foreign trainee (center) prepares to take one of the procedure photographs for a filmstrip.

# Engineering Services

Administrative Officer John P. Zurlo was transferred from the Arkansas CDC program to the Office of the Chief, Engineering Branch, on July 17. In his new position Mr. Zurlo will coordinate and direct administrative functions of all Sections and field projects of the Engineering Branch as well as assume certain management activities of field operating programs.

## ARKANSAS-WHITE-RED RIVER BASINS COMMITTEE

The Arkansas-White-Red River Basins Inter-Agency Committee was formed in compliance with a presidential request and has as its purpose "To implement the policies and purposes of the Federal Inter-Agency River Basin Committee by providing a means through which the field representatives of the participating Federal agencies may effectively interchange information and coordinate their activities among themselves and with those of the States in investigation and preparation of a report covering the water resources and related land resources of the Arkansas-White-Red River Basins." Mr. Carl Warkentin of the Little Rock River Basin office will represent the Federal Security Agency on this committee and will assist in preparation of the report.

The Assistant Chief of the Engineering Branch has been designated as CDC Liaison Officer for the AWRRB work and also is serving as FSA representative on the mapping subcommittee of the Inter-Agency Committee.

## MALARIA CONTROL ACTIVITIES

**From Operations to Surveillance.** The beginning of fiscal year 1951, the fourth year of the malaria eradication program, marked the change in emphasis of the program from operations to surveillance activities. For six of the former operational States, preliminary plans for surveillance units only were developed, and in seven States a more gradual transition was planned. In allocations to each of the seven States, to be continued in a reduced operational status, a lump sum was earmarked to be used to establish a surveillance program immediately. These activities will be conducted by a team of professional personnel including specialists in the fields of epidemiology, entomology, and engineering. The work of such teams will be

integrated closely with the regular operational programs, their principal activities being directed toward pin pointing malaria and typhus control operations. The members of these teams will be available also for providing technical guidance to locally operated insect control programs.

**Program Accomplishments.** During the quarter, residual spray operations for the season were completed in 8 of the 13 States and were rapidly nearing completion in the remainder. As indicated in table 1, 152,396 house spray applications were made during the quarter in 213 counties which were operated. Because of a larger ratio of crews at work to houses to be sprayed, operations were completed at approximately the same time as last year in spite of a delay in the beginning of this year's work.

**Experimental Chlordan Projects.** A report was reviewed from the Georgia program covering an evaluation of experimental chlordan spraying operations conducted in Claxton and Sylvania, Ga., during June, July, and August 1950. Equipment, technical guidance and promotion, and chemicals were furnished by the Georgia CDC program, while immediate supervision and actual labor were paid for by the municipalities involved. A 3.67 percent chlordan emulsion was applied at the rate of 100 milligrams per square foot around entrances, with limited spraying in kitchens, and DDT emulsion of similar strength was used in the remainder of the house. Evaluation was made by visiting various premises, counting the flies and listening to comments from householders. Public acceptance of the spraying was very good. City officials expressed satisfaction of results obtained and reported that complaints had been negligible.

While the evaluation procedures used were not entirely in accordance with generally accepted procedures, it was indicated that fly control had been achieved by this type of spraying. Most of the fly counts in the business establishments were around garbage areas. According to the report from the Georgia program, by the use of sanitary, approved garbage cans and reasonable premises sanitation, effective fly control can be achieved for the period within residual toxicity limits of chlordan.

**Time Studies.** A report of the comparative efficiencies of one- and two-man spray crews using power spray units and the Georgia-type regulated pressure portable hand spray units employed on the Oklahoma program during the 1950 spray season, was received during the quarter. Table 2

gives the number of units treated, total man-hours, man-hours per unit, and units per man-hour, and table 3 shows the comparative labor efficiency.

#### TYPHUS AND RODENT CONTROL ACTIVITIES

The number of reported typhus cases for the

**Table 1**  
SUMMARY OF DDT RESIDUAL SPRAY OPERATIONS  
July 1 to September 30, 1950

State	No. Counties	No. House Spray Applic.	Lb. DDT Used	Lb. Chlordan Used	MAN-HOURS				Lb. DDT Per Applic.	Man-hours Per Applic.	Man-hours Per Lb. DDT
					CDC	Local	Percent Local	Total			
Alabama	7	2,450	1,843****	8	3,227	2,574	44.4	5,801	0.75	2.37	3.15
Arkansas	37	18,149***	25,276	6,080	8,974	27,217	75.2	36,191	1.39	1.99	1.43
Florida	18	11,797	18,745	-	-	13,191	100.0	13,191	1.59	1.12	0.70
Georgia	20	29,172	23,701	135	7,295	18,204	71.4	25,499	0.81	0.87	1.08
Kentucky	10	2,089	2,769	1,082	-	5,096	100.0	5,096	1.33	2.44	1.84
Louisiana	8	533	627	-	2,316	631	21.4	2,947	1.18	5.53	4.70
Mississippi	18	21,312	24,766*****	2,049	5,072	19,929	79.7	25,001	1.16	1.17	1.01
Missouri	1	178	245	-	-	240	100.0	240	1.38	1.35	0.98
North Carolina	16	15,653	14,144	272	-	12,502	100.0	12,502	0.90	0.80	0.88
Oklahoma	7	1,584	1,681	-	-	1,516	100.0	1,516	1.06	0.96	0.90
South Carolina	44	29,070	31,389	785	1,560	36,555	95.9	38,115	1.08	1.31	1.21
Tennessee*	1	2,882	2,180	1,268	20	3,252	99.4	3,272	0.76	1.14	1.50
Texas**	26	17,527	14,319	-	6,659	17,352	72.3	24,011	0.82	1.37	1.68
<b>Totals</b>	<b>213</b>	<b>152,396</b>	<b>161,685</b>	<b>11,679</b>	<b>35,123</b>	<b>158,259</b>	<b>81.8</b>	<b>193,382</b>	<b>1.06</b>	<b>1.27</b>	<b>1.20</b>

\*Through Aug. 5, 1950, only.

\*\*Through Sept. 16, 1950, only.

\*\*\*Excluding 146 experimental chlordan applications and applicable chemical and man-hour data.

\*\*\*\*Excluding 719 lb. rosin-based DDT.

\*\*\*\*\*Excluding 5 lb. lindane.

**Table 2**  
MAN-HOURS UTILIZED IN SPRAYING

Crew Size	Type of Equipment	Dwelling Units Treated	Total Man-hours	Man-hours per Unit	Units per Man-hours
1 man	Power	3,743	2,392	0.64	1.56
1 man	RP Sprayer	3,720	2,930	0.79	1.27
2 man	Power	3,562	3,176	0.89	1.12
2 man	RP Sprayer	10,560	11,414	1.08	0.93
		21,585	19,912	0.92	1.08

**Table 3**  
COMPARATIVE LABOR EFFICIENCY

Crew Size	Type of Equipment	Comparative Crew Size	Comparative Type Equipment	Increased Labor Efficiency
2 man	Power	2 man	RP Portable	20.4
1 man	Power	1 man	RP Portable	22.8
1 man	Power	2 man	RP Portable	67.7
1 man	Power	2 man	Power	39.3

second quarter of calendar year 1950 was 172, as compared with 226 cases for the same period in 1949. Three hundred and eight cases occurred in the first 6 months of this calendar year, compared with 405 for the same period in 1949, a favorable reduction of 97 cases for the period.

There were 64,682 premises dusted, with a total of 31,865 man-hours, an average of 0.5 man-hour per premises. During the same quarter of fiscal year 1949, 122,327 premises were dusted with an average of 0.4 man-hour per premises. An average of 3.4 pounds of 10 percent DDT dust was used per premises.

During the quarter, 650 premises were ratproofed in 11 typhus States with 28,921 man-hours, an average of 44.5 man-hours per premises. In addition to ratproofing in the typhus States, 337 premises were ratproofed with 2,202 man-hours, an average of 6.5 man-hours, in the States operating under rodent control. This makes a total of 987 premises ratproofed with 31,123 man-hours for the operations of both typhus and rodent control.

Man-hours spent on sanitation activities continued to increase during the quarter. Ten thousand two hundred and ninety-one man-hours were spent on antirat sanitation in the typhus States, and 14,776 man-hours in the rodent control States, a total of 25,067 for the entire operations.

Total CDC and local man-hours on activities in the typhus States for the quarter were 139,720. Of this figure, State and local services contributed 78 percent. In the rodent control States, CDC and local man-hours totaled 52,125, with a local contribution of 81 percent. Table 4 summarizes typhus and rodent control operations for the quarter.

**Typhus and Rodent Control Memorandum.** Summary of Control Operations No. 5, "Summary of Typhus and Rodent Control Operations for fiscal year 1950," was distributed.

**Miscellaneous Activities.** A demonstration of sanitary landfill equipment was observed in Bowling Green, Ky. The city officials are becoming more interested in garbage storage, collection, and disposal as an antirat measure, and are becoming increasingly aware of the city's responsibility for proper garbage collection, storage, and disposal.

#### **FLY CONTROL ACTIVITIES**

**Polio-Fly Control Projects.** The Topeka, Kans., polio-fly control project was to have closed at the end of the current operating season. Field activities were to stop in October. However, certain materials and equipment items will be left with

the local health department so that control operations may continue in the future under local sponsorship and direction.

Operational activities were hampered significantly by rain at Charleston, W. Va., and Topeka, but satisfactory control was maintained generally. Upon completion of a single, city-wide residual spray application with dieldrin, space spraying and partial residual retreatment of problem areas proved sufficient. The sanitation accomplishments of the past year undoubtedly were responsible for the prolonged effectiveness of the single residual treatment. During the latter part of July, garbage collectors in Charleston went on strike, leaving the city without collection services for a period of 8 days. Despite this unfortunate occurrence, no major loss of control was observed.

At Phoenix, Ariz., an unusually prolonged rainy season and cooler temperatures apparently have increased fly breeding and sustained the fly peak above the usual midsummer decline. The unusual weather conditions, coupled with the surprising ineffectiveness of the dieldrin residual applications, have resulted in poor fly control on the project. In only four of the seven sections of the city may the fly levels be termed reasonably low. Of the remaining three sections, the business section was variable and the two large substandard sections showed no response to chemical control measures. In the latter part of August, an immediate intensive sanitation program was devised to improve the level of garbage storage and collection in the substandard areas. This will be followed by a more comprehensive program aimed at the elimination of other fly breeding sources. Further application of dieldrin residual virtually was stopped and chemical efforts were concentrated on space spraying with chlordan in the business section and the substandard sections of the city. This emergency action resulted in a significant downward trend on fly levels, but must be regarded as a holding action rather than effective control of the situation. A major revision of the organization of the Phoenix project is anticipated in the near future.

The city officials of Phoenix have been contacted several times concerning the plans to institute the sanitary landfill method for the disposal of garbage and refuse. Negotiation of new garbage collection contracts with private collectors has progressed, suitable land has been procured, and contracts have been let for the purchase of equipment. Operations were expected to start

about December 1, pending delivery of earth moving equipment. Concurrent with the commencement of landfill operations, extension of garbage collection service in the substandard areas was contemplated.

Special collections of fly eggs and larvae from Phoenix, Topeka, and Charleston, were made for dieldrin resistance tests at the Savannah, Ga., laboratory. The need for such tests was demonstrated by the apparent ineffectiveness of dieldrin on the Phoenix project. The trapping of flies and the collection of sewage specimens were continued at all projects throughout the quarter despite inclement weather.

Projects at both Troy, N. Y., and Muskegon, Mich., were operated at a much reduced scale during the quarter. Each project had received a single city-wide coverage by residual spray application (dieldrin at Troy and chlordan at Muskegon) during the previous quarter. Principal activities during the current quarter were directed towards evaluation of the effectiveness of the residual treatment and collection of virological fly and sewage samples for examination by the National Foundation for Infantile Paralysis. From partial data, the single dieldrin application at Troy appears to have been effective over the entire short season. The chlordan applications at Muskegon were relatively short lived. Both projects were closed officially on September 20, and equipment and materials transferred to other projects.

Late in September, personnel from the Fly Control Section went to Paulding, Ohio, to coordinate and guide the engineering phases of an investigation of the poliomyelitis epidemic in that area.

**Dysentery and Diarrhea-Fly Control Program.** The dysentery and diarrhea projects in Arizona, New Mexico, Texas, and Kentucky now are attaining full-scale operation. Control operations have been initiated at all projects; and good environmental sanitation, supplemented with chemical control, was emphasized. News and radio announcements, educational pamphlets, and films have been utilized to inform the public about the fly control program and proper sanitation procedures. The various State and local health departments and civic organizations have contributed their support willingly to the local programs.

Surveys of garbage and refuse collection systems in project cities were completed and recommendations made as to means of correcting existing faults, including revision of health and sanitation ordinances.

The program to replace inadequate garbage containers with standard cans was especially effective in Yuma, Ariz., where 1,200 cans were sold during the month of July. In Texas, many communities have sent representatives to observe the activities of the two project cities. The program in Harlan, Ky., was organized during the quarter, and nearby communities have evidenced interest in initiating similar fly control programs.

#### **IMPOUNDED WATER STUDIES**

**Corps of Engineers Impoundments.** Reconnaissance malaria control survey reports were completed and submitted to the Corps of Engineers, Department of the Army, on five projects during the quarter, as follows: Old Hickory and Carthage in Tennessee, Celina in Kentucky, Pioneer in Kansas, Colorado, and Nebraska, and Acworth Subimpoundment in Georgia. Requests were received from the Corps of Engineers for two survey reports, the Greers Ferry and McNary projects in Arkansas and Washington-Oregon, respectively. A field investigation of the McNary Reservoir was completed.

After several conferences and field trips in connection with the proposed clearing plans of the Corps of Engineers for the Clark Hill project in Georgia and South Carolina, the Corps of Engineers agreed to clear this large reservoir in accordance with the impounded water regulations of these States.

**Bureau of Reclamation Projects.** Reports on mosquito vector problems associated with these projects, prepared by the Midwestern CDC Services Office, were reviewed and revised. Four projects were involved: Angostura in South Dakota, Dickinson in North Dakota, and Engers and Medicine Creek in Nebraska.

**Encephalitis-Irrigation Investigations.** An extended field investigation in the Missouri River Basin (Colorado, Nebraska, and Wyoming) and in California was made to study mosquito control problems associated with irrigation projects. The Midwestern CDC Services Office and the California State Department of Health collaborated in the study. Based on observations made during the field investigation, it was concluded that the principal mosquito production problems are associated with wasted water on irrigated lands, rather than being associated with storage reservoirs or the main distribution systems. Basic material obtained during this investigation will be used in the preparation of an informational brochure on such problems.

