

# CDC

# JUNE 1950 BULLETIN

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*also*

**CDC TRAINING COURSES  
MORBIDITY DATA**

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

## *CDC Training Courses*

Listed below are training courses, sponsored by Services of the Communicable Disease Center, to be held during the ensuing several months. Further information on the courses may be obtained from the *Bulletin of Field Training Programs* issued by the Center.

### TRAINING SERVICES

1. **ENVIRONMENTAL SANITATION FIELD TRAINING**, September 25 to December 16, 1950. Twelve weeks. Amherst, Mass.
2. **ENVIRONMENTAL SANITATION FIELD TRAINING FOR GRADUATE SANITARIANS**, July 10 to September 1, 1950. Eight weeks. Amherst, Mass.
3. **FIELD SURVEY AND EVALUATION METHODS FOR MEASURING QUALITY OF HOUSING ENVIRONMENT**, August 7-12, October 9-14, and December 4-9, 1950. One week. Atlanta, Ga.
4. **FIELD SURVEY AND EVALUATION METHODS IN HOUSING SANITATION**, July 17 to August 18, September 18 to October 20, and November 13 to December 15, 1950. Five weeks. Atlanta, Ga.
5. **INSECT AND RODENT CONTROL TRAINING FOR FOREIGN PUBLIC HEALTH PERSONNEL**, July 5-18, and July 31 to August 11, 1950. Two weeks. Atlanta, Ga.
6. **RAT-BORNE DISEASE PREVENTION AND CONTROL**, October 2-20, 1950. Three weeks. Atlanta, Ga.
7. **ENVIRONMENTAL SANITATION FIELD TRAINING**, September 11 to December 1, 1950. Twelve weeks. Buffalo, N. Y.
8. **ADVANCED TRAINING COURSE FOR STATE SANITARY CHEMISTS PRIMARILY CONCERNED WITH WATER POLLUTION INVESTIGATIONS**, October 2-13, 1950. Two weeks. Cincinnati, Ohio.
9. **ORIENTATION COURSE FOR LABORATORY PERSONNEL IN THE EXAMINATION OF SEWAGE, POLLUTED WATER, AND INDUSTRIAL WASTES**, September 11-29, 1950. Three weeks. Cincinnati, Ohio.
10. **GENERAL SANITARY ENGINEERING FIELD TRAINING**, June 19 to September 8, 1950. Twelve weeks. Columbus, Ga.
11. **GENERAL SANITARY ENGINEERING FIELD TRAINING** (Special course for newly commissioned engineer officers of the U. S. Public Health Service), September 18 to December 8, 1950. Twelve weeks. Columbus, Ga.
12. **ENVIRONMENTAL SANITATION FIELD TRAINING**, September 18 to December 8, 1950. Twelve weeks. Denver, Colo.
13. **FIELD SURVEY AND EVALUATION METHODS FOR MEASURING QUALITY OF HOUSING ENVIRONMENT**, August 21-26, October 23-28, and December 11-15, 1950. One week. Syracuse, N. Y.
14. **FIELD SURVEY AND EVALUATION METHODS IN HOUSING SANITATION**, July 31 to September 1, October 2 to November 3, and November 20 to December 22, 1950. Five weeks. Syracuse, N. Y.
15. **ENVIRONMENTAL SANITATION FIELD TRAINING**, August 21 to November 11, 1950. Twelve weeks. Topeka, Kans.
16. **SPECIAL TRAINING IN RODENT CONTROL**, September 11-22, 1950. Two weeks. Topeka, Kans.

*(Continued on inside back cover)*

# CENTER HIGHLIGHTS

Jan - Feb - Mar 1950

## *Administrative Services*

### **PURCHASES ON CASH BASIS**

Plans were made for the establishment of Agent Cashier Accounts at various key points to serve CDC activities throughout the country. Under this plan, purchases are authorized and made on a cash basis. Economies are effected by reducing the number of obligating documents and vouchers, and procurement activities are facilitated.

The Budget and Fiscal Officer and his assistant served as representatives of the Bureau of State Services on the P.H.S. Subcommittee on Fiscal Accounting. The subcommittee met in Washington and was in session for approximately 5 weeks. The scope of the assignment was to evaluate the fiscal accounting requirements of the Service and to develop and recommend modifications and improvements in the accounting and auditing procedures and operations.

### **CONFERENCES ON PRINTING, BINDING**

Conferences were held in Atlanta with representatives of the Central Office on printing and binding requirements, and distribution of printed materials. Standards were established to insure full utilization of CDC facilities and those of the Agency and Government Printing Office.

The requirement for utilization of Washington facilities will necessitate more advanced planning by operating units.

### **PROPERTY UTILIZATION PROGRAM**

The property utilization program of the Supply Section continues to develop. A recent survey of surplus and unserviceable equipment resulted in the transfer and disposition of a considerable amount of property.

### **CDC VEHICLE ACCIDENTS DECREASING**

A review of the records indicates that the number of accidents involving CDC vehicles is diminishing, inasmuch as only 10 were reported for this quarter against 21 for the preceding quarter. This office continues to encourage proper care, maintenance, and control of CDC vehicles.

### **REPORT OF STATE HEALTH OFFICERS - CDC CONFERENCE**

A Condensed Report of the Proceedings of the State Health Officers - Communicable Disease Center Conference, held at Fulton County Academy of Medicine, Atlanta, Ga., October 17-18, 1950, was prepared. Copies are available upon request as long as the supply lasts.

### **MANUSCRIPTS EDITED, CLEARED**

The following is a list of the manuscripts edited and cleared for presentation and/or publication:

Andrews, J. M.: The eradication of malaria in the United States.

Baum, M. D.: Colorado's meat inspection program.



Reproducing operational maps for use in a fly control project.

- Bradley, G. H., and Lyman, F. E.: Discussion of five years' use of DDT residuals against *Anopheles quadrimaculatus*.
- Bradley, G. H., and Lyman, F. E.: Present status of the Malaria Eradication Program.
- Brookman, Bernard: The ecology of *Culex* mosquitoes.
- Crawford, J. H.: Field training for sanitarians and sanitary engineers.
- Donaldson, A. W.: Effects of various modifications of a mass staining procedure on the transfer of malarial parasites between blood films.
- Durham, W. F., Bloom, W. L., Lewis, G. T., and Mandel, E. E.: Rapid and reliable determination of carbohydrate in blood.
- Ecke, D. H., and Johnson, C. W.: Sylvatic plague in Park County, Colorado.
- Edwards, P. R., and Hermann, G. J.: A new *Salmonella* type: *Salmonella allandale*.
- Edwards, P. R., Hermann, G. J., Watt, James, and DeCapito, Thelma: Two new *Salmonella* types: *Salmonella weslaco* and *Salmonella macallen*.
- Gilbertson, W. E.: Sharpening the focus of sanitation measures.
- Goodwin, M. H. Jr.: Observations on the recession of malaria in an area of southwestern Georgia.
- Howitt, B. F.: Recovery of the Coxsackie group of viruses from human sources.
- Howitt, B. F.: Isolation and differentiation of the Coxsackie group of viruses.
- King, E. O., Frobisher, Martin, Jr., and Parsons, E. I.: Further studies on the *in vitro* test for virulence of *Corynebacterium diphtheriae*.
- Link, V. B.: Plague in North America.
- Littig, K. S.: Wood decay in the house.
- Mandel, E. E., Lehmann, E. E., and Paris, D. A.: Simple blood tests available to the general practitioner.
- Mandel, E. E., and Owings, R. E.: Quick blood sugar method suitable for routine use and screening.
- Menges, R. W., Furcolow, M. L., and Ruhe, J. S.: Experimental histoplasmosis in a dog: A nonfatal case.
- Rector, Nelson H.: Laws and statutes with reference to insect control.
- Thompson, G. A.: A note on the anopheline threshold of malaria transmission.
- Thurman, D. C., Jr., and Mortenson, E. W.: Studies of the biology of *Aedes* mosquitoes in irrigated pastures in California during 1949.
- Thurman, D. C., and Peters, R. F.: The ecology of *Aedes* mosquitoes in California.
- Watt, James, DeCapito, Thelma, Hermann, G. J., and Edwards, P. R.: Two new *Salmonella* types: *Salmonella* *nella donna* and *Salmonella pharr*, with a reference to new types found in Hidalgo County, Texas.