TYPHUS AND RODENT

June 25 to September 16, 1950 (From Pay

Table 4(a)

STATE	SUPERVISION				TRAINING AND EDUCATIONAL ACTIVITIES					LAY INVESTIGATIONS Premises	ECTOPARASITE CONTROL							EVALUATION ACTIVITIES			
	P. H. S. Man-hours				Meetings	No. Attending	Man-hours	No. Training	Man-hours		Residual Dusting				DOT Spray			P. H. S. M. H. L&LF*	Others M. H. L&LF*		
	State Super. & Adm.	Regional Super. & Entom.	Warehouse & Shop	Other Man-hours						Man-hours	Cos. Rep.	Premises Dusted	Lb. DDT & Lb./ Prem.	P. H. S.	Others	M. H. & M. H./ Prem. L&LF*	Premises Treated			Gal. & Gal./ Prem.	M. H. & M. H./ Prem. L&LF*
Alabama	600	144	0	480	0	0	0	0	0	10	24,384	69,173 2.8	1,083	7,433	8,516 0.3	0	0	0	552	79	
Arkansas	357	0	0	0	7	206	1,499	0	0	0	0	0	0	0	0	0	0	0	0	0	
Florida	771	136	328	1,991	0	0	0	0	0	14	14,642	75,700 5.2	209	9,379	9,588 0.7	0	0	0	114	1,024	
Georgia	4,329	1,708	0	840	8	85	175	0	0	476 336	30	15,680 3.4	1,102	6,017	53,167 1,282 0.5	0	0	0	379	1,865	
Louisiana	680	0	656	960	0	0	0	0	40	3	1,104	4,272 3.7	104	1,178	1,282 1.2	0	0	0	232	568	
Mississippi	1,072	280	40	740	3	85	173	22	92	3	1,161	1,010 0.7	104	258	362 0.3	0	0	0	144	0	
North Carolina	480	0	0	550	0	0	0	0	0	5	1,135	2,685 2.4	13	563	576 0.5	0	0	0	400	40	
South Carolina	1,328	400	504	0	0	0	0	0	0	3	268	678 2.5	0	245	245 0.9	0	0	0	0	407	
Tennessee	0	0	0	0	0	0	0	0	0	1	953	413 0.4	0	120	120 0.1	0	0	0	6	230	
Texas	2,912	1,560	0	480	0	0	0	0	0	11	5,355	10,219 1.9	809	3,248	4,057 0.8	0	0	0	169	121	
Virginia	766	0	0	8	9	794	216	28	56	0	0	0	0	0	0	0	0	0	0	214	
Totals	13,295	4,228	1,528	6,049	27	1,170	2,063	50	188	476 336	80	64,682 217,317	3.4	3,424	28,441	31,865 0.5	0	0	0	1,996	4,548

Table 4(b)

STATE	SUPERVISION				TRAINING AND EDUCATIONAL ACTIVITIES					LAY INVESTIGATIONS Premises	ECTOPARASITE CONTROL							EVALUATION ACTIVITIES				
	P. H. S. Man-hours				Meetings	No. Attending	Man-hours	No. Training	Man-hours		Residual Dusting				DOT Spray			P. H. S. M. H. L&LF*	Others M. H. L&LF*			
	State Super. & Adm.	Regional Super. & Entom.	Warehouse & Shop	Other Man-hours						Man-hours	Cos. Rep.	Premises Dusted	Lb. DDT & Lb./ Prem.	P. H. S.	Others	M. H. & M. H./ Prem. L&LF*	Premises Treated			Gal. & Gal./ Prem.	M. H. & M. H./ Prem. L&LF*	
California	0																					
Colorado	220			426	1		28		48											4	16	
District of Columbia	160			320																		
Hawaii										2	96	424 4.4	0	55	55 0.6	852	1,650 1.9	851 1.0	599	15,675		
Idaho	40							2	317											120	200	
Illinois	78			16																		
Kentucky	152																			408	616	
Midwest	552			168	7	95	1,574	7	1,128													
Minnesota	320			76																		
Montana																						
New Jersey						1	32	2	160												736	800
New Mexico																						
New York																						
Ohio												42			40					390	670	
Oklahoma	80			50	1	19	40	2	24	1	23	1.8	0	40	1.7							
Oregon	304			15					456													
Rhode Island	36			40	2	52	10													26	26	
Utah	336			76	1	150	24															
Washington																				88	24	
Wyoming									48			466			95		1,650	851				
Totals	2,278			1,257	12	317	1,708	13	2,181	3	119	3.9	0	95	0.8	852	1,650	851	2,371	18,027		
GRAND TOTALS	15,573	4,228	1,528	7,306	39	1,487	3,771	63	2,369	476 336	83	64,801 217,783	3.4	3,424	28,536	31,960 0.5	852	1,650	851	4,367	22,575	

\*Labor and labor foreman.  
 \*\*Alabama uses arsenic water.  
 \*\*\*Ratproofing done by private contractors, inspections by health department personnel.  
 \*\*\*\*Area or dump poisoning.

CONTROL OPERATIONS  
Roll Period Progress Report)

Table 4(a) (continued)

RATPROOFING AND ERADICATION					RAT REDUCTION										SURVEYS		LEAVE		MAN-HOURS SUMMARY					
Initial Ratproofing		Init. Erad.		Maint.	Poison Bait (Food)				Poison Water '1080'			Cyanogas		San. Activities		Estab-lishments	Man-hours		Man-hours	P. H. S.	Others	Total		
Proj. Rep.	Est. Complete	M.H. & Est. L&L*	M.H. L&L*	M.H. L&L*	Cos. Rep.	Est. Poisoned	Lb. Bait & Lb./ Est.	M.H. & Est. L&L*	Est. Poisoned	Pts. Used & Pts./ Est.	M.H. & Est. L&L*	Lb. Used	M.H. L&L*	Man-hours P. H. S.	Others		P. H. S.	Others						
0	0	0	0	0	8	12,909	6,280 0.5	6,133 0.5	2,495**	2.2	0.8	2,099	1,678	64	0	0	0	0	0	0	3,136	17,196	20,332	
1	0	0	0	1,303	1	1,057	660 0.6	164 0.2				0	0	12	477	0	0	0	0	0	480	3,332	3,812	
3	63	1,775 28.2	81	4	3	293	469 1.6	448 1.5	216	0.8	1.1	9	7	280	920	0	0	0	0	0	287	2,394	15,608	18,002
1	49	4,784 97.6	548	352	27	15,572	11,690 0.8	7,588 0.5	11	1.8	5.2	1,105	1,491	224	459	0	0	0	0	0	643	9,600	23,297	32,897
1	0***	524 524.0	12	0	1	112	56 0.5	176 1.6	69	2.4	2.0	0	0	0	0	0	0	0	0	0	0	1,928	3,342	5,270
0	0	0	0	0	4	347	558 1.6	284 0.8	200	0.8	2.0	0	0	119	189	0	0	0	0	0	0	1,863	2,027	3,890
4	102	4,476 43.9	42	4	7	3,788	4,649 1.2	2,121 0.6	244	1.3	2.0	168	188	8	5,016	0	0	0	0	0	8	1,904	12,503	14,407
3	43	1,104 25.7	0	870	2	8	4 0.4	40 5.0	30	0.4	2.0	0	0	0	240	0	0	0	0	0	80	2,792	2,486	5,278
4	78	4,773 61.2	480	380	2	356	151 0.4	406 1.1	10	0.2	2.0	23	335	10	394	0	0	0	0	0	0	80	7,074	7,154
6	250	11,319 45.3	449	0	11	0	0 0	0	3,111	2,084 0.7	4,193 1.3	0	0	430	1,447	0	0	0	0	0	0	6,946	20,191	27,137
1	65	166 2.6	0	0	1	12	57 4.8	18 1.5	1	4 4.0	4 4.0	2	5	0	0	0	0	0	0	0	88	918	623	1,541
24	650	28,921 44.5	1,612	2,913	67	34,454	24,574 0.7	17,378 0.5	6,387	8,297 1.3	7,699 1.2	3,406	3,704	1,147	9,144	0	0	0	0	0	1,106	32,041	107,679	139,720

Table 4(b) (continued)

RATPROOFING AND ERADICATION					RAT REDUCTION										SURVEYS		LEAVE		MAN-HOURS SUMMARY								
Initial Ratproofing		Init. Erad.		Maint.	Poison Bait (Food)				Poison Water '1080'			Cyanogas		San. Activities		Estab-lishments	Man-hours		Man-hours	P. H. S.	Others	Total					
Proj. Rep.	Est. Complete	M.H. & Est. L&L*	M.H. L&L*	M.H. L&L*	Cos. Rep.	Est. Poisoned	Lb. Bait & Lb./ Est.	M.H. & Est. L&L*	Est. Poisoned	Pts. Used & Pts./ Est.	M.H. & Est. L&L*	Lb. Used	M.H. L&L*	Man-hours P. H. S.	Others		P. H. S.	Others									
															376	281					0	616	853	1,469			
							1,120 0.5	2,880 1.3							0	8,202						0	160	11,402	11,562		
1					362	3	540	2,130 3.9	1,382 2.6	1	3.0	2.0	128	214		1,544						0	1,070	19,613	20,683		
															261	91						40	540	209	749		
															97	47						40	335	263	598		
															21	0	326	80 0.2	104 0.3			0	253	104	357		
																						40	1,384	3,102	4,486		
																		80	50				400	126	526		
																		80	24				40	400	24	424	
															280	0	54	1.5	0.4				40	400	24	424	
															368	256							448	368	816		
															214	630							950	1,430	2,380		
															172	160						68	240	160	400		
1	3	45 15.0													240	755							240	800	1,040		
																							480	814	1,294		
																							480	487	967		
																							220	184	404		
															0	20	98	0.6	0.6				220	184	404		
																							40	894	1,160	2,054	
1	237	1,263 5.3			1	1		16 16.0							108	139								252	1,048	1,300	
3	97	894 9.2	378		2	15	20 1.3	28 1.9																480	136	616	
															1	1*									480	136	616
6	337	2,202 6.5	482	362	9	2,799	4,310 1.5	4,473 1.6	1	3.0	2.0	128	234	2,563	12,213	497	312 0.6	246 0.5				268	9,842	42,283	52,125		
30	987	31,123 31.5	2,094	3,275	76	37,253	28,884 0.8	21,851 0.6	6,388	8,300 1.3	7,701 1.2	3,534	3,938	3,710	21,357	497	312 0.6	246 0.5				1,374	41,883	149,962	191,845		

# Entomologic Services

## MALARIA ERADICATION PROGRAM

Reports covering house inspections on the Malaria Eradication Program indicate that there has been no lessening of effectiveness of residual sprays against *Anopheles quadrimaculatus*. These reports also seem to indicate that "quad" abundance during the 1950 season has been the lowest since the program began.

## MALARIA INVESTIGATIONS

### HELENA, ARK., FIELD STATION

**Malaria Morbidity Observations.** Visits were made to all residents of the intensive study area and blood films collected from all recent immigrants, as well as from persons having symptoms suggestive of malaria. No positive films were obtained. In addition, assistance was rendered in malaria surveillance activities in White and Phillips Counties, Ark. No positive cases were located.

**Anopheline Abundance.** Density indices show that *A. quadrimaculatus* was abnormally scarce during the quarter. To determine if this condition could be due to the extensive use of the cotton insecticides, 3-5-40 (3 percent BHC, 5 percent DDT, and 40 percent sulphur) and 2½-5-40 (2½ percent aldrin, 5 percent DDT, and 40 percent sulphur), observations were made around a 30-acre cotton field. The field was dusted between 8 p.m. and 11 p.m. with the 3-5-40 mixture. Screened cages containing 50 adult *quadrimaculatus* were placed at intervals up to 500 yards in each direction from the field. The following morning the cages were examined and all adults were dead in those placed up to 500 yards to the north, 400 yards to the east, and 300 yards to the south of the field. A mortality of 10 percent occurred in control cages. It should be noted that there was a light wind movement to the northeast during the evening. Since there are probably few points in the study area which are more than 500 yards from a cotton field, it seems likely that cotton dusting operations may be responsible for the low anopheline densities. This possibility is further supported by the fact that numbers of mosquitoes in resting places increased after dusting was discontinued.

Over 300 female anophelines including both

*quadrimaculatus* and *crucians* were dissected during the quarter. No salivary gland infections were found.

### MANNING, S. C., FIELD STATION.

**Malaria survey.** Continuing the routine monthly collections of human blood films in the experimental area, 86 percent of the total population of 1,700 individuals was tested for the presence of malaria parasites. The examination to date of some 500 blood slides has turned up no positives. Blood slides from approximately 84 percent of this population were taken each month during the quarter, and in addition, 81 percent of the human marginal population of 1,184 was sampled once during the quarter. All of the July slides and 525 of the August slides have been examined, and no positives reported. It is now 18 months since the last positive slide was found. Checks upon technicians made by inserting known positives in the slide series have indicated satisfactory performance. About 80 percent of the houses in the area were given a second semiannual DDT treatment during the quarter.

Populations of both adult and larval anopheline mosquitoes in the area have been very low, rising rather markedly, however, in September with the increase in rainfall. Many of the study ponds in the area had nearly or quite dried during the early part of the quarter.

**Parasitological work.** The numbers of female *crucians* and *quadrimaculatus* adults available and dissected for the study of sporozoites were small, roughly about half as many as last year's accumulative totals in this period. Only two *crucians* were sporozoite-positive this quarter. These had only small numbers of sporozoites, and therefore were not suitable for tests with paretics at the South Carolina State Hospital.

Several more *crucians* and "quads" were found infected with unknown filarial worms, to bring the infection rates for the year to 0.24 percent for the former and 0.11 percent for the latter. Of all mosquitoes dissected this season, 0.20 percent contained these filarial worms.

For the purpose of further improving techniques of handling sporozoites, as gaged by subsequent

positive blood films, additional bird malaria transfers through artificial inoculations were performed, using the laboratory strain of *Plasmodium relictum*. Citrated canary blood was found to be superior to normal saline as a medium for use in making these transfers.

The results of laboratory studies on the transmission of bird malaria by anopheline mosquitoes made during the quarter are shown in table 1. It will be noted that no gland-positive "quads" have been found, although a few guts have been observed with oocysts. It also should be noted that every specimen (14 dissected, of 24 fed) of the *Culex quinquefasciatus* showed both gut and gland positives.

Examinations were completed of both thick and

thin blood films taken from 1,638 animals during this survey. Table 2 shows that 1 percent of some 300 equine animals were infected with microfilaria, (*Setaria equina?*), whereas 3 percent of some 400 bovine animals were positive for blood parasites. Of the bovines, 2 percent were infected with microfilaria (*Setaria cervi?*); approximately 23 percent of dogs were positive for heartworm (*Dirofilaria immitis*), and 1 percent had trypanosomes (*Trypanosoma theileri*). In the birds, more than 15 percent of some 400 mature chickens were found to be infected with a leucocytozoon parasite. Of the foregoing results, the discovery of the relatively common *Leucocytozoon sp.* in domestic chickens may explain the occurrence of the sporozoites in wild-caught anophelines which continue to be re-

Table 1  
INFECTIONS OF MOSQUITOES WITH "PLASMODIUM RELICTUM"

Lot No.	Species	No. Fed	No. Dissected	Days after Feeding	Negative		Positive	
					Gut	Gland	Gut	Gland
1	<i>Culex quinquefasciatus</i>	24	14	8 to 12	0	0	14	14
2	<i>Culex quinquefasciatus</i>	27	8	5 to 10	0	0	8	8
3	<i>Anopheles quadrimaculatus</i> (Q-1)	23	9*	5 to 18	6	9	3	0
4	<i>Anopheles crucians</i>	39	13	5 to 11	13	13	0	0
5	<i>Anopheles quadrimaculatus</i> (Q-1)	70	45	14 to 17	45	45	0	0

\*Only three of these "quads" survived as long as 18 days after infected blood meal and they were negative - both gut and gland.

Table 2  
BLOOD PARASITE SURVEY OF DOMESTIC ANIMALS - MANNING, S. C.

Animals	Total Animals Sampled to Date	Microscopic Examinations This Quarter	Cumulative Examinations	Micro-filaria	Trypanosomes	Leuco-cytozoon	Haemo-proteus
Mammalian							
Equine	300	-	300	3*	-	-	-
Bovine	400	-	400	8**	4***	-	-
Canine	400	250	400	91****	-	-	-
Porcine	106	56	106	-	-	-	-
Avian							
Chicken	400	302	400	-	-	61	-
Duck	13	13	13	-	-	-	-
Goose	7	7	7	-	-	-	-
Guinea	2	2	2	-	-	-	-
Turkey	10	8	10	-	-	10*****	3
<b>Total</b>	<b>1,638</b>	<b>638</b>	<b>1,638</b>	<b>102</b>	<b>4</b>	<b>71</b>	<b>3</b>

\**Setaria equina* (?)  
\*\**Setaria cervi* (?)  
\*\*\**Trypanosoma theileri*

\*\*\*\**Dirofilaria immitis*  
\*\*\*\*\**Leucocytozoon smithi*

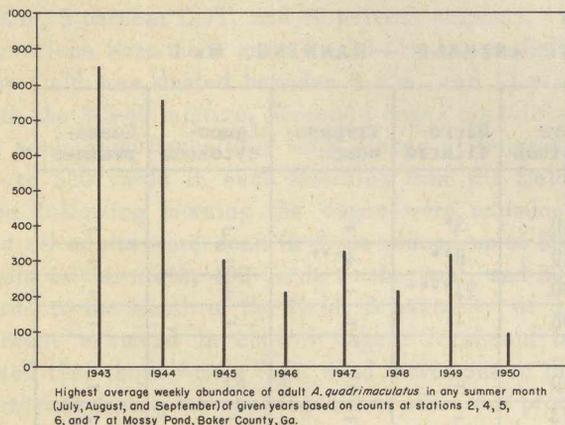
corded in the absence of any blood-positive cases of human malaria. Studies on this possibility and on the blood parasites of wild animals (primarily reptilian to date) are continuing.

NEWTON, GA., FIELD STATION.

During the quarter, 10 of the persons visited by the station nurse in the experimental area had some of the symptoms of malaria, but in no instance was malaria diagnosed. Returns on all submitted blood films, so far as received from the laboratory, have been negative.

The drought has been so severe that surface waters have been almost nonexistent in the experimental area throughout the summer; small residual pools remain only in the most nearly permanent bodies of water. According to the U. S. Weather Bureau, the period from September 1, 1949, through September 30, 1950, was the driest recorded at Albany (about fifty miles to the northeast), in the more than fifty years for which there are records. Anophelines, usually abundant in the summer, have been exceedingly rare (figure 1), and in some localities which normally support large populations of *Anopheles*, these mosquitoes have been entirely lacking over considerable periods. It was necessary to go outside the experimental area to obtain specimens in sufficient quantities for dissections, and as a source of ova from which specimens could be reared for use in other projects.

Figure 1



FSA - PHS

CDC-ATLANTA, GA.

NOV. 1950

Large numbers of reared *Anopheles crucians* females were utilized in a special project of testing the susceptibility of this species to local avian malarials. A total of 876 *crucians* females were induced to feed on infected birds and 265 of these survived until dissected. Except for a single oocyst,

found on the stomach of one specimen, all were negative. Infections were demonstrated, however, in control lots of *Aedes aegypti* and *C. quinquefasciatus* fed on the same birds.