#### LIBRARY EXCHANGE LIST

In the CDC Library, material requested from the third Medical Library Association Exchange list, consisting of 952 items, was sent to 94 libraries, some of which are located in Canada, South America, England, and Lebanon. The CDC Library participated in aiding foreign libraries through United Nations Educational, Scientific, and Cultural Organization by sending 1,777 items to 15 libraries. A supply of 331 items was sent to the Escuela de Medicina de la Universidad de Chile, which burned recently.

#### NEW BOOKS ADDED TO LIBRARY

Some current books recently added to the CDC library:

- Advances in protein chemistry, V. 5, 1949.
- Afifi, M. A. Bilharzial cancer, 1948.
- Allport, G. W. The psychology of rumor, 1947.
- Blakiston's New Gould medical dictionary, 1949.
- Boyd, M. F. Malaria; a comprehensive survey of all aspects of this group of diseases from a global standpoint, 2v., 1949.
- Byrnes, Eugene. A complete guide to drawing, illustration, cartooning, and painting, 1948.
- California Mosquito Control Association. Proceedings and papers. 17th, 1949.
- Carrier, W. H. Pan engineering, 1949.
- Coale, A. J. Problem of reducing vulnerability to atomic bombs, 1947.
- Coward, K. H. Biological standardization of the vitamins, 1949.
- Custer, R. P. Atlas of the blood and bone marrow, 1949.
- Dana, A. W. Kitchen planning for quantity food service, 1949.
- Dressler, William. Atlas of electrocardiography, 1949.
- Flosdorf, E. W. Freeze drying, 1949.
- Gaade, W. Beginselen der organisch chemisch nomenclatur, 1948.
- Goodale, R. H. Clinical interpretation of laboratory tests, 1949.
- Headstrom, B. R. Bird nests, 1949.
- Jacobs, M. B. The analytical chemistry of industrial poisons, hazards, and solvents, 1949.
- Kaston, B. Spiders of Connecticut, 1948.
- Lever, W. F. Histopathology of the skin, 1949.
- Lynch, T. I. Communicable disease nursing, 1949.
- McLester, J. S. Nutrition and diet in health and disease, 1949.
- Motor carrier directory, 1949.
- Pittsburg. Carnegie Library. Rules for filing, 1948.

- Pratt, Robertson. Antibiotics, 1949.
- Prescott, S. C. Industrial microbiology, 1949.
- Rand McNally and Company. Rand McNally cosmopolitan world atlas, 1949.
- Raper, K. B. A manual of the penicillia, 1949.
- Roberts, Llywelyn. Aids to public health, 1947.
- Roddis, L. H. Preparation and measurement of isotopes and some of their medical aspects, 1948.
- Rosebury, Theodor. Peace or pestilence, 1949.
- Savage, W. G. Practical public health problems, 1949.
- Schopfer, W. H. Plants and vitamins, 1949.
- Schrenk, H. H. Air pollution in Donora, Pennsylvania. Epidemiology of the unusual smog episode of October 1948. Preliminary report, 1949.
- Sigerist, H. B. Medicine and health in the Soviet Union, 1947.
- Sunderman, P. W. Normal values in clinical medicine, 1949.
- Theilheimer, Wilhelm. Synthetic methods of organic chemistry; a thesaurus. V. 2, 1949.
- Thomson, David. Oral vaccines and immunization by other unusual routes, 1948.
- U. S. Bureau of Medicine and Surgery. Manual of radiological safety, 1948.
- U. S. Bureau of the Budget. The budget of the United States Government for the fiscal year ending June 30, 1951, 1950.
- U. S. Employment Service. Dictionary of occupational titles, 1949.
- United States Government organization manual, 1949.
- U. S. Library of Congress. Legislative Reference Service - Index to the reports of the Commission on Organization of the Executive Branch of the Government, 1949.
- U. S. Public Health Service. Manual of serological tests for syphilis, 1949.
- Vernon, Arthur. The history and romance of the horse, 1946.
- Warshaw, L. J. Malaria, the biography of a killer, 1949.
- Wuhrman, Ferdinand. Die Bluteiweisskörper des menschen, 1947.
- Zimmerman, O. T. Scientific and technical abbreviations, signs, and symbols, 1949.

## Audio-Visual Production Services

### MAJOR PRODUCTIONS RELEASED DURING THE QUARTER

#### Motion Pictures

- 4-089.4 The Laboratory Diagnosis of Tuberculosis, Part IV - Typing of Tubercle Bacilli by Animal Inoculation. 16mm, sound, B&W, 14 minutes, 501 feet.
- 4-090.0 Community Fly Control Series - Fly Control through Basic Sanitation. 16mm, sound, color, 9 minutes, 316 feet.
- 4-104.0 Rat-Proofing Procedures (for PHS Region V). 16mm, sound, B&W, 4 minutes, 170 feet.
- 4-110.0 Community Fly Control Series - Spraying Procedures and Equipment, Part II - Space Spraying. 16mm, sound, color, 7 minutes, 257 feet.

#### Filmstrips

- 5-118.0 Home Safety and Health Departments. 35mm, sound, B&W, 15 minutes, 91 frames.
- 5-123.4 The Laboratory Diagnosis of Tuberculosis, Part IV - Typing of Tubercle Bacilli by Animal Inoculation. 35mm, sound, color, 7 minutes, 58 frames.
- 5-124.0 Ten-Eighty, A Rat Poison for Professional Use. 35mm, sound, B&W, 15 minutes, 73 frames.
- 5-127.0 Laboratory Diagnosis of Tinea Capitis in Children. 35mm, sound, color, 9 minutes, 64 frames.
- 5-157.0 Film Script to Film Strip. 35mm, silent, B&W, 20 frames.

- 5-165.0 Visual Aids for Teaching Entomology. 35mm, silent, color, 30 frames.
- 5-166.0 Measurement of Serum Total Base - The Sunderman Conductivity Method. 35mm, silent, B&W, 23 frames.
- 5-167.0 The Grant-in-Aid Procedures (for PHS Region VI). 35mm, silent, color, 46 frames.

#### 2x2-Inch Slide Series

- 9-033.0 Municipal Sewage Treatment - Equipment and Structures, B&W, 259 slides.
- 9-033.1 Municipal Sewage Treatment Equipment and Structures, Part I - for the Imhoff Tank Process. B&W, 20 slides.
- 9-033.2 Municipal Sewage Treatment Equipment and Structures, Part II - for the Primary Treatment Process. B&W, 19 slides.
- 9-033.3 Municipal Sewage Treatment Equipment and Structures, Part III - for the Chemical Precipitation Process. B&W, 49 slides.
- 9-033.4 Municipal Sewage Treatment Equipment and Structures, Part IV - for the Trickling Filter Process. B&W, 104 slides.
- 9-033.5 Municipal Sewage Treatment Equipment and Structures, Part V - for the Activated Sludge Process. B&W, 41 slides.
- 9-033.6 Municipal Sewage Treatment Equipment and Structures, Part VI - for the Vacuum Filtration and Sludge Incineration Process. B&W, 16 slides.

9-038.0 Measurement of Serum Total Base -- The Sunderman Conductivity Method. B&W, 23 slides.

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

#### Motion Pictures

- 4-087.0 Striking Back Against Rabies
- 4-088.1 Laboratory Diagnosis of Diphtheria, Part III -- Tests for Virulence of *C. diphtheriae* in Animals
- 4-105.0 Intraoral and Pharyngeal Structures and Their Movements (V.A. -- CDC Cooperative Project)
- 4-106.0 Laboratory Diagnosis of Diphtheria, Part IV -- The *in vitro* Test for Virulence of *C. diphtheriae*
- 4-111.0 The Laboratory Diagnosis of Rabies

#### Filmstrips

- 5-061.0 Identification of U. S. Species of *Anopheles* Larvae
- 5-130.0 Identification of the U. S. Genera of Adult Ticks
- 5-163.0 Laboratory Diagnosis of Diphtheria -- The *in vitro* Test for Virulence of *C. diphtheriae*

#### 2x2-Inch Slide Series

- 9-035.0 Ten-Eighty, A Rat Poison for Professional Use

### MAJOR PRODUCTIONS COMPLETED DURING THE QUARTER TO FINAL REVISION OF EDITED PRINT STAGE

- 4-043.0 Life Cycle of *Diphyllobothrium latum*
- 4-091.0 Community Fly Control Series -- Spraying Equipment and Procedures, Part I -- Residual Spraying
- 5-023.0 The Liver -- Portal Cirrhosis
- 5-143.0 Taking Care of Diabetes, Part III -- Insulin and Its Use (Division of Chronic Disease -- CDC Cooperative Project)
- 5-154.0 What Makes the Right Film Right.

### OTHER PRODUCTIONS COMPLETED AND RELEASED DURING THE QUARTER

#### Exhibits

- 6-012.0 Municipal Sewage Treatment -- Biological Oxidation -- Sludge Disposal

#### Film Guides

- G 4-034.0 Manson's Blood Fluke
- G 4-077.0 Use of Aircraft for Insect Control, Part I -- Mosquito Control
- G 4-089.1 The Laboratory Diagnosis of Tuberculosis, Part I -- Preparation of a Culture Medium
- G 4-089.2 The Laboratory Diagnosis of Tuberculosis, Part II -- Preparation of Sputum Specimens
- G 4-102.0 Preservation of Bacteria by Desiccation *in vacuo*.

### PROJECT DEVELOPMENTS

Work was completed on the very unusual Kodachrome motion picture "Intraoral and Pharyngeal Structures and Their Movements," for the Veterans Administration. Due to the featured patient's facial cancer, resulting in the removal of one side of the face and nearly half the palate, it was possible

to photograph movements of the tongue, pharyngeal wall, epiglottis, and other intraoral structures. The laboratory work and production of release prints are being done by the Department of Agriculture.

At the end of the quarter, editing was in progress on 11 motion pictures, most of which are scheduled for completion this fiscal year. They are:

- (1) 4-080.0 The Fight Against the Communicable Diseases
- (2) 4-087.1 Rabies (Edition for Special Distribution)
- (3) 4-088.0 Laboratory Diagnosis of Diphtheria, Part I -- Microscopy Study and Isolation of *C. diphtheriae*
- (4) 4-088.2 Laboratory Diagnosis of Diphtheria, Part II -- Determination of Types of *C. diphtheriae*
- (5) 4-101.0 Laboratory Diagnosis of Influenza
- (6) 4-103.0 Municipal Sewage Treatment Processes
- (7) 4-107.0 Municipal Sewage Treatment Processes, Supplement I -- Sewage Treatment Processes
- (8) 4-108.0 Municipal Sewage Treatment Processes, Supplement II -- Sludge Treatment Processes
- (9) The Rat Problem (Army-CDC Cooperative Project)
- (10) Habits and Characteristics of Rats, Part I -- The Norway Rat (Army-CDC Cooperative Project)
- (11) Habits and Characteristics of Rats, Part II -- The Roof Rat (Army-CDC Cooperative Project)

### PRODUCTION OF FILMS

A new discovery in technique was made and put into practice whereby a black and white printer could be converted into a color printer, at no cost except for labor. This conversion enables the Filmstrip Unit to make emergency color prints of the highest quality, and process them in the laboratory at a minimum cost.

### UTILIZATION OF FILMS

In the distribution of audio-visual aids and utilization materials, the number of loans made by the Film Library during the quarter is shown by the following table:

Month	Motion Pictures		Filmstrips	Totals
	CDC	Outside Sources	CDC	
January	172	54	245	471
February	129	42	158	329
March	209	64	333	606
<b>Total</b>	<b>510</b>	<b>160</b>	<b>736</b>	<b>1,406</b>

This is an increase of 18 percent over the preceding quarter.

Two hundred and forty-two requests for copies of the CDC Film Catalog-Utilization Guide were received and filled. New, up-to-date alphabetical and classified lists of CDC productions were

released and mailed to all catalog holders.

In the production of new utilization, evaluation, and publicity materials, the writing of a condensed, conventional-type film catalog describing all CDC productions to date was completed.

Film guides were written for 4-089.4 and 5-123.4, "Laboratory Diagnosis of Tuberculosis, Part IV - Typing of Tubercle Bacilli by Animal Inoculation," and 5-124.0, "Ten-Eighty, a Rat Poison for Professional Use."

The accompanying charts depict (1) the total number of showings of CDC productions; (2) the total audiences for CDC productions; (3) a comparison of the results of field evaluations of motion pictures and filmstrips in 1948-49 with 1950; (4) percentage of total distribution of both motion pictures and filmstrips going to each of the various types of organizations and institutions such as CDC, universities and colleges, State boards of health and medical schools. The data for the chart referred to in No. 3 above show that for motion pictures the percentage of field ratings

of "excellent" rose from 38 percent for 1948-49 to 56 percent for 1950; for filmstrips, the increase was from 57 to 72 percent. At the same time, the percentage of field ratings of "poor" dropped from 5 to 1 percent for motion pictures and from 2 to 0 percent for filmstrips.