The NIH strain of *A. quadrimaculatus* was closed out at the beginning of the quarter and new attempts are being made to colonize a local strain of this species.

Techniques are being developed and keys prepared for the identification in all instars of the local anophelines. Other studies of the morphology and biology of local anophelines are in progress.

Seven of 157 wild *crucians* dissected during the quarter were found gland positive for a small sporozoite-like body identical with the structures found in the glands of specimens of this species in the summers of 1948 and 1949. Foreguts and hindguts as well as stomachs were dissected, but cysts were not found. When stained, the small sporozoite-like bodies appear more like inorganic crystals than like sporozoites.

During the quarter, 136 birds and 66 lizards were examined for blood protozoa. Twenty-five of the birds were positive for *Plasmodium* and 29 were positive for *Haemoproteus*. Only 5 of 66 lizards were found infected with *Plasmodium*. The vector of this lizard parasite has not yet been discovered.

#### ECTOPARASITE INVESTIGATIONS.

**Murine Typhus Activities.** During the 6-month period January through June 1950, 6,140 rats (including some dead rats examined for ectoparasites) were examined in 10 Southern States. In addition, records on 340 rats from a rodent survey in Oklahoma, and on 12 rats from a rat survey started in Illinois in June, were received for this period. Of the above 6,492 rats, 3,849 (59 percent) were from 10 percent DDT dust projects; 1,486 (23 percent) were from areas where 5 percent DDT dust formerly had been used in Georgia, Alabama, and Tennessee; and 1,157 (18 percent) were from rodent surveys in undusted counties of seven States.

Analyses have been made on the geographical distribution and relative abundance of the two species of rats, *Rattus norvegicus* and *Rattus rattus*, and on the geographical distribution and abundance of the Oriental rat flea, *Xenopsylla cheopis*. A detailed study of several phases of the incidence of typhus infection in rats is now under way.

**Tick-Tularemia Investigations in Arkansas.** The greater part of the work on the Arkansas tick-

tularemia project\* has been completed and it is considered that sufficient data are available to present some of the results at this time. These results may be divided into two parts as follows: (a) a tick survey of Arkansas, and (b) testing of ticks for tularemia infection.

Only four species of ticks were taken during this survey: the lone-star tick, *Amblyomma americanum*; the American dog tick, *Dermacentor variabilis*; the black-legged tick, *Ixodes scapularis*; and the rabbit tick, *Haemaphysalis leporis-palustris*. Of these, *A. americanum* and *D. variabilis* were taken commonly on several hosts, *I. scapularis* appeared only as single specimens, and *H. leporis-palustris* was taken only on rabbits and quail. *A. americanum* was very abundant in the west-central section of the State and was found in greater or lesser numbers in nearly all of the counties in which collections were made. *D. variabilis* was not as numerous as *A. americanum* in most of the areas surveyed, but was taken in 16 of the 28 counties where collections were made. Records on the elevation at which collections were made and at which ticks were collected show that the lone-star tick occurs at all elevations in Arkansas up to at least 2,000 feet. It appears to be most numerous, however, at elevations of between 500 and 1,000 feet. The American dog tick was taken at elevations of from 200 feet up to at least 1,500 feet but did not show a definite altitudinal preference within this range. The majority of collections of ticks were made by dragging a large piece of white flannel over grass and low vegetation in areas where ticks might be expected to be found. Adults and nymphs of *A. americanum* were taken in large numbers by this method. Adults of *D. variabilis* and of *I. scapularis* also were taken readily by this method. Both adults and nymphs of *A. americanum* will attach readily to man. *D. variabilis* also was found attached to man, but records from the men operating the drags showed that it did not attach as quickly as did *A. americanum*. *A. americanum* adults, or adults and nymphs, were taken on dogs, horses, wild pigs, cattle, and in greatest numbers on deer. Nymphs of this species also were taken on rabbits, tree squirrels, and on opossums. *D. variabilis* adults were taken on dogs, wild pigs, horses, and opossums, but nymphs of this species were found only on dogs. The rabbit tick, *H. leporis-palustris*, was found only on rabbits and quail, adults and nymphs of this species being taken on both hosts. Adults and

nymphs of the lone-star tick, *A. americanum*, were taken in large numbers, both on a drag and on various animals, during the entire period of the survey. The available data, representing collections from many counties by different collectors, do not indicate a definite peak or cycle of abundance of either adults or nymphs within this 4½-month period. The first adults of *D. variabilis* were taken on April 22, and the greatest numbers of this species were taken from about June 13 to July 20. Nymphs of *D. variabilis* were taken only during July. *I. scapularis* is known to be most common during the cooler months and consequently very few specimens were taken during the survey.

Records of the Arkansas State Health Department show that the incidence of tularemia cases, and especially those having a history of tick bite, have a very definite geographical and/or altitudinal distribution, being highest in the hilly counties of the northwestern and west-central parts of the State and quite low in the eastern and southern counties where the elevation is low. It appears from the foregoing information that there may well be a correlation between the occurrence of tularemia cases and abundance of the two ticks — *A. americanum* and *D. variabilis*.

Tests of ticks for the presence of tularemia were made and results have been received to date from the Western CDC Laboratory on tests of 20 pools of ticks consisting of totals of 228 adults and 875 nymphs of *A. americanum*, 48 adults of *D. variabilis*, and 5 adults of *H. leporis-palustris*. These were collected from a drag and from six species of animal hosts during the periods April 18–May 19, and August 3–29, 1950, in 16 counties in western and central Arkansas. All of these pools of ticks were negative for tularemia. Further collections remain to be tested.

#### ENCEPHALITIS INVESTIGATION. (In cooperation with Hooper Foundation, University of California)

During the quarter, emphasis again was primarily on field investigations in the epidemiology of arthropod-borne virus encephalitis in Kern County, Calif. Arthropod material and blood samples collected in the field laboratory in Bakersfield, Calif., were transmitted to the San Francisco, Calif., laboratory for testing.

**Encephalitis Incidence in the Study Area.** Between May and September, 15 cases of clinically-diagnosed equine encephalomyelitis were reported

\*The background, aims, and organization of this project were given in the September 1950 CDC Bulletin, pp.17–18.

by local veterinarians, the earliest symptom onset being May 21 and the last reported early in August; 7 of the 15 sick horses died, but only one case has been confirmed as Western equine encephalomyelitis by the isolation of virus from brain tissue.

A relatively large number of cases exhibiting clinical symptoms of human encephalitis are admitted to the Kern General Hospital annually, and blood samples have been obtained from nearly 150 such patients, both during the acute phase of illness, and during convalescence. Laboratory confirmation in most cases is not yet available, except that two cases positive for Western equine, and two positive for St. Louis type of encephalitis have been reported.

**Entomological Studies.** During the period June through September, over 50,000 mosquitoes were collected, identified, and frozen for virus testing; some 32,000 of these were *Culex tarsalis*, which is suspected to be the primary mosquito vector. Although only a small portion of these mosquitoes have as yet been tested through mouse inoculation, some 14 viruses have been isolated to date, all from *C. tarsalis*, and four of the viruses have been identified as being of the Western equine type.

During the same period, 183 blood samples were obtained from wild birds trapped in the study area, and 278 bloods were collected from normal horses in the area; the blood from both groups is to be tested for the presence of antibodies to the encephalitic viruses.

Avian malaria studies were carried on to a limited extent this year, and 189 blood smears were made from trapped wild birds. Also, 924 mosquitoes were

dissected and examined for the presence of oocysts and sporozoites of malaria; these dissections showed 6 percent of 751 *C. tarsalis* specimens positive, and 7 percent of 14 *Culex stigmatosoma* positive; the other 6 mosquito species dissected all proved negative. The comparison of these results with those of previous years indicates that the infection rate this year was quite low.

**Preliminary Trials with Bait Traps and Dry Ice.** Preliminary results obtained using dry ice as a bait in two animal-bait-type traps indicate that it is superior bait to either calf or chicken, insofar as attracting large numbers of mosquitoes is concerned. This ratio of attractiveness was evident throughout all the trials, and is especially significant when one notes the large number of the important species — *C. tarsalis*, *C. quinquefasciatus*, and *Aedes nigromaculis* — that were taken (table 3). It would appear plausible from these results to consider that dry ice may be an attractant more readily standardized than is possible in using animals, in cases where it is desired to compare mosquito catches made over a period of time. In the present instance, however, the primary purpose in using the traps was to obtain as many mosquitoes as possible from pasture areas, and it is realized that the data available for comparisons of catches with dry ice versus animal baits are not entirely adequate.

**Studies on Mosquito Biology.** Data are being obtained on the relative proportion of deplete and gravid or engorged females of these species being collected in shelters throughout the year, so as to compare the seasonal activities of several adult

Table 3  
COMPARISON OF MOSQUITO CAPTURES IN BATES-TYPE TRAP  
BETWEEN DRY ICE AND OTHER ATTRACTANTS

Bait Used	Number of Trials	Species of Mosquitoes Captured									
		<i>C. tarsalis</i>		<i>C. quinquefasciatus</i>		<i>A. dorsalis</i>		<i>A. nigromaculis</i>		Misc. Species	
		Total Caught	Ave./ Trial	Total Caught	Ave./ Trial	Total Caught	Ave./ Trial	Total Caught	Ave./ Trial	Total Caught	Ave./ Trial
Dry ice (CO <sub>2</sub> )	49	9,036	184	578	12	175	4	4,477	91	11	0.3
Dry ice-Light	2	234	117	26	13	46	23	2,551	1,275	0	0
Light alone	1	42	42	0	0	8	8	7	7	0	0
Calf	8	879	110	43	5	4	0.5	400	50	0	0
Chicken	7	780	111	120	17	2	0.3	21	3	0	0
Control (No bait)	3	10	3.3	0	0	0	0	10	3.3	0	0

*Culex* species in the study area; although observations will be carried out for at least one complete year, preliminary indications are that *quinquefasciatus* rapidly increases its activity towards the end of August, whereas *tarsalis* begins to decrease, both in numbers and in feeding activity, in August.

There has been some question as to whether the eggs of *tarsalis* are able to withstand severe winter cold, and therefore might serve as the overwintering phase of the species in areas where winters are severe. Observations in this area indicate that *tarsalis* most likely overwinters here as an adult female, and a small amount of breeding has occurred even during January and February, which are normally the coldest months of the year in Kern County, Calif. In testing the effect of cold on *tarsalis* eggs in the laboratory, egg rafts were subjected to various degrees of refrigerator temperatures; whereas controls hatched in approximately 48 hours, none of the eggs placed in the refrigerator at temperatures between 4 degrees and 7 degrees centigrade hatched after being removed and held at room temperature for as long as 6 days. It was also noted that eggs left frozen into ice were disrupted and that the individual eggs sank when the ice melted.

Yakima, Wash., Studies, 1949. The final results of neutralization tests on avian serum samples from wild birds collected in August 1949 have been obtained; 25 different bird species were bled and a relatively high incidence of St. Louis encephalitis neutralizing antibodies was found, as compared with that for Western equine; no explanation of this ratio is offered at this time. The past few years have been a period of quiescence insofar as encephalitis is concerned, and no evidence of virus activity has been found in any other group of animals in this area.

Neutralization Test of the Chicken Sera, Kern County, Calif. In February 1950, 87 chickens were tested in Kern County for Western equine encephalitis, and 92 chickens were tested for the St. Louis type with the results indicated in table 4.

It will be noted that the bulk of positive sera was obtained in Shafter and other rural areas, and that urban Bakersfield had relatively few positive sera. It is believed that this may be due in large part to the more complete control of *Culex* mosquitoes in the urban areas; in rural parts of the Kern County Mosquito Abatement District, emphasis is and always has been placed upon the control of *Aedes*, chiefly because of the great importance of the annoyance problem, and of the fact that sufficient funds are not available to finance the minutely detailed inspection necessary to control *C. tarsalis* effectively.

#### FLY-POLIO INVESTIGATIONS

Full-scale control operations were in effect at Phoenix, Ariz., Topeka, Kans., and Charleston, W. Va., during this quarter. At the latter two cities, a high degree of control prevailed throughout the season. In Topeka, fly densities remained at the general level of 2 to 3.5 flies per grill count in all sections of the city; in Charleston, weekly grill indices rarely exceeded 2.5 flies per grill count (figure 2). Of 3,888 inspections of fixed and random station blocks in Charleston, only 6 percent averaged more than 5 flies per grill count as compared to 56.3 percent in the untreated town. Only one block inspection in the treated city yielded an average in excess of 30 flies per grill count.

Effective control in these cities stems from combined sanitational-chemical control measures. Insecticidal treatment consisted of a city-wide application of dieldrin (25 milligrams per square foot) to fly resting surfaces in May and June, followed

Table 4  
RESULTS OF NEUTRALIZATION TESTS ON CHICKEN SERA,  
KERN COUNTY, CALIF., FEBRUARY 1950

Area	Western Equine				St. Louis			
	No. Tested	No. Pos.	No. Neg.	Percent Pos.	No. Tested	No. Pos.	No. Neg.	Percent Pos.
Bakersfield (urban)	20*	1	19	5.0	21	0	21	0
Shafter (rural)	36**	14	22	37.8	38	7	31	18.4
Other rural	31**	11	20	35.4	33	10	23	30.3

\* Plus one doubtful.

\*\*Plus three doubtful.



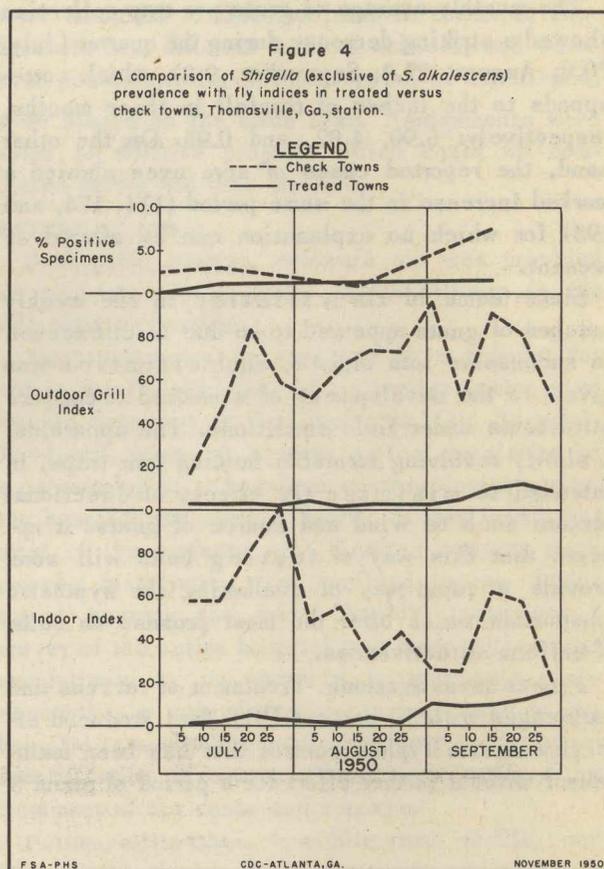
breeding in animal enclosures but actually enhanced it. Other breeding sources, however, showed curtailed breeding. Since animal enclosures are numerous in all study areas, fly populations in check towns were normal or above for the season. Other insects, particularly agricultural pests, were in over-normal abundance.

**Dysentery Studies.** The substitution of dieldrin and chlordan for DDT sprays midway in the fourth quarter resulted in excellent fly control in the three treated towns during July and most of August. Late in August resistance to both chlordan and dieldrin became apparent in the treated towns. Laboratory tests of field flies confirmed the field observations, and during September this resistance to dieldrin and chlordan was shown to be relatively greater than previously had been the resistance to DDT. In fact, in tests at field dosage levels, flies from treated towns frequently showed mortality rates similar to untreated checks. Throughout September, control difficulties in the treated towns were confined to barns and other animal enclosures. These represented not only areas of greatest fly breeding but also of most complete surface area coverage with the residual insecticide. Of particular note was the fact that the town treated with chlordan, and never with dieldrin, yielded flies as resistant to dieldrin as those from dieldrin-treated towns. At the end of the quarter, DDT sprays were found to be superior to either chlordan or dieldrin by both laboratory and field test methods, but fell considerably short of maintaining the degree of fly control first enjoyed with dieldrin and chlordan.

Entomological studies continued as planned except that during July and August the extremely low fly populations in the treated towns prevented adequate testing of field flies for resistance to insecticides. The rapid increase in fly abundance in September provided ample flies for testing. From the data thus obtained it was currently indicated that:

- (1) In all three towns DDT is now more effective at field dosage rates than either chlordan or dieldrin.
  - (2) Chlordan is slightly more effective at field dosage rates than dieldrin.
  - (3) Use of chlordan sprays has developed resistance to dieldrin as great as the use of dieldrin itself.
  - (4) Doubling test dieldrin dosage rates (to 100 milligrams per square foot) resulted in only a slight increase in mortality in resistant flies.
- Epidemiological studies continued and 5,300

homes were revisited for history of illness data. Rectal swab cultures of children taken by the nurse totaled 3,100. Both history data and swab cultures indicated presence of diarrheal disease and the number of cultures positive for pathogenic *Shigella* spp. continued at a greater rate in the untreated, as compared to the treated towns (figure 4). The study of the *Salmonellae* in domestic animals and of comparability of *Salmonella* media progressed satisfactorily.