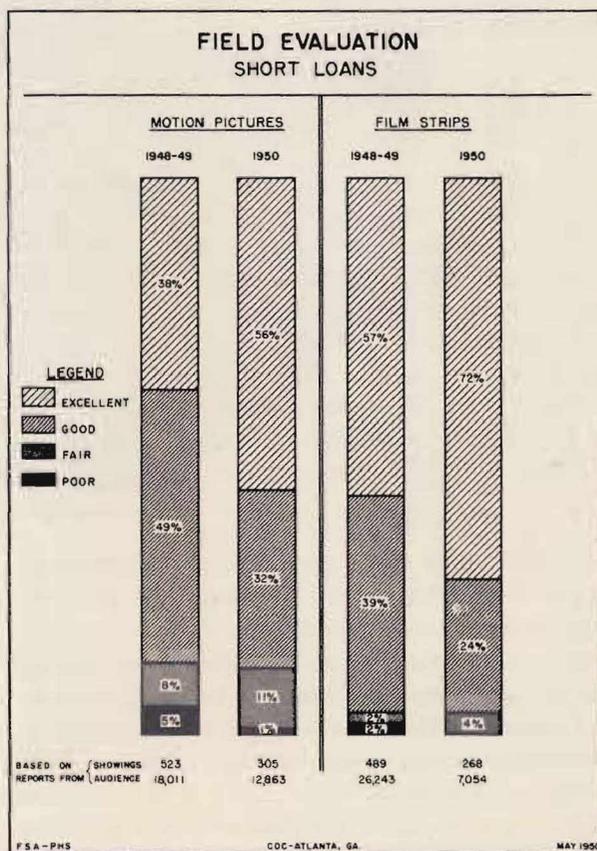
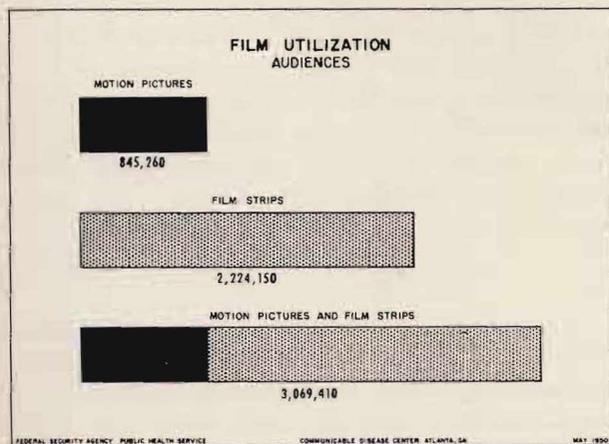
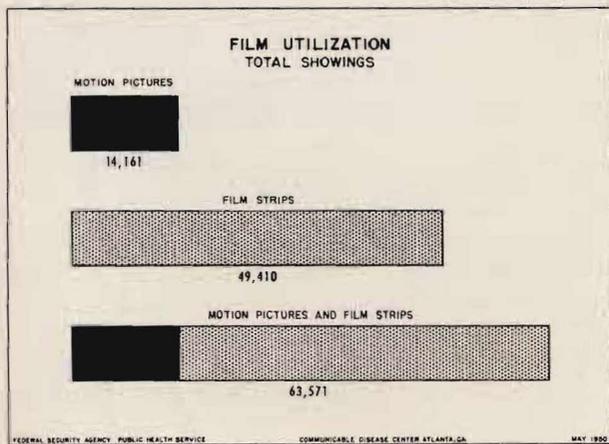
#### BULLETIN ON TUBERCULOSIS

A special bulletin describing a program for country-wide utilization of the three motion pictures and three filmstrips of the "Laboratory Diagnosis of Tuberculosis" series was prepared together with individual evaluation questionnaires for each film, and sent to the 48 State laboratories to facilitate utilization and evaluation of the films.

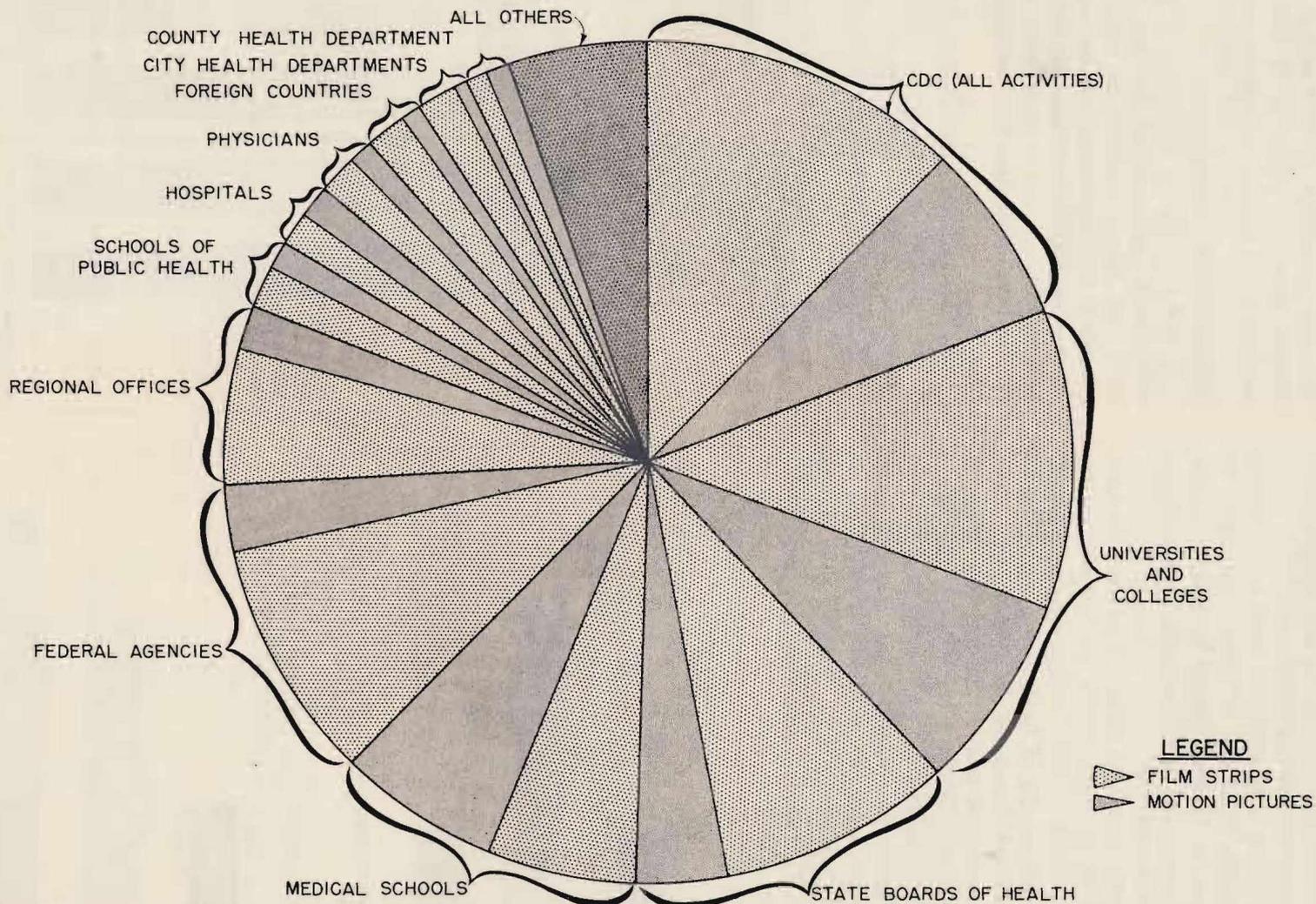
Individual evaluation forms also were prepared for the motion picture productions 4-090.0, "Basic Sanitation," and 4-110.0, "Space Spraying," which have been released in the Community Fly Control series.