**Conjunctivitis Studies.** Epidemiological investigation of sore eyes including bacteriological cultures has continued as originally planned. Of 812 cases and contacts in the household study, 238 (28 percent) yielded cultures of *Hemophilus* from the eye. Approximately two-thirds of the strains were *H. aegyptius*, and Koch-Weeks bacillus, while the rest were *H. influenzae* (Pfeiffer's bacillus). This is in contrast to the winter months when the great majority of strains recovered were *H. influenzae*.

With the opening of elementary schools in September, the school study was resumed under the

same procedure as last year which stressed cultural examination of acute cases.

The routine trapping of *Hippelates* in the same blocks used in the study of sore eyes continued to show great variation from town to town and from week to week. It cannot be stated conclusively to what extent this variability reflects the actual prevalence of eye gnats, but to obtain a control on the trapping results, observations have been started on the numbers of gnats which are attracted to people out of doors, especially children.

The monthly average of gnats per trap collection showed a striking decrease during the quarter (July, 70.8; August, 27.3; September, 9.3), which corresponds to the inches of rainfall in these months, respectively: 6.90, 4.82, and 0.95. On the other hand, the reported cases of sore eyes showed a marked increase in the same period (114, 174, and 198) for which no explanation can be offered at present.

Since some of the variation in the weekly catches of gnats appeared to be due to differences in successive lots of bait, much attention was given to the development of a method to compare attractants under field conditions. The apparatus, a slowly revolving turntable holding four traps, is intended to minimize the effects of directional factors such as wind and source of gnats. It appears that this way of testing baits will soon provide a rapid way of evaluating the synthetic compounds which offer the most promise as baits of uniform attractiveness.

**Typhus Investigations.** Treatment of rat runs and harborage with 10 percent DDT dust produced effective murine typhus control that has been maintained without further effort for a period of about 3

years beyond completion of the last dusting cycle.

A greater reduction in *Xenopsylla cheopis* abundance and in prevalence of typhus antibodies in rats was accomplished in Brooks County than in Thomas County by treating a higher percentage of the Brooks County premises with more dust per establishment.

In dusted areas, since February 1948, there has been a generally upward trend in both *X. cheopis* abundance and in prevalence of typhus antibodies in rats. Percentages of rats infested with *X. cheopis* and positive to the typhus complement fixation test during 1950 were as follows:

	Percent Infested		Percent Positive	
	July	August	July	August
Grady (untreated)	77	70	46	44
Thomas (dusted)	31	31	7	12
Brooks (dusted)	23	27	6	13

Unanswered questions: (1) How long will previous dusting operations remain effective in typhus control? (2) Will continued dusting operations result in eradication of typhus from the rat reservoir?

Human epidemiological studies show that during the quarter only one case of typhus fever was confirmed, and that was in July from Grady County. No confirmed cases have been found in Thomas County this calendar year as compared to 2 in Brooks County and 13 in Grady County.

Serious thought is being given to the suggestion that murine typhus fever might be eliminated as a disease of public health importance in the United States by presently known control procedures. A proposal for testing the feasibility of such an eradication program has been prepared.

## Epidemiologic Services

### NATIONAL DEFENSE

Continuing emphasis was placed throughout the quarter on planning for the modification of the program of the Center to serve more effectively in the national defense. Two subjects received special attention: (1) the promotion of studies on air-borne disease, and (2) the development of an epidemic intelligence service in the Nation.

**Air-borne Disease Studies.** As a long-range policy for the development of defense against possible biological warfare, the decision was made to give a high priority to studies of air-borne disease. In the planning, emphasis is being placed on the development of sound peacetime research and field projects which in themselves may not carry the highest priority but with the defense

implication are to receive first attention. A primary objective is to develop professional personnel with detailed knowledge and experience in the problems of the measurement, study, and control of pathogenic particles in the air. Existing or new programs in which Epidemiologic Services is participating are:

Environmental studies of the dissemination of pathogenic agents at the newborn nursery in Charity Hospital, New Orleans, La. These studies include bacterial air sampling for the possible dissemination of enteric organisms through the air and ventilating system of the nursery.

Studies of ragweed hay fever and other pollen diseases in Charleston, W. Va., and possibly in Kansas City, Kans., and Phoenix, Ariz. In the poliomyelitis morbidity survey studies in Charleston and Phoenix, the incidence of hay fever is being measured by monthly house-to-house interviewing. These epidemiologic studies will be correlated with measurement of pollen densities, using the continuous pollen sampler developed in the Technical Development Services\*.

The continuous pollen sampler will be utilized in Kansas City, not only for determination of pollen densities, but also as a tool for development in searching for histoplasmosis spores in the air.

Studies of the epidemiology of coccidioidomycosis in Phoenix have been initiated and will include efforts to isolate this agent from the air and from dust.

**Epidemic Intelligence.** In order to prepare for the rapid detection of possible epidemics resulting from induced enemy action, plans have been developed for expanding the epidemic aid responsibilities of CDC by recruiting young medical officers and providing them with the maximum amount of experience in the investigation of naturally occurring epidemics. These epidemiologists will be placed in strategic centers in the country to serve State and local health departments. They will be affiliated with research laboratories studying infectious diseases whenever possible.

In the national defense program, a modified system of uniform national morbidity reporting is an essential feature. These epidemiologists will participate in developing the reporting system and in consulting with the States in this problem. Plans for modifying the morbidity reporting system have been developed extensively in cooperation

with the National Office of Vital Statistics and the Public Health Service Committee on Morbidity Reporting (page 22).

#### MEDICAL STUDENT PROGRAM

During the summer of 1950 the medical student program was extended and organized into a more effective program than in past years. Fourteen students were drawn from all stages of medical training on the basis of an expressed interest in epidemiological field work. Following a 1-week period of general orientation in Atlanta, Ga., they were assigned to field projects in teams of two. Students from different medical schools, and whenever possible, with different years of experience, were placed on the same team. Assignments were made to definite projects which could be completed during the time allowed.

#### EPIDEMIC AID

During the quarter, epidemic aid was provided as requested by State health officers in the following outbreaks:

**Amebiasis-Iowa.** In response to a request for aid in the investigation of a possible outbreak of amebic dysentery at the Woodward State Hospital, Woodward, Iowa, in August, a team consisting of a parasitologist and medical epidemiologist visited the hospital and made a survey. It was found that most of the patients with diarrhea carrying *Endamoeba histolytica* were confined to two dormitories housing the most "untidy" patients. A survey of the entire hospital was made with recommendations as to possible improvements. Subsequently, a trained technician was sent to the hospital to assist the local laboratory in the better identification of cases. Plans were outlined for treatment of the cases and carriers.

**Poliomyelitis-Ohio.** A mobile team of CDC and Ohio State Health Department personnel was organized for aid in the control and investigation of an epidemic of poliomyelitis in Paulding County, Ohio, following a request in September. In this rural county of approximately 15,000 persons, 32 cases of paralytic poliomyelitis had occurred since the first of July and 8 cases had been reported during the week prior to September 23. A preliminary survey by the State epidemiologist indicated that the cases were concentrated in two small communities, Paulding and Jackson, where the rate exceeded 500 per 100,000. Considerable community alarm was present.

\*See CDC Bulletin, November 1950, p. 24.

The mobile team made an intensive study with the view to allaying public hysteria and in the hope that useful leads for future control procedures might be uncovered. A full report of the epidemic will be presented subsequently.

**Infant Diarrhea-Alabama.** Representatives from the Diarrhea-Dysentery Unit in New Orleans, La., conducted environmental studies in a nursery in a moderate-sized Alabama city following the report on September 19 of a minor outbreak of infant diarrhea. Recommendations for improved techniques were made.

#### REPORTABLE DISEASES LIST CHANGES

Changes in the national list of reportable diseases, to be effective throughout the country on January 1, 1951, are based in part on the experience of the Communicable Disease Center in the use of morbidity data gathered from the States by the National Office of Vital Statistics. Day-to-day use of these data has indicated discrepancies, inaccuracies, incompleteness, and other inadequacies, varying from disease to disease. For example, there are now in existence two sets of morbidity data for a given disease; weekly figures by county and monthly figures by State. These two sets of data in many instances bear no resemblance to each other and their use requires careful handling to avoid complete confusion.

In March 1950, the Public Health Service Committee on Morbidity Reporting was appointed with the Chief, Epidemiologic Services, and the Officer in Charge, Statistics Section, being full members. The CDC representatives were assigned the responsibility of reviewing the list of notifiable diseases and making recommendations for a modified list. A study of the problem was made and program reviews in three Southeastern States were completed. A report "A Proposal for Revising Morbidity Reporting by States," was submitted to the full committee on September 28. The report has been accepted, with modifications, by the Committee and became the substantial body of the full report, which was to be submitted to the State and Territorial Health Officers Association, the American Public Health Association, and all State health departments.

It is proposed that the State monthly report be discontinued and that only a weekly report by county and a corrected annual report be employed. Details of these changes will be given in a later CDC Bulletin.

#### FIELD CONSULTATION SERVICES

Statistical assistance to field stations in the past had been accomplished largely through central office consultation. During the present quarter, steps were taken toward provision of more direct service through brief assignment of central office statisticians to field stations.

In the desire to develop consultation services to State health departments in the promotion of the soundest communicable disease control programs, the Chief, Epidemiologic Services, conducted program reviews of the general communicable disease control programs in Mississippi, Georgia, and South Carolina, for the VI Regional Office program review.

#### DISEASE APPRAISAL

**Malaria.** Future plans for the malaria appraisal program have been modified. Instead of concentrating activities of epidemiologic personnel assigned to the States to the simple appraisal of reported cases of malaria, the reorientation of the program will emphasize malaria surveillance with the view to detecting as promptly as possible any local foci of endemic spread of malaria so that prompt eradication measures may be undertaken. Plans were well developed before the end of the quarter for the organization, in each of the 13 operational States, of malaria surveillance teams, consisting of an epidemiologist, an engineer, and an entomologist, to maintain a constant check on the malaria problem and to insure that malaria does not become re-established in this country. Table 1 shows the malaria appraisal record for the quarter.

**Typhus.** Progress can be reported in the plans to extend the personnel now employed in malaria appraisal to more intensive study of typhus fever. Whenever the load of malaria cases permits, personnel assigned to States are appraising typhus cases and promoting, insofar as possible, laboratory confirmation, using the complement fixation test.

The most extensive activity is being conducted in the State of Georgia without personnel from CDC. Of a total of 75 cases reported in Georgia, 11 have been proved positive and 64 remain still to be completed. Inasmuch as therapy is known to delay the antibody response, it will be several months before a final classification of these 64 cases can be made. Table 2 lists typhus appraisal results for the quarter.

**Table 1**  
**RECORD OF MALARIA APPRAISAL**  
**July 1 to September 30, 1950**

State	Total Cases Appraised	Cases Appraised as				
		Positive	Presumptive	Doubtful and Improbable	Not Malaria	Incomplete
Alabama	12	-	6	6	-	-
Arkansas	37	1*	2	11	17	6
Georgia	20	-	5	15	-	-
Mississippi	30	1	7	22	-	-
South Carolina	23	2**	5	8	-	8
Tennessee	11	-	3	8	-	-
Texas	115	20***	1	94	-	-
<b>Totals</b>	<b>248</b>	<b>24</b>	<b>29</b>	<b>164</b>	<b>17</b>	<b>14</b>

\*Acquired in Panama.

\*\*One of these represents the Nation's first case of quartan malaria in some years. It was discovered in a colored school teacher in an area traditionally endemic for this type of malaria.

\*\*\*Most of these were introduced from Mexico.

**Table 2**  
**RECORD OF TYPHUS APPRAISAL**  
**July 1 to September 30, 1950**

State	Total Cases Appraised	Cases Appraised as				
		Positive	Presumptive	Doubtful and Improbable	Not Typhus	Incomplete
Arkansas	1	1	-	-	-	-
Georgia	75	11	-	-	-	64
Mississippi	2	1(W.F.*)	-	1	-	-
South Carolina	1	-	-	-	1	-
<b>Totals</b>	<b>79</b>	<b>13</b>	<b>-</b>	<b>1</b>	<b>1</b>	<b>64</b>

\*Weil-Felix test

#### INVESTIGATION OF DISEASES

**Poliomyelitis.** Tables 3, 4, 5, and 6 show the results of poliomyelitis investigations during the quarter in Phoenix and Maricopa County, Ariz., and Charleston and Kanawha County, W. Va.

In Charleston four cases of poliomyelitis occurred within a one-block radius with one fatality. Enumeration of all households in the area involved (four blocks) was made on September 1. The reported morbidity in these blocks is shown in table 7 as compared with reported morbidity in the rest of Charleston at the same time. It will be seen that the incidence of minor illness was higher in the area of special blocks than in the other survey areas in Charleston.

Substantial progress has been made in the coding of basic family records and of the morbidity reports from Charleston and Phoenix.

**Table 3**  
**INCIDENCE OF REPORTED POLIOMYELITIS**  
**Phoenix and Maricopa County, Ariz.**

1950	Paralytic		Nonparalytic		Doubtful	
	Phoenix	Total	Phoenix	Total	Phoenix	Total
Jan. - June	1	6	6	11	1	6
July	1	3	0	2	-	-
Aug.	4	16	4	14	2	6
Sept.	1	4	2	10	2	5
Total through Sept.	7	29	12	37	5	17

The laboratory collaborative studies in the poliomyelitis-fly investigations will involve the testing of the following human specimens for virus isolation:

- (1) From frank paralytic cases, five stool

**Table 4**  
**SUMMARY OF MORBIDITY SURVEY**  
**Phoenix, Ariz.**

1950 Period	Number of Households	Number of Persons	Persons with Symptoms*		Persons with Fever		Persons with Symptoms at Time of Visit	
			Number	Percent	Number	Percent	Number	Percent
May 24 to July 24	1,546	5,468	708	12.9	157	2.9	319	5.8
June 26 to August 26	1,447	5,129	818	15.9	161	3.1	392	7.6
July 26 to September 30	1,496	5,321	966	18.2	157	3.0	501	9.4

\*Persons with symptoms with onset in the 4 weeks prior to time of interview.

**Table 5**  
**INCIDENCE OF REPORTED POLIOMYELITIS**  
**Charleston and Kanawha County, W. Va.**

1950	Paralytic		Nonparalytic		Doubtful	
	Charleston	Total	Charleston	Total	Charleston	Total
January-June	1	5	0	0	0	0
July	0	6	0	1	0	1
August	8	15	1	1	0	0
September	4	16	0	4	1	5
Total through September	13	42	1	6	1	6

**Table 6**  
**SUMMARY OF MORBIDITY SURVEY**  
**Charleston, W. Va.**

1950 Period	Number of Households	Number of Persons	Persons with Symptoms*		Persons with Fever		Persons with Symptoms at Time of Visit	
			Number	Percent	Number	Percent	Number	Percent
May 22 to July 14	1,118	3,653	402	11.0	110	3.0	191	5.2
June 19 to August 11	1,120	3,661	401	11.0	77	2.1	182	5.0
July 17 to September 8	1,134	3,730	504	13.5	132	3.5	271	7.3
August 14 to October 6	1,126	3,719	807	21.7	135	3.6	486	13.1

\*Persons with symptoms with onset in the 4 weeks prior to time of interview.

Table 7  
SUMMARY OF MORBIDITY SURVEY  
AREA OF FOUR POLIOMYELITIS CASES  
Charleston, W. Va.

Area	Dates of Interviews 1950	Number of Households	Number of Persons	Persons with Symptoms*		Persons with Fever		Persons with Symptoms at Time of Visit	
				Number	Percent	Number	Percent	Number	Percent
Special Blocks	Sept. 1	54	175	54	33.3	8	4.6	15	8.6
Remainder of Charleston	Aug. 28-Sept. 1	308	1,070	124	11.6	30	2.8	70	6.5
	Sept. 5-8	235	769	125	16.3	31	4.0	60	7.8

\*Persons with symptoms with onset in the 4 weeks prior to time of interview.

specimens from epidemic and five from non-epidemic cases in each city for isolation and typing of virus.

(2) From nonparalytic or abortive cases, stool specimens from at least five cases occurring in non-epidemic periods in each city.

(3) In Phoenix only, serums and serial monthly stool specimens from families in two districts with infants born into the study population.

In addition to the primary objective of the poliomyelitis investigations to determine the role of flies in the epidemiology of poliomyelitis as well as other factors of importance in poliomyelitis, certain subordinate epidemiologic projects are being planned. These include:

Study of enteric diseases in Phoenix. The epidemiologist in the Phoenix project, in cooperation with physicians in the area, is providing consultative and diagnostic services for coccidioidomycosis, and plans for further studies of this disease in this area are being developed. In addition to the regular morbidity survey in selected areas of the city, data also are being collected from schools and industries in Phoenix and Charleston as a subsidiary measure of morbidity.