#### COURSES PRESENTED

Two 1-week courses in audio-visual education



# FILMS ON LOAN



9



On location during the photographing of the CDC film RURAL RAT CONTROL. This film supplements the series of rodent control films being produced in cooperation with the Army Medical Film Corps.

were presented (February 13-17 and March 13-17, 1950). In addition to Georgia, the States of Arkansas, Delaware, Kentucky, New Jersey, and South Carolina were represented. The curriculum included: (1) administration of a public health audio-visual program; (2) story development; (3) still cameras; (4) movie cameras; (5) film library operations; (6) film content analysis; (7) film structure, repair, and maintenance; (8) equipment: types, selection, operation, and repair; (9) educational methods applied to the use of all types of visual aids; (10) utilization materials: their types and use; (11) film evaluation; (12) slide making; (13) exhibits and posters; (14) audio-visual workshops; (15) study of trainee problems.

#### **COOPERATIVE PROJECT WITH THE ARMY ON RAT-CONTROL FILMS**

Most of the scenes on the sets required for the Army-CDC cooperative film project on rat control

at Savannah, Ga., had been completed as of the end of the third quarter. In the middle of March, the Army photographers left Savannah for return about April 15, 1950, when they were to endeavor to photograph a difficult sequence showing a rat burrowing beneath a cement foundation, and another showing the birth of Norway rats. While the Army photographers are away, a CDC camera crew is scheduled to make use of the sets to obtain close-up scenes of rat activity for the CDC film "Rural Rat Control."

#### **COOPERATIVE PROJECT WITH THE DIVISION OF CHRONIC DISEASE ON DIABETES FILMS**

At the end of the quarter, the series of filmstrips on diabetes, a cooperative film project with the Division of Chronic Disease, was nearing completion. The art work on six of the strips had been completed and was being photographed. The remaining five strips were scheduled for photographing about the middle of May.

# Engineering Services

Senior Engineer (R) John H. Bright was designated as Assistant Chief, Engineering Services, February 10, 1950. Mr. Bright replaces Sanitary Engineer L. B. Hall, who will be transferred to Technical Development Services following completion of postgraduate training at The Johns Hopkins University.

## AIR-BORNE ALLERGENS INVESTIGATION

Sanitary Engineer L. B. Hall has undertaken an investigation, in connection with his graduate studies at Johns Hopkins University, of the migration of ragweed pollen and its relation to the problem of the reduction of human hay fever by control of ragweed. The method of approach will be four-fold: (1) library research, (2) development of a theoretical prediction of the migration of pollen under a given set of circumstances, (3) development of improved equipment for collecting, recording and identifying pollen, and of methods of tagging pollen and counting tagged pollen, and (4) studies of pollen migration (a) when artificially dispersed, and (b) when naturally dispersed.

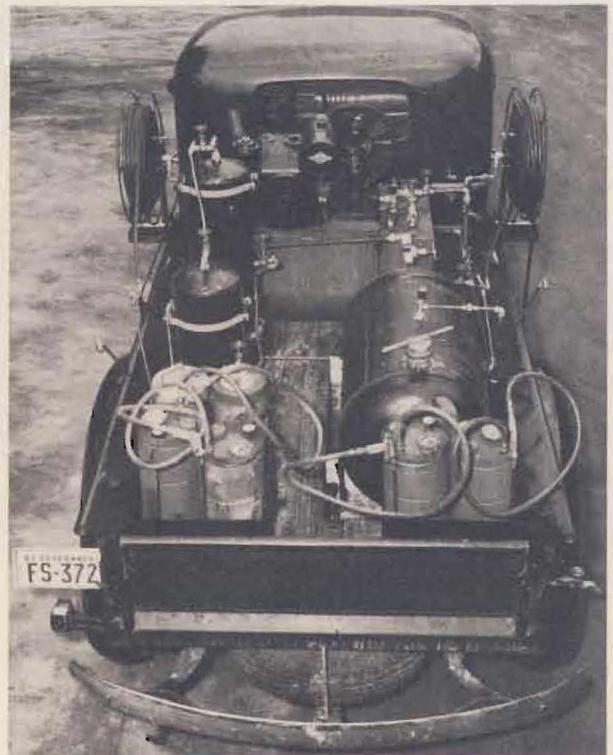
## INSECT-BORNE DISEASE RESEARCH OUTLINE

The Environmental Health Study Section of the Division of Research Grants and Fellowships, National Institutes of Health, has suggested that CDC assist in the preparation of an outline of insect-borne disease research for consideration by that Section. The purpose of such an outline is to assist the Study Section in the promotion of worthwhile basic research in the field of insect-borne diseases, a field of particular interest to the Communicable Disease Center. The Chiefs of Entomologic, Epidemiologic, Laboratory, Technical Development, and Veterinary Public Health Services of the Center were asked to submit suggestions for incorporation into the outline, which was to be completed prior to the next meeting of the Environmental Health Study Section in May.

## MALARIA CONTROL ACTIVITIES

**Chlordan Released for Use on Program.** During the past 2 years there has been an increasing number of complaints of the apparent failure of DDT to control house flies in those areas where residual spraying has been under way for several

years. As a result, some of the States have encountered considerable difficulty in obtaining sufficient local participation in the residual spray program. While concurrent fly control has never been an objective of the residual spray program, the fly control achieved in the past has made the program popular with the general public and has served to promote local participation in the mosquito control program. It was therefore deemed advisable to incorporate into the malaria control spray program some means of obtaining satisfactory concurrent fly control. Among the various new insecticides investigated by the Technical Development Services, chlordan has been recommended, although many undesirable features of this insecticide are recognized. The use of chlordan as a fly control measure on the residual spray program was not intended as a substitute for premises hygiene but as an adjunct to State and local health department efforts being directed toward improvement of



Lay-out of spray equipment in truck used in time-motion studies as an aid to economy and efficiency in the application of residual sprays.

rural sanitation. Actual application of the insecticide is accompanied in general by instructions to the householder regarding elimination of fly breeding as a means by which to obtain permanent improvement in premises sanitation.

Chlordan is not recommended for general interior spraying of homes and will be used primarily in the treatment of porches, screens, and the interiors of outbuildings. It is not recommended for use in dairy barns or milk processing plants. It is doubtful if exterior applications of chlordan will remain effective for any appreciable length of time, and interior treatments of outbuildings at the rate of 100 milligrams per square foot may result in effective fly control for only a period of 8 to 11 weeks. In view of the short residual period, it has been recommended that chlordan spraying not be undertaken prior to late May or early June.

Since chlordan is somewhat more toxic than chemicals previously used on the operational program, representatives of State operational programs have been advised that mixing of concentrates should be accomplished in central mixing plants where trained personnel observe all precautions.

Despite the undesirable features of chlordan, several States (Georgia, Kentucky, Mississippi, and Arkansas) have indicated their desire to include this chemical in this season's operations, particularly in areas where DDT-resistant flies have been encountered. Residual Spray Memorandum No. 25-1950, issued on February 1, 1950, advised the residual spray States of the decision to permit wide use of chlordan in calendar year 1950 operations.

Cooperative experimental projects using chlordan are to be conducted in two counties in Alabama and one county in Arkansas this season. In Alabama, DDT will be applied to the interiors of dwelling units except the kitchens. Kitchen walls, porches, screens, and the interiors of all outbuildings except dairy barns and feed bins will be treated with a 2½ percent chlordan emulsion at the rate of 100 milligrams of chlordan per square foot. Larviciding of fly breeding areas with this chemical also will be undertaken. In Arkansas, the use of chlordan will be similar to the practice in Alabama, but no DDT spraying will supplement the chlordan treatment. Careful supervision of spraying operations will be provided and adequate entomological evaluation of results in both States is to be made. It is hoped that the data obtained will prove valuable in planning the 1951 season's

spraying operations.