#### DIARRHEA DISEASE:

**New Orleans Study.** In addition to air sampling in the premature nursery at Charity Hospital, New Orleans, La. (page 21), swab sampling of environment has been conducted. In general, the swab contact method as outlined by "Standard Methods for the Examination of Dairy Products" has been followed with modifications. These modifications consisted of (a) the use of urea broth instead of

buffered distilled water with the thought that a very direct and simple method for the sampling for *Proteus* organisms could be determined on a basis of whether or not the urea broth was hydrolyzed; and (b) the use of nutrient broth instead of buffered distilled water. Due to the sterile environment that exists in the nursery, it has been found that in a qualitative manner, it can be shown that more surfaces are contaminated with gram negative bacilli if the swab samples in nutrient broth are incubated for 24 hours prior to streaking on selective *Salmonella-Shigella* media. The identification of typical colonies is similar to that employed in the laboratory that is investigating the medical aspects of the problem of epidemic diarrhea of the newborn.

**Puerto Rico Study.** During the course of diarrheal and dysentery studies carried on during the past 15 years, large volumes of data have been collected which have been only partially analyzed. From time to time as additional bits of information are seen in the course of new studies, it becomes necessary to reopen these avenues of investigation. One such mass of material was collected by Dr. Watt\* while on duty in Puerto Rico.

Forty-five inmates of a mental institution were cultured daily for 6 months and thereafter on a biweekly schedule for 6 months. Presence or absence of *Shigella* was recorded. The 45 individuals who started the study were not all cultured for the entire year. When an individual died or left the study for any other reason, he was replaced by another; thus, the number of individuals cultured each day was constant.

\*From the Microbiological Institute, National Institutes of Health.

From the results of this study there were several characteristics of the *Shigella* infections which could be estimated. These consisted of the following:

Average duration of infection by type of *Shigella flexneri* IV (Schmitz and New Castle); average duration for 1st, 2d, 3d, etc. infection by type of *Shigella*; reinfection rates by same and different type of *Shigella*; average length of interval between infections with same and different organisms; infectivity of organisms; and prevalence by time.

**Texas Study.** Further investigations concerning the role played by the mobile family in the Texas study were made. It was shown that 35 percent of the diarrheal cases were contributed by persons who entered the study (May 1946–Aug. 1948) and were present continuously thereafter. Of the total entrants, 22 percent remained throughout this period.

Of the original entrants who were present continuously throughout the study, approximately 7 percent were born in Mexico.

Further studies of environmental factors as they relate to presence or absence of diarrhea in households, were done on the basis of household-months of experience.

An attempt was made to estimate attack rates with environmental factors and multiple correlation theory, but the results were very poor.

It was hoped that a much better correlation coefficient could be obtained by use of median fly count in place of the average high grill count of flies when used in conjunction with percentage of positive cultures or with percentage of families with new infections each month. However, this coefficient was only raised from .49 to .53.

A test to determine percentage of cases of diarrhea recalled during the 6-month period indicated no significantly greater number of cases forgotten at the end of the 6-month period as compared to the beginning. A similar test was run on the period 6 months before the interview, as compared to a period 6 to 12 months before the interview. The percentage of cases remembered 1 to 6 months was significantly greater than percentage of cases remembered 6 to 12 months.

An investigation of the number of animals owned by "Salmonella Families" versus those owned by "Negative Families" revealed no differences by kinds of animals owned or of average numbers owned.

## Q FEVER STUDIES

The Q fever studies continue in conjunction with the Virus and Rickettsial Laboratory of the California State Health Department in Berkeley, Calif.

In contrast to 1949 when one small urban outbreak occurred during July, no human outbreaks were recognized during the summer months. However, new cases of sporadic occurrence were recognized at a lesser rate during the quarter.

Analysis and reporting of results of the completed Rio Vista field study of naturally infected sheep have begun. It is felt that this project has yielded important information concerning the pathogenesis of Q fever in sheep.

Protocols for the continuation of these studies are completed and actual operation of this project at Davis, Calif., will begin early in October.

The first three studies of experimentally inoculated sheep have been concluded and are undergoing analysis prior to reporting of results. This series of studies, too, has yielded much information basic to the explanation of the pathogenesis of the infection in animals.

## LEPROSY CONTROL

During the quarter leprosy investigations have been confined, for the most part, to the States of Florida, Louisiana, and Texas.

An 8-month study of the leprosy situation in the State of Florida was completed. Three cases not previously known to physicians or health authorities were found. One of these had become arrested; one was a very early bacteriologically negative case in a young child; and the other was a bacteriologically positive case. The study revealed a need for a more energetic case-finding and follow-up program in the State; that, with rare exception, satisfactory home isolation of open cases of leprosy, is impossible; that prolonged and intimate contact with open cases is not essential to the spread of the disease; and that the extent of the problem does not warrant the services of a full-time leprosy control officer.

The records of all patients admitted to Carville Hospital, La., from the State of Louisiana during the past 30 years were abstracted. All the information from these records of cases admitted from 10 of the parishes has been assembled in order to inaugurate control programs in these parishes.

Five new cases of leprosy were investigated in the cooperative program in Texas.

# Laboratory Services

## LABORATORY CONSULTATION SERVICES

Program reviews of laboratory facilities were performed for the following State Departments of Health: Colorado, Florida, Kansas, Montana, New Hampshire, Washington, West Virginia, and Wyoming.

Special brief surveys of current laboratory procedures and techniques in respect to the diagnosis of enteric infections were made in Ohio upon special request from the State health officer. Seven laboratories in two cities were reviewed for this purpose.

For the Kentucky State Department of Health, at Louisville, consultation was given in cooperation with a staff member from the Environmental Health Center relative to planning and appointments for the proposed new laboratory building.

## TRAINING

Training courses presented during the quarter are shown in table 1.

## EXTENSION SERVICE

Specimens and keys were sent out monthly to 321 laboratories throughout the United States, Alaska, Territory of Hawaii, Canada, and Puerto Rico. These specimens consisted of *Iodamoeba butschlii* trophozoites, *Dientamoeba fragilis* trophozoites, *Endamoeba histolytica* trophozoites, *Giardia lamblia* cysts, *Wuchereria bancrofti* microfilariae, *Schistosoma mansoni* eggs, *Trichuris trichura* eggs, *Ascaris lumbricoides* eggs, hookworm eggs, *Strongyloides stercoralis* larvae, *Endamoeba coli* trophozoites and rare cysts, *Endolimax nana* trophozoites, *Leishmania donovani* and *Plasmodium falciparum*.

## PARASITOLOGY AND MYCOLOGY

Identification of Structures in Blood Smears. In an attempt to identify certain microfilaria-like structures which occasionally are found in blood smears stained for microscopic examination, a

Table 1  
TRAINING COURSES PRESENTED BY LABORATORY SERVICES

Courses	Date 1950	Students						Totals
		State, County, City Health Depts.	U. S. Public Health Service	Other Federal Organizations	Private Institutions	Universities	Foreign Students*	
Laboratory Diagnosis of Mycotic Diseases Part 1 (Third course)	July 24 to Aug. 4	11	3	7	-	-	1	22
Laboratory Diagnosis of Mycotic Diseases Part 2 (Third course)	Aug. 7-17	6	3	6	4	-	1	20
Laboratory Diagnosis of Tuberculosis (Fifth course)	Aug. 21 to Sept. 7	14	2	7	1	-	3	27
Laboratory Diagnosis of Bacterial Diseases Part 1 (Third course)	Sept. 1-22	6	1	8	3	-	2	20
Laboratory Diagnosis of Bacterial Diseases Part 2 (Third course)	Sept. 25 to Oct. 6	6	1	8	2	-	2	19
Laboratory Diagnosis of Parasitic Diseases Part 1 (Sixteenth course)	Sept. 18 to Oct. 6	5	-	11	5	1	-	22

\*Foreign students represented the following countries: Cuba, Philippine Islands, Brazil, and Belgium.

series of test examinations was started. Trichina larvae and the spores of certain fungi have been collected and prepared in blood films.

**Cytochemical Tests.** Such tests on amebae were continued with the following observations:

Acid phosphatase was demonstrated in trophozoites of both *E. histolytica* and *E. coli*. A very selective non-enzyme-related fixation of lead in the nuclei of *E. coli* cysts and *E. histolytica* trophozoites was observed.

Polysaccharides demonstrable by periodic acid oxidation have been found in cysts and trophozoites of the intestinal amebae. The material is uniformly dispersed throughout the cytoplasm, and does not appear to be concentrated in the chromatoidal bars of *E. coli*. The cyst wall of this ameba gives a very intense reaction, as do yeast cells, while red blood cells are negative.

**Media for Fungi.** An evaluation of four media with regard to their efficiency in the isolation of dermatophytes has been completed for statistical analysis. Preliminary results indicate that Sabouraud's dextrose agar is as good or better than newly designed media.

**Mycological Diagnostic Services.** A total of 503 cultures and specimens was received to be examined for the presence of pathogenic fungi. This material was submitted from 32 States, Canada, England, and France. From the total, 121 isolations of pathogenic fungi were completed: 98 *Candida albicans*, 1 *Coccidioides immitis*, and 1 *Cryptococcus neoformans*. Nine species of dermatophytes made up the remaining 21 identifications.

**Malaria Surveys.** Blood slides were examined from:

South Carolina	5,762
Georgia	51
Arkansas	153
<b>Total</b>	<b>5,966</b>

Of this total, 16 were unsatisfactory for examination and 61 known control positive slides were found. These 61 slides do not constitute new clinical malaria cases. No new cases of malaria have been diagnosed from survey slides in more than 2 years.

**Consultations.** One of the mycologists made a visit to the mycology laboratories of the London School of Tropical Medicine, London, England, during the summer. The diagnostic methods and special techniques used in those laboratories were reviewed and projects under study discussed.

**National Parasitological Evaluation Program.** Distribution of 110 specimens to each of 42 State and Territorial laboratories was reported in the September 1950 CDC Bulletin. Tabulation and preliminary ranking and rating have been carried out. Evaluation of the program has been made and results are being analyzed. Details will be reported in a future issue of the CDC Bulletin.

**Texas Intrastate Parasitological Evaluation Program.** The protozoology unit has examined 20 specimens, serving as referee for this State.

**Maryland Pathology Society Program.** Four specimens identical to those sent to a group of laboratories in Maryland have been examined in cooperation with the Parasitological Evaluation program of this Society.

#### VIRUS AND RICKETTSIA STUDIES

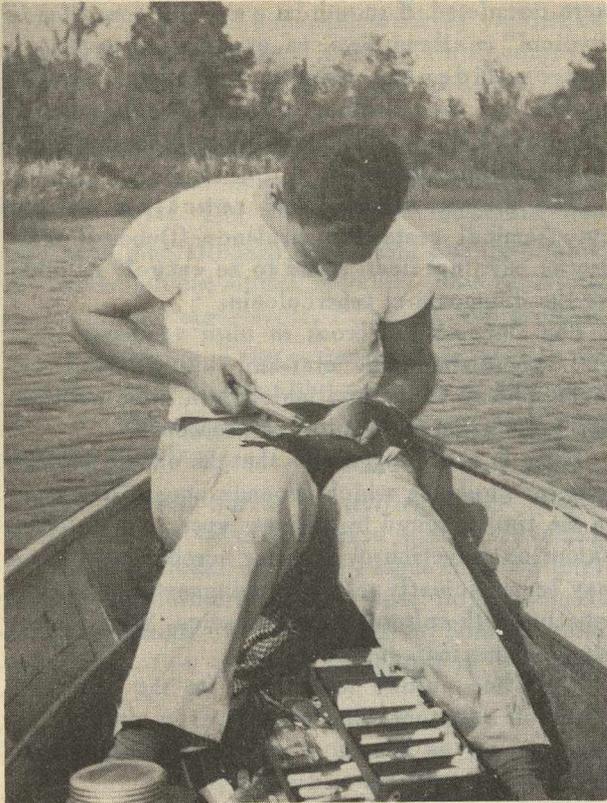
Field investigations developed cooperatively with the Louisiana State Department of Health have yielded one isolation of a virus similar to Eastern equine encephalomyelitis (E.E.E.). This isolation was made from a single lot of arthropods consisting of two specimens of *Culiseta melanura* collected near Ponchatoula, La., on August 17, 1950.

A second strain of virus was recovered from a grackle in the same general area. This virus has not yet been identified, although antigenically it seems similar to E.E.E. virus. Other strains of virus were isolated from these field studies: one from a little blue heron at Bordelonville, one from a snowy egret from Barataria Bay.

**Antiviral Agents.** Initial studies were completed to determine the effect of 70 percent isopropyl alcohol against certain viruses in experiments simulating oral thermometer contamination. Virucidal action was found against *Herpes simplex*, type A influenza (PR-8), type B influenza (Lee), and equine encephalomyelitis (Eastern type). No such effect was apparent with Lansing poliomyelitis virus. Quantitative studies relating to time and concentration will continue, but at present it seems that isopropyl alcohol might not be considered as a universal virucide, and that other agents may have to be included as a part of the disinfectant medium.

Preliminary studies were made to determine the virucidal effect of terramycin hydrochloride, *in vitro*, against five virus types.

**Immunological Tests.** The complement fixation tests with mumps, E.E.E., Western equine encephalomyelitis (W.E.E.), and St. Louis encephalitis



Drawing blood from waterfowl collected near Lake Pontchartrain, La.

(S.L.E.) were used 122 times in testing 87 serums submitted for study.

Submitted for neutralization tests against E.E.E. were 90 serums of which the single positive serum came from Georgia. One hundred serums were tested against W.E.E., of which 1 from Wisconsin, 1 from Utah, 8 from Oklahoma, 2 from Ohio, and 1 from Missouri were positive. Against St. Louis virus, 54 serums were tested to find 2 positives from Utah. Against lymphocytic choriomeningitis (L.C.M.) virus, 21 serums were tested without positive results.

Submitted for virus isolation and identification were 27 specimens, among which a horse brain isolation of E.E.E. and a mouse brain isolation of L.C.M., only, were positive.

Histopathological diagnostic studies were made on 11 specimens submitted for such study. Specimens submitted for rabies isolation totaled 73, with rabies identification made on 1 equine specimen from Georgia, 1 mongoose from Puerto Rico, 1 human case from West Virginia, and 1 bovine specimen from Honduras.

## BACTERIOLOGICAL STUDIES

**Diphtheria.** Progress was made in the development of a satisfactory serological test for the diagnosis of *Streptobacillus moniliformis* infections.

**Special Bacteriology.** For leptospirosis diagnosis, 514 specimens of blood and serum were received; 446 of these were satisfactory for testing. Among these serums, 31 were positive against one or both of the usual antigens at significant titers; 25 were human serums, 3 were dog serums, and 3 came from rat infections.

**Streptococcus.** In August the Army doubled its order for streptococcus typing serum for use in its programs during the coming year.

A total of 117 items was submitted for diagnostic study from nine States during the quarter. A group of 91 cultures came from a rheumatic fever study, these cultures submitted for typing at CDC. Another referred diagnosis consisted of two cultures isolated from lesions in swine. The strains proved to be L, Beta hemolytic streptococci, a group previously reported as pathogenic for dogs.

There were seven cultures, isolates from commercially prepared frozen orange juice, identified as Group D enterococci.

**Enteric Bacteriology.** As a representative of the Public Health Service Dr. P. R. Edwards attended the Fifth International Congress of Microbiology in Rio de Janeiro, where he participated in the meetings of the Enterobacteriaceae Subcommittee and of the Committee for Enteric Phage Typing. En route he visited laboratories working with enteric bacteria in Brazil, Uruguay, Argentina, Peru, and Mexico.

Polyvalent Arizona paracolon serum was distributed to all the State health laboratories to aid in recognition of those forms and to stimulate interest in the group in the hope that more could be learned regarding their incidence in man.

Serums for *E. coli* 055:B5 and *E. coli* 0111:B4, which repeatedly have been incriminated in infant diarrhea, were distributed to a number of laboratories to aid in the diagnosis of infant diarrhea and to gain some knowledge of their incidence in the United States.

Materials distributed upon request totaled 1,504 cultures and 6,834 ml. of typing serums. These included *Salmonella* and *Shigella* grouping and typing serum now available to all State health departments upon request and similar serums for the armed services.

A number of *Shigella* cultures representative of a classification recently in use in Japan were received for study. Aberrant cultures of *Shigella boydii* also are under investigation.

A majority of *E. coli* cultures and the *Escherichia*-like paracolony cultures were grouped serologically. It has been found that *E. coli* O serums can be used quite successfully to group those paracolony cultures which produce indol, and which do not produce acetylmethyl carbinol.

Among the total of *Salmonella* cultures submitted for identification were 91 cultures of *S. typhi*, and 44 cultures of *S. paratyphi B* which were subjected to bacteriophage typing.

One new phage type of *S. typhi* which appeared simultaneously in Connecticut and Michigan, and which has since appeared in Maine, was studied and confirmed.

Four *Salmonella* cultures, reported as type undetermined, apparently constitute two new serologic types, the exact antigens of which remain to be determined.

A single Arizona culture was received which seemingly contains antigens unlike any previously encountered.

During this quarter the 1,692 specimens received for diagnosis included 850 specimens from man, 738 from animals, 30 from foods, and 10 from water and sewage. There were 228 *Shigella* from man only. *Salmonella* specimens included 231 from humans, 581 from animals, 30 from foods, and 10 from water and sewage.

**Nursing Research.** Studies to determine the efficiency of ethyl alcohol and isopropyl alcohol for disinfecting sputum from patients with active tuberculosis, *in vitro*, have been completed. Both these agents, in various concentrations for varying time intervals, were used against different strains of microorganisms. This last series of experiments provides the screening device for selection of further studies of more practical application.

Formalin was added to the series of disinfectants under study to determine efficiency of thermometer disinfection. Bacteriostasis has become more troublesome in studies using this substance than in previous studies with alcohols and phenols. The initial studies with formalin have included 107 tests with *S. typhi*, *Corynebacterium diphtheriae*, and streptococci.

**Tuberculosis Studies.** Studies to determine the validity of using colony characteristics as a single criterion for type determination of mycobacteria

were completed. If growth on a specified medium is "typical" in all respects, an experienced technician may confidently identify human-type tubercle bacilli by their colony characteristics. If "atypical," the culture should be further studied by animal inoculation.

The Leyva nucleic acid reaction and the cytochemical tests for virulence (Dubos-Middlebrook) have not been found to be entirely reliable for the diagnosis of tuberculosis.

The Dubos-Middlebrook *in vitro* virulence test, by comparison with standard animal virulence tests, proved to be unreliable. Both false positive and false negative results are common.

There is some suggestion that the simple *in vitro* test for virulence which depends upon differences in the time required by various types to decolorize oxidation reduction dyes under aerobic conditions may be sufficiently reliable to suggest use in conjunction with cultural characteristics. Some further study seems indicated, however.

The slide culture techniques for the determination of streptomycin sensitivity are not as accurate nor as sensitive as such determinations made on solid culture media.

The method described by Kabler to maintain viability of tubercle bacilli in mailed gastric specimens was further evaluated. It was found that disodium phosphate added to gastric specimens is a valid method for preserving tubercle bacilli in viable form during mail transport.

Carbohydrate utilization results proved to be too inconsistent to suggest specific value for routine laboratory diagnosis of mycobacterial types.

Preliminary work has been started to evaluate the red cell agglutination reaction for the diagnosis of tuberculosis.

**Evaluation Program for State Laboratories.** A total of 55 specimens has been mailed to 54 separate laboratories and 3 referee laboratories cooperating in the evaluation study. It is anticipated that the shipments of specimens will terminate in March 1951.

#### WESTERN CDC LABORATORY

**Human Plague.** On July 1, 1950, a 15-year-old boy in Santa Fe County, N. Mex., became ill. He died on July 4. *Pasteurella pestis* was recovered from autopsy specimens. This is the fifth New Mexico case in a year, the second fatality, and the second fatal case to receive penicillin as the only therapeutic agent. The patient is known to have trapped a prairie dog some time before the

onset of illness, but subsequent survey yielded no plague-positive specimen in Santa Fe County, although a positive specimen was collected in a nearby county.

On July 24, 1950, a Navajo Indian girl became ill after she had been tending sheep in Apache County, Ariz. The tentative diagnosis was tularemia, and although the patient was quite sick, she made an uneventful recovery after receiving penicillin and aureomycin. *P. pestis* was isolated from a specimen of the patient's blood sent to the New Mexico Public Health Laboratory at Albuquerque, N. Mex. This is the first human case ever reported in Arizona.

**Wild Rodent Survey Activities.** Four mobile plague survey units continued operations along the eastern border of known plague-infested territory. Field collections were made in 25 counties of North Dakota, Nebraska, Kansas, South Dakota, and Texas. One unit was withdrawn at the end of

August, while the other three units were scheduled to continue operations through October.

Additional specimens for diagnostic examination were received from the Sandia Army Base in New Mexico, and from Arkansas, New Mexico, Oklahoma, Utah, Washington, and Wyoming. CDC field units sent in one plague-positive specimen from Rawlins County, Kans., and two plague-positive specimens from Dallam County, Tex. These are the first recoveries of plague from collections in those counties, although they both have been surveyed previously.

**Domestic Rodent Control.** At the beginning of the quarter rodent control personnel were on duty in California (3); Colorado (2); Idaho (1); Montana (1); New Mexico (2); Oregon (1); Utah (2); Washington (2); and Wyoming (1).

Surveillance examinations of materials from San Francisco, Calif., Bremerton and Tacoma, Wash., and Burlington, Iowa, disclosed no plague infections.

## Technical Development Services<sup>\*</sup>

*(This report presents results of work in progress and the conclusions reached may not be final. For this reason, the contents should not be published or referred to in articles for publication without permission. Reference in this report to any commercial materials or equipment does not in any way constitute a recommendation of such materials or equipment by the U. S. Public Health Service.)*

### TOXICOLOGY

#### TOXICITY OF DIELDRIN:

**Effect of Dermal Applications of Various Formulations.** Of 14 rats chronically poisoned with large doses of 6.25 percent dieldrin solution given once per week at the rate of 100 milligrams of dieldrin per kilogram of body weight, 2 rats have survived for a mean of 150 days. These rats have been dosed 2 and 18 times respectively. Small numbers of rats dosed repeatedly with 1.25 and 0.62 percent dieldrin emulsion at the rate of 20 and 10

milligrams per kilogram respectively have survived after getting as many as 299 doses. None of these surviving rats show signs of intoxication. Rabbits appear to be fairly resistant to poisoning with dieldrin emulsion given in repeated doses at the rate of 10 milligrams per kilogram provided they survive the first few applications. The premise that they are more susceptible to dieldrin poisoning than rats seems to hold.

There was no significant difference in mortality between rats receiving (dermally) single doses of coarse grade technical dieldrin powder at the rate of 200 milligrams per kilogram and rats getting finely ground powder. Dieldrin, administered dermally as a powder of whatever grade of grinding, has been highly toxic to rats, either on an acute or chronic basis.

Mortalities were high (70 to 100 percent) in a series of tests designed to evaluate any significant differences in the toxic effects of applications of dieldrin solution given at 100 milligrams

<sup>\*</sup>Abstracted from Technical Development Services Summary of Activities No. 23, July, August, and September 1950.

per kilogram between young and old male and young and old female rats. Differences observed between these groups, which received doses of solution repeatedly once per week were small, but were consistent with the conclusion reached earlier in these studies that young rats are slightly more susceptible than old rats, and female more than male rats.

There are indications that hamsters compare favorably in resistance to dieldrin poisoning with rats when 1.25 percent emulsion is repeatedly applied at the rate of 20 milligrams per kilogram. No difference was demonstrated in the reactions of groups of rats to dieldrin poisoning by the dermal route when they were maintained at different temperatures. The nature of the hair and skin of certain test animals prevents the proper spreading of dieldrin formulations, especially emulsions. Washing the skin of a test animal with an acetone-ether mixture before dosing with insecticide facilitates spreading of the insecticide formulation. However, tests indicated that absorption of the insecticide was not favored by this prewashing.

On the basis of chronic dosing at the rate of 20 milligrams per kilogram, heifers appear slightly more resistant to liquid dieldrin formulations than rabbits and less resistant than monkeys, dogs, and, especially, rats treated by the same route and method. Sheep appear to be markedly more resistant to this type of dieldrin poisoning than cows.

**Use of Barbiturates in the Treatment of Various Species of Poisoned Laboratory Animals.** In spite of apparently successful recognition of the same clinical signs of dieldrin poisoning which were used as criteria for the beginning of medication in dogs and monkeys, the medication of guinea pigs was unsuccessful in aiding their survival. Recognition of clinical signs of poisoning in hamsters was very poor and no success was had in their medication. Earlier findings that dogs are strikingly benefited by barbiturate medication following dieldrin poisoning have been further substantiated in a test involving 10 dogs which were chronically intoxicated by dieldrin given dermally at the rate of 20 milligrams per kilogram, five times per week. Only one of five dogs slated for phenobarbital dosing died as compared to five out of five among the controls. A small percentage of dogs retired from the sedative schedule relapsed (presumably because of the presence of dieldrin and/or injury from it) after extended periods of time up to 60 days following the first observed

convulsion. These dogs recovered under renewed medication.

**Weight Loss and Its Cause in White Rats.** Current tests confirmed the results of earlier tests and added information on the lipid content of the livers of poisoned and unpoisoned rats. Livers of rats poisoned by dieldrin contained a higher percentage of fat than did the livers of rats in control groups. The values for lipid content paralleled the values for liver weight (expressed as the percentage of body weight at death). On the average, the livers of poisoned rats contained in absolute terms almost as much lipid as did the livers of essentially normal rats that had continued uninterrupted growth during the entire treatment period and far more than the livers of rats starved to the same degree. Presumably poisoned rats failed to mobilize fat reserves in the liver and/or deposited new lipid materials in an abnormal manner. The percentile liver weight of rats fatally poisoned with dieldrin by whatever formulation was similar to that of normal rats (unstarved controls) and different from that of rats fed restricted diets.

#### TOXICITY OF OTHER CHLORINATED HYDROCARBONS:

**Effect of Dermal Applications of Aldrin on Mice, Rats, and Rabbits.** One percent aldrin compounded in floor wax has been applied to the clipped shoulders of rats at the rate of 16 milligrams per kilogram per day, 5 days per week. Eight out of 10 rats died following administration of a mean total dosage of 222 milligrams per kilogram. Clinical signs of poisoning were similar to those of dieldrin intoxication. Rabbits were less resistant than rats under this regimen of poisoning. Mice also proved to be susceptible.

In exactly similar tests groups of 10 male and 10 female mice were maintained on wooden flooring panels with finished surfaces which had been rubbed with 1 percent aldrin floor wax. The application was designed to give ordinary polishing and was at the rate of 17.7 milligrams of aldrin per square foot. Two mice died within 16 days. On bio-assay, the livers of about half the 18 survivors showed a low degree of insecticidal activity indicating the presence of aldrin.

**Effect of Dermal Applications of Different Formulations of Lindane on Rabbits.** In a test with small numbers of rabbits, mortality figures for acute lindane poisoning (single dermal applications at 100 milligrams per kilogram) were similar to

those in many tests reported earlier for dieldrin, while the mortality figures for chronic exposure at the 10 milligrams per kilogram level were lower than those for dieldrin.

**Effect of Dermal Applications of Chlordan on White Rats.** All rats were killed by two or three applications of 25-percent chlordan concentrate given at the rate of 400 milligrams of chlordan per kilogram.

**Effect of Dermal Applications of DDT on White Rats.** Doses of a 10 percent DDT emulsion have been given rats at the rate of 160 milligrams per kilogram per day, 5 days per week. Indications are that when test rats succeed in surviving the first few days, they are then capable of resisting the toxicant on a chronic basis.

**Effect of Dermal Applications of Insecticide 49-RL-39 on White Rats.** A small number of rats were not intoxicated by single dermal applications of the candidate insecticide 49-RL-39 at 400 milligrams per kilogram administered as a finely ground technical powder.

#### RODENTICIDE STUDIES:

**Field Investigations with Warfarin in Bait against Norway Rats.** Warfarin-poisoned yellow corn meal has now been used in 30 rat-infested business establishments for at least 1 year. Although none of these places is ratproof, satisfactory rat control has been maintained for the period. Light reinfestation has occurred occasionally but has been eliminated by the poison already in place.

**Field Studies to Investigate the Use of Warfarin in Solid Baits against Roof Rats.** Because of the difficulty of getting roof rats living in feed barns to accept other foods useful as semipermanent baits, the acceptance of eight candidate poison-free bait materials was checked under field conditions. Oatmeal was the food of choice for use in semipermanent rat baits. Warfarin in baits (using, side-by-side, oatmeal and corn meal with 15 percent peanut butter) was tested against roof rats on farms at dosage levels of 0.25 and 0.10 milligrams per gram of bait. Control was achieved in slightly less time on farms where the 0.25 milligrams per gram dosage level of warfarin was used than with the lower concentration. Oatmeal was preferred at most but not all stations.

**Laboratory Studies of the Effect upon Oriental Rat Fleas of Warfarin when the Poison is Fed to the Host.** There was no indication that the health of *Xenopsylla cheopis* adults or their reproductive capacity in the first or second generation was

appreciably affected by maintaining the fleas constantly on rats poisoned by yellow corn meal bait containing warfarin at the rate of 0.10 milligrams per gram of bait.

#### CHEMICAL STUDIES:

**Synthesis of DDT.** Current investigations on the toxicology of insecticides have been extended to include a study of the metabolism of DDT in small animals. The well known colorimetric methods of DDT assaying are rather tedious, and accurate determinations are difficult whenever micro quantities are extracted from tissues, feces, and urine.

Labeling of DDT or some closely related compound with a radioactive isotope would simplify the sample preparation. Furthermore, the high specific radioactivity of micro quantities would increase the sensitivity of the quantitative measurements. Preliminary experiments on the synthesis of the p,p'-iodine analog of DDT, namely DDT (2,2-bis-(p-iodophenyl)-1,1,1-trichloroethane) indicate the feasibility of labeling the compound with radioiodine-131.

#### RADIOISOTOPE STUDIES WITH INSECTS

**Studies on the Tagging of Various Flies with P<sup>32</sup>.** The persistence of radioactivity in adult *Musca domestica*, *Callitroga macellaria*, and *Phaenicia pallescens* was apparently influenced by the phosphorus content of food received after the feeding of P<sup>32</sup> milk. Flies maintained on a 10 percent honey diet (16 milligrams of P per 100 grams of honey) showed slower loss of radioactivity than flies maintained on a milk diet (93 milligrams of P per 100 grams of milk). The age of flies, within the range of 1 to 5 days old, did not influence the level of radioactivity attained after a 1-day feeding of P<sup>32</sup>-milk. Levels of radioactivity attained were found to be directly proportional to the concentration of P<sup>32</sup> in the milk diet.

#### INSECTICIDE STUDIES

##### STUDIES ON FLY RESISTANCE:

**Studies on Dieldrin Resistance in Laboratory Strains of the House Fly.** House flies have been reared through 12 generations in colonies having 5, 25, and 45 percent surface treatments, respectively, with deposits of 25 milligrams of dieldrin per square foot. Based on the 48-hour mortalities after timed exposures to residual deposits with complete coverage, the adults from the 5 percent coverage colony have held the same level of resistance in the F<sub>7</sub> to F<sub>11</sub> generations whereas flies in the other two colonies have shown increasing resistance.

Crosses between Nonresistant and Dieldrin-resistant Strains of "*M. domestica*." Offspring from reciprocal crosses between nonresistant and dieldrin-resistant flies showed an intermediate degree of resistance. There was no definite difference between the sexes in the transmission of resistance.

**Determination of the Dieldrin Resistance of Field Strains of the House Fly.** Laboratory evaluations showed that, in connection with premises and dairy spraying operations, dieldrin resistance developed in certain Georgia field strains of *M. domestica* within a period of 2 months. Chlordan resistance has also been detected in certain Savannah, Ga., field strains.

Flies from Topeka, Kans., Charleston, W. Va., and Pharr, Tex., have not shown dieldrin resistance. Flies from Phoenix, Ariz., had a high degree of dieldrin resistance however.

**Relative Effectiveness of Various Chlorinated Hydrocarbons against a Dieldrin-resistant Strain of "*M. Domestica*."** Residual deposits of Q-137, chlordan, heptachlor, lindane, benzene hexachloride (BHC), and two confidential products were not effective against a local field strain of DDT-dieldrin-resistant house flies.

**Determination of the Pattern of Loss of Resistance in DDT-resistant Strains of the House Fly.** After a period of 2 years or more, field strains of the house flies from six towns in Texas showed no marked loss of DDT resistance in the absence of regular DDT applications.

**Cooperative Studies on the Degree of DDT Resistance in Various Laboratory and Field Strains of "*M. Domestica*."** Considerable variation in the degree of DDT resistance has been shown in comparisons of the most resistant laboratory and field strains of house flies from laboratories at Riverside, Calif., Orlando, Fla., Urbana, Ill., and Savannah, Ga. At the Savannah laboratory only the Illinois strains have maintained the same degree of resistance through seven generations; the other strains have tended toward reversion.

**Comparative Tests with Standard Insectary Strains from Various Laboratories.** Comparative tests have shown the insectary strains of house flies from Thomasville, Ga., to have considerable DDT resistance. National Association of Insecticide and Disinfectant Manufacturers strains for 1948 and 1950 were comparable to the Savannah insectary strain.