#### **Program Plans:**

**Fiscal Year 1950 (Remainder).** Residual spray operations will be conducted in 302 counties in 13 residual spray States during the remainder of fiscal year 1950. Significant changes or modifications in field operations include adoption of the one-man spray crew exclusively for Arkansas; purchase by the Florida program of a sufficient quantity of the Georgia-type constant-pressure spray cans for the entire State program; and modification of operations in Arkansas to delay premises treatment with chlordan until May 15, 1950.

**Fiscal Year 1951.** During the late summer of 1949, representatives of the Engineering, Entomologic, and Epidemiologic Services visited seven States designated for operations during fiscal year 1951 to reevaluate the malaria problem and agree on future operational areas. As a result of these conferences, a revised county preapproval list was developed. The current list contains 147 counties preapproved for CDC participation in malaria control operations during fiscal year 1951. At the peak of the residual spray program, 369 counties were so approved. The reduction in approved counties indicates a lower malaria incidence prevailing in those areas where malaria was formerly a major public health problem.

**Program Accomplishments.** Residual spraying operations were begun in eight States during the quarter. Table 1 summarizes activities for the period in question.

#### **TYPHUS AND RODENT CONTROL ACTIVITIES**

The number of reported typhus cases for 1949, according to the Bureau of Vital Statistics in Washington, was 984, with a rate of 0.7 per hundred thousand population. This is a decrease of 200 under the 1,184 reported for 1948, with a rate of 0.8 per hundred thousand population. As of February 28, 1950, 94 cases were reported, 26 less than during the same period in 1949. Three human plague cases occurred in New Mexico and Hawaii in 1949 and one is reported for 1950 in New Mexico, but all were acquired from native wild rodents rather than from domestic rats.

**Program Plans.** Typhus Control Memoranda Numbers 67 (Compound 42) and 68 (Preapproved Counties for Cooperative Typhus Control Operations for Fiscal Year 1951) were released. The criterion for preapproval was changed to:

1. Eighteen or more cases during the period 1946-49, with a minimum of three cases in

Table 1

**SUMMARY OF DDT RESIDUAL SPRAY OPERATIONS**  
January 1 - March 31, 1950

State	No. Counties	No. House Spray Applic.	Lb. DDT	Operation Man-hours			Lb. DDT per Applic.	Man-hours per Applic.*	Man-hours per Lb. DDT*
				CDC	Local	Total			
Alabama	23	7,772	7,062**	11,332	1,870	13,202	0.91	1.22	1.34
Arkansas	-	-	-	10,920	1,892	12,812	-	-	-
Florida	1	238	155	-	275	275	0.65	1.15	1.77
Georgia	17	12,922	10,044	3,272	9,169	12,441	0.78	0.92	1.18
Kentucky	-	-	-	-	960	960	-	-	-
Louisiana	10	859	915	4,480	1,125	5,605	1.07	1.56	1.47
Mississippi	-	-	-	6,113	-	6,113	-	-	-
Missouri	-	-	-	-	-	-	-	-	-
North Carolina	3	258	209	2,052	352	2,404	0.81	1.67	2.07
Oklahoma	-	-	-	-	-	-	-	-	-
South Carolina	2	260	275	1,680	8,520	10,200	1.06	1.38	1.31
Tennessee	3	1,822	3,171	516	4,834	5,350	1.74	1.66	0.96
Texas	2	4,097	2,521	5,478	3,104	8,582	0.62	1.01	1.63
<b>Grand Total</b>	<b>61</b>	<b>28,228</b>	<b>24,352</b>	<b>45,843</b>	<b>32,101</b>	<b>77,944</b>	<b>0.86</b>	<b>1.10</b>	<b>1.27</b>

\*These averages include local supervision and spray crew man-hours only.

\*\*Excluding 1,721 pounds of rosin-formulation DDT.

1949, and with rates of six or more per hundred thousand for both periods. (These criteria have been used to include counties with a relatively recent problem but to exclude those without such problem.)

- Five or more cases during 1949 with a rate of six or more per hundred thousand. (This criterion has been used to provide for those counties having a substantial problem in 1949 but not in previous years.)

Sixty-six counties were preapproved for fiscal year 1951 operations.

**Program Accomplishments.** Tabulations of man-hours spent in DDT dusting in the States of Alabama, Florida, Georgia, and Texas during calendar year 1949 indicated that 130,494 man-hours were expended (table 2). Local man-hours were 93,108,

Table 2

**MAN-HOURS SPENT IN DDT DUSTING**

State	CDC	Local	Total	Percent Local of Total
Alabama	5,202	21,405	26,607	80
Florida	8,152	20,070	28,222	71
Georgia	8,557	35,159	43,716	80
Texas	15,475	16,474	31,949	52
<b>Total</b>	<b>37,386</b>	<b>93,108</b>	<b>130,494</b>	<b>71</b>

or 71 percent of the total. The greatest number of local man-hours reported by any one State is 80 percent and the lowest reported is 52 percent.

During the quarter, 31,196 premises were dusted as compared with 40,987 premises for the same period in 1949; 105,257 premises were poisoned as compared with 78,695 in 1949; and 1,308 premises were ratproofed as compared with 1,150 in 1949. It is gratifying to note that the man-hours spent on sanitation activities during the quarter were increased from 8,521 in 1949 to 26,637 in 1950. The total man-hours for all activities, including local and CDC, for the quarter were increased from 182,959 in 1949 to 240,170 in 1950. Table 3 summarizes typhus and rodent control operations for the quarter.

Rodent control in cities was expanded to Montana and Idaho by the assignment of one man to each State health department.

During the quarter, rodent control personnel of the Typhus and Rodent Control Section assisted in a ratproofing school in Columbus, Ohio.

**Transfer of Rodent Control Activities to Western CDC Laboratory.** Administrative responsibility for the rodent control programs in Regions IX and X was transferred to the Western CDC Laboratory in San Francisco, Calif., January 1, 1950, and that

for New Mexico (Region VIII) was transferred to the Western CDC Laboratory in March 1950.

#### **FLY CONTROL ACTIVITIES**

**Program Plans.** According to present plans, operations in the two northern polio investigational cities (Troy, N. Y., and Muskegon, Mich.) will be greatly reduced by July 1, 1950. Virological and entomological investigations will continue until about September 30, at which time CDC participation will be withdrawn. As a result of the curtailment of operations in Troy and Muskegon, it will be possible to increase operational assistance to the three southernmost cities.

As in previous years, control operations at all projects will consist of improvement in local sanitation practices supplemented by the application of insecticides. Intensified efforts are being made to conduct community-wide clean-up campaigns, promote garbage-can sales, increase the effectiveness of local collection methods, and replace unsatisfactory means of garbage disposal with the sanitary land fill methods.

Chemical measures will include use of the new insecticide dieldrin in all project cities except Muskegon. At the latter chlordan will be substituted for dieldrin. The pattern of treatment will include:

1. Application of premises-wide residual treatment in substandard areas.
2. Application of garbage-can larvicide, plus limited residual treatment in business and better-class residential sections.
3. Special treatment for problem units, such as rendering plants, stockyards, and abattoirs.

**Program Accomplishments.** Throughout the quarter, all projects, except that in Phoenix, were operating on the reduced winter schedule. In Phoenix, spraying operations were begun in mid-March. Fly and sewage specimens have been forwarded to Yale University for virological examination by the Troy and Topeka projects.

The educational campaign sponsored by project personnel is noteworthy. Radio and newspaper publicity is planned, and civic groups and school authorities will participate actively in the dissemination of educational material and in meetings to discuss sanitation.

Operation of the sanitary land fill in Charleston is proceeding satisfactorily. A bulldozer is handling approximately one-half the average local incinerator load. Officials of Charleston plan to purchase additional equipment for land fill opera-

tions in the near future.

#### **IMPOUNDED WATER STUDIES**

Four malaria survey reports, including one final report, were submitted to the Corps of Engineers. They covered the Clark Hill Reservoir, in Georgia and South Carolina; the Mississippi Navigation Pools, 1 to 27, in Illinois, Iowa, Minnesota, Missouri, and Wisconsin; the Alabama River Basin, in Alabama, and the Howell Mill Shoals, in Alabama. Requests were received from the Corps of Engineers for two additional reconnaissance reports on the Canyon Reservoir, in Texas, and the Joanna Reservoir, in Missouri.

Field inspection trips were made to several reservoir sites, including Allatoona Reservoir, in Georgia, to see results of the clearing job; Canyon Reservoir, in Texas, to get data for reconnaissance report, and Victoria Navigation Project, near Victoria, Tex., to obtain data for a report. A discussion of the "Laws and Statutes with Reference to Insect Control" was presented at the meetings of the American and Virginia Mosquito Control Associations in February.

At the request of the Arkansas Health Department, assistance was rendered in the revision of impounded water regulations for that State.

#### **SPECIAL SERVICES**

**Disaster Aid Equipment.** The reconstruction of the fourth 100 gpm truck-mounted water purification unit was completed, and it was placed in operation. One of the units was transferred to Region VIII, together with a power wagon, two 3,000-gallon and two 1,000-gallon rubberized fabric water-storage tanks. Plans were made to assign one water purification unit to Region X, and one to Region I. The fifth unit, the last of the five purchased by CDC from the Army, is now in the process of reconstruction and after completion will be retained in Atlanta CDC headquarters. Arrangements were made to distribute all of the rubberized fabric water-storage tanks which were secured some months ago. Under this plan, two of the 3,000-gallon tanks and five of the 1,000-gallon tanks will be sent to each of the offices where the water purification units have been assigned, including the Midwestern CDC Services office to which one unit was assigned some time ago.

The last piece of equipment for the motor drying unit, the hot air blower, was received during the quarter. This unit, together with certain other disaster aid equipment, will be retained by CDC in Atlanta.

Table 3(a)

STATE	GARBAGE AND REFUSE					SUPERVISION				RAT REDUCTION TRAP		EDUCATIONAL ACTIVITIES			TRAINING		LAY INVESTIGATIONS		ECTOPARASITE CON-					
	Sanitary Land Fill			Storage and Collection		P.H.S. Man-hours			Other Man-hours	Est.	Man-hours	Meet-ings	No. in Attendance	Man-hours	No. Train-ing	Man-hours	Premises	Man-hours	Cos. Rep.	Premises Dusted	Residual Dusting		DDT	
	No. Insp.	M.H.	No. Inaug.	No. Investi-gated	M.H.	State Super. & Adm.	Regional Super. & Entom.	Ware-house & Shop													Lb. DDT and Prem.	M.H. & M.R./L&F*		Premises Treated
Alabama						600	384	0	480			0	0	0					5	4,810	22,214	1,756	4.6	0.4
Arkansas						400	80	0	0			0	0	0					0	0	0	0	0	0
Florida						1,493	1,171	598	1,395	634	1,219	0	0	0					4	2,711	11,683	1,571	4.3	0.6
Georgia						4,614	2,723	0	840			0	0	0			344	257	25	10,335	21,106	5,234	2	0.5
Louisiana						768	0	600	960			0	0	0					2	2,213	4,910	1,020	2.2	0.5
Mississippi			7			964	720	480	460			38	780	1,008					1	25	40	32	1.6	1.3
North Carolina			8			480	0	0	600			10	350	720					4	1,220	2,597	656	2.1	0.5
South Carolina						1,328	400	504	0			0	0	0					3	363	1,046	573	2.9	1.6
Tennessee			2			0	0	0	0			38	120	121					0	0	0	0	0	0
Texas			1	15	2,036	3,108	2,200	1,440	480			124	3,600	4,935	36	2,460			13	8,768	35,348	10,647	4	1.2
Virginia**						1,744	128	238	0			0	0	0					0	0	0	0	0	0
Total			18	15	2,036	15,499	7,806	3,860	5,215	634	1,219	210	4,850	6,784	36	2,460	344	257	57	30,445	98,944	21,489	3.2	0.7

Table 3(b)

STATE	GARBAGE AND REFUSE					SUPERVISION				RAT REDUCTION TRAP		EDUCATIONAL ACTIVITIES			TRAINING		LAY INVESTIGATIONS		ECTOPARASITE CON-						
	Sanitary Land Fill			Storage and Collection		P.H.S. Man-hours			Other Man-hours	Est.	Man-hours	Meet-ings	No. in Attendance	Man-hours	No. Train-ing	Man-hours	Premises	Man-hours	Cos. Rep.	Premises Dusted	Residual Dusting		DDT		
	No. Insp.	M.H.	No. Inaug.	No. Investi-gated	M.H.	State Super. & Adm.	Regional Super. & Entom.	Ware-house & Shop													Lb. DDT and Prem.	M.H. & M.R./L&F*		Premises Treated	
Colorado						16	0	0	0																
District of Columbia					304	480	0	0	240																
Hawaii**						98	0	0	2,745									2	751	42	10	.06	.01	946	
Idaho						0	0	0	0																
Illinois						400	0	0	99																
Kentucky						0	0	0	0																
Midwest	11	1,000	11			212	0	0	264			12		1,796	174	5,850									
New Jersey						0	0	0	0																
New Mexico	8	136	8			0	0	0	0			32	693	97	25	81									
Ohio						414	0	0	280																
Washington						0	0	0	0																
Utah			1	6	240	294	48	0	24			34	709	943	200	460									
Wyoming						0	0	0	0																
Oklahoma						0	0	0	0																
Oregon						560	0	0	812						7	280									
Minnesota						200	40	0	90																
Total	19	1,136	20	6	544	2,674	88	0	4,554			78	1,402	2,836	406	6,671			2	751	42	10	.06	.01	946
GRAND TOTAL	19	1,136	38	21	2,580	18,173	7,894	3,860	9,769	634	1,219	288	6,252	9,620	442	9,131	344	257	59	31,196	98,986	21,499	3.2	0.7	946

\*Labor and labor foreman.  
 \*\*Includes pay-roll period progress report No. 26, 1949.  
 \*\*\*Area and dump poisoning. Man-hours not included in total percentage.