#### STUDIES ON FLY HABITS:

**Studies on Controlled Populations of Flies.** A large outdoor screen cage, 80 by 30 by 10 feet, has been designed for basic studies on controlled populations of adult *M. domestica*, *C. macellaria*, and *P. pallescens*. Comparisons made of the fly counts at various bait stations located on the cage floor showed those stations near the corners and along the west side of the cage to have higher counts. Upon release of a mixed population of the three species there was a characteristic species distribution in the cage. Less than 10 percent of any given species was recorded at all of the bait stations at any one time.

Milk, horsemeat, vegetable soup, and diamalt solution were evaluated as baits on the basis of attractiveness for all three species and consistence of attractiveness over a 2-day period. Horsemeat and diamalt had general attractiveness for all three species of flies, but the horsemeat did not maintain good attractiveness on the second day.

There was a general decrease in the number of flies at the bait stations toward midday. With the same population, bait counts from noon to 2 p.m. were approximately one-half of those made from 8 to 10 a.m. Temperature also influenced the bait station counts. At 96 degrees to 99 degrees Fahrenheit counts were 40 percent of those made at temperatures of 81 degrees to 84 degrees Fahrenheit.

#### BIO-ASSAY TECHNIQUES:

**Extraction and Bio-assay of Dieldrin.** In the preliminary steps for the detection and quantitative measurement of dieldrin in fatty tissue, dieldrin was added to fatty tissue and subsequently was extracted with benzene. This extraction was compared with known dieldrin benzene solutions using microloop applications on adult *M. domestica*. Results showed that although the recovery of dieldrin from the fatty tissue was essentially 100 percent, certain other components of the fatty tissue retarded the toxic effects of the dieldrin. For comparison purposes, therefore, the 72-hour mortalities were used.

#### DISINSECTION OF AIRCRAFT:

**Applications of Melted DDT on Various Materials Used to Finish Aircraft Interiors.** Applications of melted DDT were made on 31 materials used for interior finishes on commercial passenger planes. None of the materials were physically damaged. Residual deposits on dark-colored plastic-coated materials were clearly visible but had little residual activity. Applications on fabrics showed

no discoloration and were highly effective.

#### **Effect of Mechanical Disturbance on Melted DDT and Water-wettable DDT on Metal Panels.**

**Vibration** - Aluminum panels treated with deposits of water-wettable DDT and melted DDT were subjected to vibrations of 1/16-inch amplitude from a 60-cycle a.c. current for periods of 8 and 30 hours. Although visible amounts of the water-wettable deposits were shaken off, both types of treatment gave 100 percent kills of the test insects at the end of the experiment.

**Rubbing Action** - Water-wettable DDT deposits were easily removed from metal by hand rubbing, but the melted DDT deposits adhered like a semidry paint.

**Crystallization** - Melted DDT deposits on hard surfaces crystallize very slowly unless stimulated by contact with insects or other objects. The droplets, however, show quicker knock-down of insects than the dry crystals. The adhesion of the liquid DDT to the insects is the suggested explanation.

**Comparative Tests Involving Melted Technical Grade DDT and DDT-Rosin Emulsion Applied on Glass Panels.** Deposits of 200 milligrams of DDT per square foot were applied on glass panels using melted DDT and a DDT-rosin formulation. Evaluations of the residual toxicity of deposits on panels exposed to outside weathering and those held inside were made after 1, 4, 8, and 12 weeks. The DDT-rosin deposits gave kills of 90-100 percent after 12 weeks of outside weathering, while the melted DDT deposits were similarly effective for 8 weeks only. Deposits of DDT-rosin on panels held inside gave effective kills for 3 weeks only, while the melted DDT deposits have given kills of 100 percent over a 12-week test period. The release of DDT through the weathering of the rosin in exposed deposits is believed to account for the difference in the residual effectiveness of the deposits in outdoor and indoor tests.

#### **CHEMICAL STUDIES**

**Synergists for DDT.** A search for compounds which would improve the effectiveness of DDT against resistant house flies has been initiated. So far, 170 compounds have been examined by exposing a resistant strain of wild flies to poster board panels treated with methyl ethyl ketone solutions of DDT and the candidate compound. The most promising of the compounds tested so far is 1,1-bis-(p-chlorophenyl) ethanol. This compound may also be designated as p-dichlorodiphenyl

methyl carbinol which is abbreviated to DMC. Deposits containing this compound (DMC) and DDT in respective ratios of 1 to 10 up to 1 to 1 were about five times more effective than DDT alone. DMC alone showed little or no toxicity to the test flies. It therefore appears that the improvement in effectiveness of the DDT is synergistic in nature.

**Tests on Various Tracer Dyes to Determine Light-Fastness.** A limiting factor in the use of tracer dyes to measure insecticidal deposits is the stability of the dye in light. Thirty dyes suitable for the purpose indicated have been examined for light-fastness by exposure of treated panels to direct sunlight for periods up to 6 hours. Three of these showed less than 10 percent deterioration in the longest exposure period. DuPont AD-2253 and Calcogas Green were 95 percent stable, and Calcogas Violet was about 91 percent stable for 6 hours.

**Volatility of Various Insecticides from Residual Sprays on Smooth Surfaces.** In the September 1950 Bulletin, data were presented on the loss of aldrin, BHC, chlordan, dieldrin, DDT, and lindane from glass panels during a 73-day period. The losses of these insecticides were followed through 142 days. At the end of this period, over 90 percent of the DDT and dieldrin remained; lindane and chlordan had volatilized to the extent of about 85-90 percent, 15 percent remaining. About 8 percent of the aldrin remained and less than 2 percent of the BHC. There was indication that the gamma isomer is the least volatile of the materials present in BHC.

#### **EQUIPMENT DEVELOPMENT**

##### **ATMOSPHERIC POLLEN AND DUST SAMPLER (CONTINUOUS RECORDING TYPE):**

**Field Tests.** Tape movement of the redesigned pollen and dust sampler was reduced to 7/8 inch per hour in one model and 1/2 inch per hour in a second model, providing 20 and 12 inches respectively per 24 hours of operation. The inlet was redesigned to give better protection against rain entering the box, and both modified models are now being field tested.

**Efficiency Studies.** Laboratory tests were conducted to measure the amount of pollen passing through the box without sticking to the adhesive cellulose tape. The results indicated the collecting efficiency to be high.

**Modification for Use in Airplanes.** A third model of the sampler was modified for use in a PT-17 airplane to permit sampling of air at different

altitudes. Modifications required use of a direct current motor to drive the tape, and use of an air scoop and Venturi-suction arrangement in place of the motor-driven blower for passing air through the sampler.

**Air-scoop Pollen and Dust Sampler.** A pollen and dust sampling device for use on an airplane was designed to aid in the calibration of the continuous recording sampler when mounted in aircraft. The device consisted of an air scoop and microscope slide holder arranged to sample the atmosphere for pollen and dust by impinging such particles on a petrolatum-coated microscope slide.

#### BASAL METABOLISM ROCKER:

An automatically operating rocking device intended to slowly agitate solutions contained in medium-sized Erlenmeyer flasks was built for use in basal metabolism studies of small animals. Operation is attained by a constant stream of water falling alternately into opposite sections of a rocker-mounted fan.

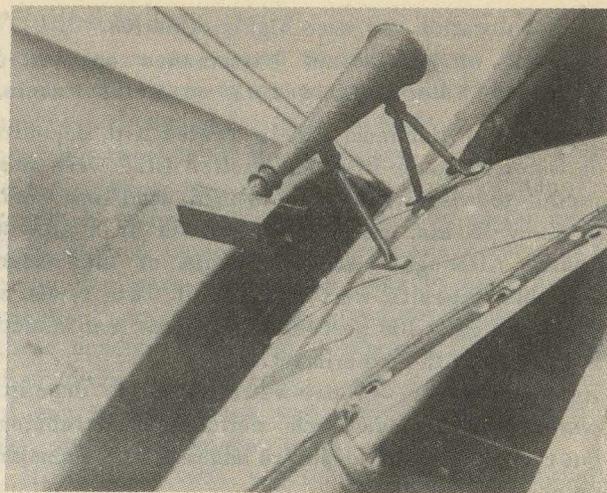
#### ANIMAL EXPOSURE CAGES, KNOCK-DOWN TYPE:

Special animal cages with glass doors were built of ½-inch mesh hardware cloth and mounted in a Peet-Grady chamber for holding experimental animals exposed to vapors from residual sprays applied to the walls of the chamber.

#### CONTROL METHODS AND EVALUATION

##### FIELD INVESTIGATION ON ADULT HOUSE FLY AND MOSQUITO CONTROL:

**Outside Residual Treatments of Rural Premises for Fly and Mosquito Control.** Field tests were conducted in rural areas to determine the feasibility of using dieldrin in a combined house fly and mosquito control program where sprays were applied as residual treatments outside of dwellings. An application of 50 milligrams of dieldrin per square foot gave effective house fly control for 5 to 7 weeks, depending upon the degree of coverage applied in the premises outbuildings. Mosquito populations on treated premises were drastically reduced initially and considerable control was maintained during the 10-week test period, although the numbers of *Anopheles quadrimaculatus* encountered were too small to permit conclusions on the efficacy of this type of spraying in preventing them from entering homes. The rapid development of resistance to dieldrin by the house flies in the treated areas prevented the full evaluation of this method of spraying for fly



Air-scoop pollen and dust sampler, a direct impingement type collector, mounted on a PT-17 aircraft.

control. Screens alone were approximately 95 percent effective in preventing house flies from entering homes.

**Adult Fly Control Studies at Dairies.** Toxaphene at 200 milligrams per square foot and piperonyl butoxide with pyrethrins at dosages of 133 and 6.6 milligrams or 100 and 5 milligrams, respectively, per square foot failed to produce satisfactory fly control. Flies at the test dairies treated with dieldrin and chlordan developed resistance to these materials with the result that effective fly control was not achieved in most instances. Flies at some test dairies are now resistant to practically all presently available chlorinated hydrocarbon residual insecticides.

##### FIELD INVESTIGATIONS ON THE USE OF FLY LARVICIDES:

**Fly Larvicide Studies on Rural Premises.** A single surface treatment of chlordan at the rate of 1 gram per square foot, applied to all fly breeding material on rural premises, was only partially effective. Drastic fly reductions were achieved in most cases, but continuous fly breeding was observed on some premises where satisfactory control was not accomplished. Where control was obtained, it was effective less than 6 weeks in most instances.

**House Fly Larvicide Investigations at Dairies.** Larviciding with dieldrin, chlordan, and lindane was effective at dairies practicing fair to good sanitation but was ineffective in the presence of poor sanitation. House flies at one dairy demonstrated the ability to develop a very high degree

of resistance to dieldrin within less than 2 months after its initial use as a larvicide.

#### PHARR, TEX., SECTION

##### ENVIRONMENTAL SANITATION STUDIES:

**Relative Fly Populations in Three Sanitation Study Towns.** The usual midsummer decline in the fly population occurred in Anglo and Latin sections of Mission, Edinburg, and Pharr. In Mission and Edinburg, where sanitation practices are being promoted, the fly population curve in the Latin section continued on a gradual decline through August. In Latin Pharr, where no special sanitation practices are being promoted, the population level remained well above that of the Latin sections in the other two towns and in late July rose from 8.0 to a level of about 12.5 for the month of August.

**Premises Sanitation Improvements.** Monthly premises sanitation surveys in the three towns showed an over-all reduction from the preceding 3 months in the numbers of fly attractants in the Latin sections. Decreases in the number of dish and wash water attractants in the Latin sections were quite pronounced.

**Factors Affecting Fly Populations.** Studies on factors affecting fly populations in the three towns showed an increase in the numbers of approved garbage containers in the Anglo sections of Edinburg and Pharr and in the Latin section of Mission.

##### CHEMICAL FLY CONTROL INVESTIGATIONS:

**Selective Block Method of Applying Outdoor Residual Sprays for Fly Control.** Selective block treatments with dieldrin-rosin sprays for city-wide fly control were applied in Elsa and La Villa

during the latter part of June in the same manner as previously carried out in Weslaco. In the 11 weeks to date, good control of flies has been maintained. In Weslaco, where treatment was made in late April 1950, a satisfactory fly population level is being maintained to date. This low level is attributed in part to the seasonal decline in fly populations following a low base population maintained by chemical control during the normal peak fly month of June, and to fair sanitation practices continued after an extensive early summer clean-up campaign.

**Studies of Day and Night Fly Resting Habits.** Studies of day and night fly resting habits were continued in order to determine preferred resting places and seasonal trends. All flies were found in fewer numbers during the quarter. Ground surfaces (with scattered food scraps and wash water) continued to be the principal daytime locations for house flies, while trees and bushes, and grasses and weeds were the principal nighttime resting places. Ground surfaces during the daytime and grasses and weeds during the nighttime constituted the principal resting places for *Phaenicia* spp. Very few *Drosophila* spp. were found during the period. Of those found, all daytime specimens were found in privy pits while at night the adult flies were distributed principally on privy ceilings, trees and bushes, garbage in containers, and privy pits. In May, paired *Drosophila* traps were set in the kitchens and privies of 27 premises; 6,890 adults comprising two species were trapped. Of these, 4,473 *D. repleta* and 91 *D. melanogaster* were obtained from the privy traps and 2,213 *D. repleta* and 113 *D. melanogaster* were obtained from the kitchen traps.

## Training Services

#### FIELD TRAINING

Table 1 shows the courses given during the quarter by Field Training Centers.

**Bloomington, Ill.** A new training center at Bloomington was established in cooperation with the State Health Department of Illinois and the Public Health Service Regional Office at Chicago. Mr. C. D. Spangler, formerly at Columbus, Ga., is the officer in charge of this Center. He plans to de-

velop sanitary engineering field training in cooperation with the colleges and universities in this section of the country.

**Columbus, Ga.** Mr. Richard F. Clapp was appointed officer in charge of this Center. There were 18 trainees from other countries who visited the Columbus, Ga., Center during the quarter. Thirteen of these persons attended the sanitary engineering course, and the remainder obtained information

relative to international health relations and the activities of the Columbus Center and the Columbus-Muscogee County Health Department. In addition, there were eight visitors from the United States who visited this Center to receive information relative to field training and sanitary landfill operations.

**Pittsburgh, Pa.** The Training Center staff is cooperating with the faculty of the Pennsylvania State College in the development of undergraduate curricula in sanitary science and health education. It is hoped that graduates of these courses will provide a source of trained personnel in Pennsylvania for positions with local health agencies and the State health department.

#### STATE FIELD TRAINING (COOPERATIVE ENTERPRISES)

**Maryland.** The second field training school for sanitarians was completed September 8, with certificates of satisfactory completion awarded to five trainees.

The third school for sanitarians began September 25 in the Navy Hospital at the Naval Academy in Annapolis, Md., as the facilities at the Prince Georges County Health Department were not large enough to accommodate the larger number of trainees. The Navy, working in cooperation with the Public Health Service Region III Office, made arrangements with the Maryland State Department

Table 1  
COURSES PRESENTED BY FIELD TRAINING CENTERS

Course	Number of Times Given	Location of Center	Duration (Weeks)	Starting Date 1950	Students	
					ORGANIZATIONS REPRESENTED	Totals
Graduate Sanitarian Field Training	Second	Amherst, Mass.	8	July 10	Graduate sanitarians from University of Massachusetts	16
Sanitation Personnel Training	Third	Amherst, Mass.	12	Sept. 25	State and local health dept.	15
Environmental Sanitation	First	Bloomington, Ill.	12	Sept. 25	Trainees	8
Sanitary Inspectors Training	First	Buffalo, N. Y.	12	Ended July 15	Erie County Health Dept.	11
Sanitary Inspectors Training	Second	Buffalo, N. Y.	12	Sept. 11	Erie County Health Dept. (11), other health dept. (4), and trainee (1)	16
General Sanitary Engineering Field Training	Fourth	Columbus, Ga.	12	Ended Sept. 8	Trainees	16
Sanitary Engineering	Second	Columbus, Ga.	12	Sept. 18	Trainees	13
Milk and Food Training	First	Denver, Colo.	2	Aug. 14	Trainees	17
Plumbing	First	Denver, Colo.	1	Sept. 11	Sanitarians from Colorado	44
Environmental Sanitation (Basic)	Second	Pittsburg, Pa.	12	Sept. 25	Bureau of Sanitation, Pittsburg Dept. of Health	11
Environmental Sanitation	Eighth	Topeka, Kans.	3 months	Aug. 21	Trainees*	11
Milk and Food Sanitation**	First	Topeka, Kans.	1	Aug. 28	Trainees	43
Rodent Control and Premises Sanitation***	First	Topeka, Kans.	2	Sept. 11	Rodent control and premises sanitation personnel in Kansas City, Mo.	28
Appraisal Method for Measuring Quality of Housing	Second	Syracuse, N. Y.	5	Ended July 14	Health dept., Syracuse, N. Y.	1

\*One representing Iran Foundation, Tehran, Iran, and one from School of Hygiene, Athens, Greece.

\*\*Held at Spearfish, S. Dak., in cooperation with State Board of Health, South Dakota; and Public Health Service Region VII Office.

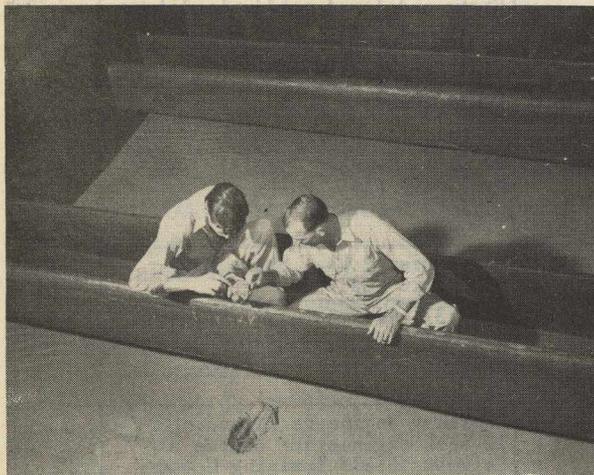
\*\*\*In cooperation with the Kansas City Health Department, and the Missouri and South Dakota Health Departments.



Trainee and instructor making test to determine if water is acid or alkaline after treatment at plant.

of Health for six Navy personnel to attend the course. The State sanitarian has taken charge of the school, and the Navy is taking an active part in the teaching responsibilities. The course schedule was changed only slightly. A half day was added on Military Organization and Function, and a full day on Disaster Planning.

North Carolina. The Department of Field Train-



Trainee and instructor examining filter sand to determine effectiveness of backwashing.

ing, School of Public Health, University of North Carolina, began its third year of operation in July of this year.

Provision has been made for supervised field experience in North Carolina for sanitation students of the School of Public Health. The Department of Field Training is giving guidance and assistance in planning the program. If as successful as anticipated, it will facilitate the making of field experience a university requirement, at least for sanitarians and engineers without previous health department experience.

An 11-week program for a group of nurses employed in local health departments, who are graduates of schools of nursing which do not meet the eligibility requirements for admission to a school of public health or public health nursing, includes the following: 1 week at the State board of health, 2 weeks of lecture and group work at Chapel Hill, and 8 weeks of carefully planned experience in a local health department.

In addition to this program, an apprenticeship program has begun. Detailed outlines of the experience which the apprentices are to receive are being worked on by committees on which the Department of Field Training and Public Health

Nursing of the School, the Nursing Section of the State Board of Health, and local training centers are represented, but inauguration of the program has not waited on completion of this material.

The Department has participated in developments with respect to field training at the national level, both through the cosponsoring with the W. K. Kellogg Foundation of a workshop on sanitation field training which drew participants from across the Nation, and through the participation of personnel in the deliberations of national committees.

**South Carolina.** During July, arrangements were completed with the State health officer of South Carolina to assign a sanitation training officer to assist their personnel in developing an adequate field training program in sanitation.

#### HEADQUARTERS TRAINING

Table 2 shows Headquarters training courses presented during the quarter.

#### TRAINING PUBLIC HEALTH PERSONNEL FROM FOREIGN COUNTRIES:

Special observation and training courses were arranged for 30 public health workers from 14

foreign countries who came to Training Services during the quarter. A break-down is as follows: Austria, 1; Brazil, 3; Canada, 2; Chile, 1; China, 2; Colombia, 1; El Salvador, 2; Germany, 2; Greece, 2; Japan, 2; Okinawa, 1; Peru, 1; Philippines, 9; and Switzerland, 1.

#### OTHER HEADQUARTERS ACTIVITIES

##### CONFERENCES:

To assist in developing a plan for assembling Nation-wide information on field training, conferences were held at the Department of Field Training, School of Public Health, University of North Carolina. A Report on Academic Education for APHA Committee on Field Training is being prepared.

##### EXPANSION OF SERVICES:

Representatives of Training Services participated in a series of conferences held with personnel from the Preventive Medicine Division of the Army, Office of the Surgeon General, Washington, D. C., regarding the possible utilization of CDC facilities in the training of Army "Preventive Medicine"

Table 2  
HEADQUARTERS TRAINING COURSES

Course	Number of Times Given	Location	Duration (Weeks)	Starting Date 1950	Students	
					Organizations Represented	Totals
Insect and Rodent Control Field Training	First	Atlanta, Ga.	2	July 5	Foreign public health workers (8) P.H.S. personnel (4) State and local public health personnel (3)	15
Insect and Rodent Control Field Training	Second	Atlanta, Ga.	2	July 31	Foreign public health workers (7) P.H.S. personnel (1) State and local public health personnel (2)	10
Insect and Rodent Control Field Training	Special	Atlanta, Ga.	2	Aug. 14	Sanitary engineers attending 12-week course at Columbus Field Training Center	16
Fly Control	Special	Atlanta, Ga.	3 days	July 3	CDC	7
Insect and Rodent Control	First	Maxwell Air Force Field, Montgomery, Ala.	2 days	Sept. 12	Maxwell, Gunter, Tyndall, and Craig Air Force Bases	28
Insect and Rodent Control	Ninth	Louisiana Dept. of Health Center	1	Sept. 18	Sanitarians, La., State Dept. of Public Health	13
Housing Sanitation	Special	Atlanta, Ga.	3 days	July 19	CDC(3) and a foreign trainee	4
Housing Sanitation	Special	Atlanta, Ga.	-	Sept. 6	Board of Health, Cincinnati, Ohio	1
Housing	Special	Columbus, Ga.	2 days	Sept. 28	Sanitary engineers attending 12-week engineering course at Columbus Field Training Center	13
Housing	Special	Topeka, Kans.	1 day	Aug. 26	Sanitarians attending 12-week engineering course at Topeka Field Training Center	10

companies. As a result of these conferences, an outline of Field Training Courses was sent to Washington for their perusal.

Similar conferences on training were held with personnel of the Division of Preventive Medicine, Bureau of Medicine and Surgery of the Navy.

#### TRAINING MATERIALS:

**Rat Control Films.** Technical assistance has been provided in connection with the final scene arrangement and narration rewriting for the series of films on rat control, being produced jointly by the U. S. Army and CDC. Two films have been released.\* The films on "The Rat Problem" and "Sanitation and Techniques in Rat Control" were up for final approval in answer print form. The films "Rat Killing Techniques" and "Rat Ectoparasite Control," were to be ready for recording and printing in answer print form in October. The final scene and narration changes of the "Rat-proofing" film were scheduled for October.

Shooting of the scenes not involving rat action was completed during the quarter for the film "Rural Rat Control." This completed the shooting for this film and it was to be ready for film cut-

ting during the second quarter of fiscal year 1951.

#### EVALUATION:

The preliminary form of the achievement test for the environmental sanitation field training program was made ready for use during the quarter by the APHA State Merit System Service. It was administered by six of the field training centers at the beginning of the fall training programs to approximately 64 trainees. The examination in its present form will be given to approximately 200 trainees for the purpose of testing the test and of developing two comparable forms to be given before and after the training period.

Before the test was completed in its present form, the test items were reviewed in New York by a committee of representative training instructors.

With the cooperation of the Experimental and Evaluation Branch, Public Health Service Division of Health Education, the program of determining the readability of various training materials was initiated. The results point to certain factors which indicate the value of pretesting training materials before they are published. Further study and experiments are planned.

## Veterinary Public Health Services

### RABIES

**Epidemic Aid.** Epidemic aid was continued into July in the two areas where rabies epizootics occurred during June — east Texas and Puerto Rico. Immunization programs instituted in east Texas have brought the epidemic under control. Wildlife rabies in the epidemic area in east Texas was reduced 95 percent from its peak incidence in February 1950 by the execution of an intensified fox trapping program.

**New Cases in Puerto Rico.** In Puerto Rico, however, sporadic new cases have been reported. During July, investigations were conducted in an attempt to locate the foci of infection among dogs and mongooses. In addition, a course on the laboratory diagnosis of rabies was given. Immunization is being continued throughout the Island and plans are being made for a dog quarantine station. A con-

firmed case of rabies in a naturally infected wild mongoose has been reported. During September there were reports of mongooses attacking animals and humans at Fort Buchanan and Vega Baja. It is unusual for the mongoose to attack man. These reports indicate the animals may be rabid. There is increasing evidence now that the mongoose population of the Island may be the principal reservoir for the disease.

Brain specimens still are being received from Puerto Rico by the Laboratory at Montgomery, Ala. Four of these were confirmed as positive.

Control and quarantine procedures for rabies were discussed by health officials for all countries in the West Indies at a conference in Jamaica held by the Pan American Sanitary Bureau in August. Dr. Ernest S. Tierkel and Dr. G. L. Dunnahoo of the U. S. Public Health Service served as expert

\*See Audio-Visual Production Services section, this Bulletin.

consultants.

**Rabies in San Antonio, Tex.** In the meantime, dog rabies in San Antonio made this the main epizootic area in the United States. An all-out campaign against rabies was planned for San Antonio during the month of October. The highest reported incidence of rabies for the past 10 years has been in the San Antonio area, and a long-range control program is being prepared.

**Other Cases Reported.** A total of 483 specimens has been diagnosed as positive for rabies in Indiana this year, although there has been a decline of 30.2 percent in the incidence of animal rabies as compared with 1949. During August two human deaths were reported in the State due to rabies. Increased interest in better dog control is evident throughout the State.

The number of animal brains received for examination in Florida during the first quarter decreased to approximately one-third of those received during the previous 3 months, and only 3 of the 55 received were found to be positive.

Five new cases of rabies were reported for Colorado during the quarter. Vaccinations are being continued, and it is planned to publicize the need for continuing the immunization program begun during the March epidemic in view of the new dog population which has developed since closing of the mass clinics held during that period.

The 48 States reported 1,585 cases of rabies in animals to the Bureau of Vital Statistics during the quarter, an increase of 625 cases over the first quarter of fiscal year 1950. This is partly due to broader and better reporting of the disease by the States.

#### **POLIOMYELITIS**

A veterinarian served on the team for the poliomyelitis epidemic in Ohio in September, where extensive investigations were carried on to determine the relation, if any, of suspicious illnesses in hogs to the human outbreak of poliomyelitis. No evidence of any unusual illness could be ascertained among swine in the Paulding area. There is no evidence in the literature that swine or any other domestic animal may carry polio virus. Laboratory tests will be made on animal blood, excretions, and milk.

#### **PUBLIC HEALTH VETERINARIANS CONFERENCE**

During August the first CDC Conference of Public Health Veterinarians was held. The program began

with a visit to the Virus Laboratory in Montgomery, Ala., where discussions on rabies and related problems were held. Four days were spent in Atlanta, Ga., where discussions of veterinary public health programs and various animal diseases were given by heads of departments and leaders in the field of veterinary medicine from all parts of the United States and several foreign countries. The last day of the conference was spent in Savannah, Ga., for conferences on the toxicology of insecticides and rodenticides and a tour of the facilities there.

#### **Q FEVER**

Yolk sac material containing *Coxiella burnetii* has been titrated and diluted with sterile milk to make the material used for the thermal deathtime tests at Davis, Calif. It has been found that dilutions of  $10^{-8}$ ,  $10^{-9}$ ,  $10^{-10}$ ,  $10^{-11}$  must be used to reach the infectivity end point in guinea pigs and embryonated eggs. Guinea pigs then are inoculated with each dilution. Since *C. burnetii* remains fully immunogenic when heat killed, subpassages in guinea pigs must be made. This requires a minimum of 12 guinea pigs per dilution; and since unheated samples must be run as controls, but do not need subpassage in guinea pigs, a total of 72 guinea pigs is needed for each time-temperature run. This requires a minimum of 9 weeks before results in guinea pigs are known. A similar situation exists when embryonated eggs are used as a host for the growth of *C. burnetii* surviving in the test samples. Three blind passages must be made through eggs before sufficient numbers of rickettsiae are present to preclude the possibility of false negatives.

**Pasteurization Procedures Evaluation.** Work has started on the project to evaluate commercial pasteurization procedures with reference to *C. burnetii*. In the milk survey program, milk is tested as received by dairies by being inoculated into guinea pigs for evidence of the presence of *C. burnetii*. Thus when producers are identified as having infected herds, arrangements are made to collect samples of the raw milk as it arrives at the creamery in the mixing vat and again after pasteurization. To date, two new sources of milk contaminated with the *Rickettsia* of Q fever have been uncovered.

**Pilot Studies.** Pilot studies are under way at the Rocky Mountain Laboratory to determine an optimum dose for cattle when exposed by inhalation of an aerosol spray. A dose just sufficient to infect susceptible cattle is desired. Results to date in-

dicate that this dose equals about 100 infectious guinea pig doses.

#### BRUCELLOSIS

In Indiana, the cooperative program between physicians and the State board of health is continuing and the bacteriological findings on each case of brucellosis for the past 3 years is now available. Comparative studies of the records on those cases diagnosed as brucellosis and the bacteriologically proved cases of the disease will be made.

#### CREEPING ERUPTION

With the aid of the Florida State Board of Health, studies have been made on the larvicidal effect of sodium borate (Borascu) in greyhound kennels. Soil samples were collected prior to treatment, 26 and 60 days after treatment. The study has not been completed, but a very marked reduction in the larvae count was found after treatment with only a small increase in the period between 26 and 60 days.

#### SALMONELLOSIS

Bacteriological studies of various materials in the environment of dogs infected with *Salmonella* resulted in several positive identifications in pens, feed pans, and flies. Continued examination of greyhounds established that in the off-season, infection varied widely in incidence. In a semirural area where *Salmonella* infection was found to be unusually common among house, hunting, and cattle dogs, a detailed survey was carried out to investigate the relationship of infection in animals to that in humans. Relatively few infections could be identified in humans.

#### ANTHRAX

During the quarter there was a marked increase of this disease in Texas, an area which has been endemic for a long time. There was a large epizootic of the disease in northeast Texas and in the milkshed areas around San Antonio. Fifty thousand animals were quarantined in three northeastern Texas counties, and residents have been furnished information by the Texas State Department of Health for their protection against this highly fatal disease.

#### LEPTOSPIROSIS

It is planned to use dogs in the studies of this disease at the Laboratory at Hamilton, Mont.

Several strains of *Leptospira* have been procured to orient personnel in culturing, transferring, and handling cultures of *Leptospira*. These strains are being grown in fertile hen eggs as well as other media. *Leptospira* agglutination tests also are being conducted in various animal serums.

#### MEAT INSPECTION

During the quarter meat inspection services of Denver and Colorado Springs, Colo., were surveyed and granted State approval under regulations of the State board of health. Trade barriers against meat inspection gradually are disappearing, as evidenced by an increasing number of requests for such services.

The Texas State Department of Health has drawn up a tentative code governing sanitation and inspection of poultry and domestic rabbits.

#### COLUMBIA RIVER BASIN STUDIES

Principal animal diseases which have been detected in the basin area so far are plague, tularemia, Rocky Mountain spotted fever, Western equine encephalomyelitis, Q fever, and brucellosis. A total of nearly 500 pools of serums, ticks, mosquitoes, and carcasses was obtained during the investigations, which began in April and ended in September.

A veterinary public health program was presented to the Washington State Department of Health during the quarter by the CDC veterinary officer assigned to the State. The program was approved in content and resulted in the formation of a permanent Veterinary Public Health Committee in the State Association which will work with the public health veterinarians and State health department in carrying out the veterinary program.

#### PSITTACOSIS

An officer from the Services made an investigation of psittacosis quarantine facilities in Florida. A recommendation of 90 days quarantine for all imported psittacine birds was accepted by the Foreign Quarantine Division, Public Health Service. The birds will be housed in clean quarters inaccessible to the public.

At the Conference of Public Health Veterinarians it was recommended that the present Interstate Quarantine Regulations governing psittacine birds be revised in light of new scientific information on bird reservoirs, the successful treatment of human cases, and the expense and difficulty of enforcement of present regulations.

## REGULAR CORPS EXAMINATIONS

Examinations for Scientists and Sanitarians (Bacteriologists) and for Scientists and Sanitarians (Entomologists, Parasitologists, and Protozoologists) in the Regular Corps of the Public Health Service will be held February 12-14, 1951, in various cities throughout the country. Completed applications must be in the Washington office by January 15.

Appointments are permanent and provide opportunities for career service in research and public health activities. Benefits include periodic pay raises and promotions; liberal retirement provision; medical care; annual and sick leave.

Appointments will be made in the grade of assistant and senior assistant, equivalent to Navy ranks of lieutenant (j.g.) and lieutenant, respectively. Entrance pay is \$4,486 for assistant (with dependents) and \$5,346 for senior assistant, including rental and subsistence allowance.

Candidates must have had at least 7 years of professional training and experience beyond high school, and must have, or expect to receive by November 1951, a master's or doctor's degree.

For application forms and additional information, write to: Surgeon General, United States Public Health Service, Federal Security Agency, Washington 25, D. C. Attention: Division of Commissioned Officers.

## CORRECTION

*CDC Bulletin IX (10), October 1950:*

*Page 15, figure 3, "RABIES IN DOGS BY INDEX RANK 1949." A comparative index rank of "light," (1-10), was erroneously attributed to Warren County, N. J. There were no dog rabies cases reported in Warren County in 1949.*