OPERATIONS

(From pay-roll period progress report)

Table 3(a) (continued)

TROL		EVALUATION ACTIVITIES				RATPROOFING AND ERADICATION					RAT REDUCTION										MAN-HOURS SUMMARY		
Spray		U.S.P.H.S. M.H. L&LF*	Others M.H. L&LF*	Proj. Rep.	Est. Complete	M.H. & Est. L&LF*	M.H. L&LF*	M.H. L&LF*	Cos. Rep.	Est. Poisoned	Poison Bait (Food)		Poison Water '1080'		Cyanogas		San. Activities		U.S.P.H.S.	Others	U.S.P.H.S.	Others	Total
Gal. & M.H. / Prem. L&LF*	M.H. & M.H. / L&LF*										Lb. Bait & Lb. / Est.	M.H. & M.H. / L&LF*	Est. Poisoned	Pts. Used & Pts. / Est.	M.H. & M.H. / L&LF*	Lb. Used	M.H. L&LF*	U.S.P.H.S.					
		1,436	704	0	0	0	0	0	7	3,653	1,886	2,878	2,499	2,015	1,166	898	120	176	3,384	8,063	11,447		
		0	0	3	32	1,265	281	2,255	0	0	0	0	0	0	0	0	20	40	968	3,373	4,341		
		321	720	4	159	2,922	102	18	3	1,554	1,686	1,326	847	1,002	33	30	657	5,350	5,951	13,944	19,895		
		2,860	1,301	2	60	5,652	556	8	23	22,237	17,655	9,703	110	90	1,589	3,166	250	451	14,176	23,529	37,705		
		180	256	2	46	2,466	216	56	2	788	357	294	107	154	0	0	0	0	3,088	3,882	6,970		
		328	20	0	0	0	0	0	26	59,115	35,907	15,655	1,155	1,839	0	0	72	3,208	4,183	20,603	24,786		
		560	146	6	182	5,256	335	83	9	7,094	8,317	2,753	380	407	407	703	140	220	2,904	10,155	13,059		
		0	328	4	64	1,938	442	740	2	5	85	34	51	165	0	0	0	0	3,708	2,744	6,452		
		275	461	4	87	4,254	989	400	2	193	77	339	0	0	0	0	0	0	2,098	4,741	6,839		
		252	80	6	213	6,771	238	0	8	35	16	12	1,218	4,331	0	0	254	381	20,726	18,899	39,625		
		364	910	1	48	78	0	0	1	174	3	27	213	88	0	8	0	0	2,474	1,111	3,585		
		6,576	4,926	32	891	30,602	3,159	3,560	83	94,848	65,989	33,021	6,580	10,091	1	3,292	4,805	1,513	9,826	63,660	111,044	174,704	

Table 3(b) (continued)

TROL		EVALUATION ACTIVITIES				RATPROOFING AND ERADICATION					RAT REDUCTION										MAN-HOURS SUMMARY						
Spray		U.S.P.H.S. M.H. L&LF*	Others M.H. L&LF*	Proj. Rep.	Est. Complete	M.H. & Est. L&LF*	M.H. L&LF*	M.H. L&LF*	Cos. Rep.	Est. Poisoned	Poison Bait (Food)		Poison Water '1080'		Cyanogas		San. Activities		U.S.P.H.S.	Others	U.S.P.H.S.	Others	Total				
Gal. & M.H. / Prem. L&LF*	M.H. & M.H. / L&LF*										Lb. Bait & Lb. / Est.	M.H. & M.H. / L&LF*	Est. Poisoned	Pts. Used & Pts. / Est.	M.H. & M.H. / L&LF*	Lb. Used	M.H. L&LF*	U.S.P.H.S.						Others			
		400	0	1	48	728	80	360	1	***	800	0	0	0	0	0	0	0	1,184	1,200	2,384						
		0	0	1		15.2	1,520	0	1	***	6,470	2,880	0	0	0	0	0	8,202	480	13,146	13,626						
2,369	870	2.5	0.9	785	14,595	1	29	4.7	117	270	3	532	4.7	2.4	0	625	151	0	1,888	1,229	21,689	22,918					
		0	0															232	189	232	189	421					
		0	0															120	44	520	143	663					
		0	0															240	160	240	160	400					
		374	374						1	2	4	10	0	0	0	0	0	0	3,392	6,498	9,890						
		0	0															480	360	480	360	840					
		0	0															368	240	579	343	922					
		0	0															66	1,312	480	1,592	2,072					
		0	0	2	86	1,744	411	368										0	0	480	2,043	2,523					
		8	0	1	254	1,704	800	0											165	138	2,201	2,623	4,824				
		0	0						1	10	103	52	0	0	0	1	20	488	366	496	430	926					
		384	451															104	136	488	587	1,075					
																		0	0	840	812	1,652					
																		0	0	200	130	330					
2,369	870	2.5	0.9	1,951	15,420	6	417	10.3	2,928	998	7	544	9,085	5,006	626	171	2,263	13,035	13,521	51,945	65,466						
2,369	870	2.5	0.9	8,527	20,346	38	1,308	26.7	6,087	4,558	90	95,392	75,074	38,027	0.8	0.4	9,865	6,580	10,091	1	3,918	4,976	3,776	22,861	77,181	162,989	240,170

# Entomologic Services

## MALARIA INVESTIGATIONS

**Malaria Morbidity Studies.** Observations on malaria morbidity and malaria-transmission potentials were continued at the Newton (Ga.), Manning (S. C.), and Helena (Ark.) stations. Visits were made by nurses in the Georgia and Arkansas experimental area, and blood films were collected from residents of the South Carolina area so as to detect persons with symptoms of malaria. No cases of malaria were detected among more than five thousand persons in the study groups. The last blood-positive case of malaria was detected in South Carolina in February 1949.

**Observations on Overwintering of "Anopheles."** *Anopheles quadrimaculatus* were detectable in small numbers during each of the winter months in the Georgia area. Larvae were present in the breeding places until the last week of March. In the South Carolina and Arkansas area, *quadrimaculatus* were also present during February. It is likely that the mosquitoes observed in Arkansas represent overwintering or "hibernating" mosquitoes. In the Georgia and South Carolina experimental areas, where the climate is much milder, *quadrimaculatus* activity probably continues throughout the winter but at a greatly reduced rate.

**Studies on Malaria Parasites.** Work related to identification of sporozoites found in *Anopheles crucians*, not known to be a vector of human malaria, was conducted at the Georgia and South Carolina stations where this species has been found infected with malaria parasites. At Manning, blood films have been obtained from more than one thousand domestic animals and are being examined for the presence of blood parasites. So far, no malaria parasites have been found, but microfilaria and trypanosomes have been observed. Studies are being made of bird malaria, and one species (*Plasmodium relictum*) is being maintained in the laboratory to provide material for testing the susceptibility of *Anopheles* to this type of malaria.

Work on bird malaria is also being conducted at the Georgia station where other species are maintained. Activities here include investigations on the natural history of malaria infection in lizards. Attempts are being made to work out the epidemiology of this infection, including determination of the vector. Habits of the lizard host permit repeated

examinations in nature; so if the vector can be detected, many problems in malaria epidemiology can be investigated under natural conditions. Information obtained suggests that transmission of the infection occurs naturally during the fall and winter months.

**Studies on "Anopheles" Biology.** The biology of *Anopheles* mosquitoes is being studied at all three stations. At the Newton station, attempts have been made to colonize local species of *Anopheles* to provide adequate sources of material for experiments. Twelve species of mosquitoes other than *Anopheles* also were reared in the insectary. Other problems under investigation are the biotic potential of *Anopheles* mosquitoes, studies of *Anopheles* ova, studies on the chemical characteristics of water in mosquito breeding places, and work on development of standard rearing media for mosquito larvae, to be used in physiological studies.

At the Manning station, studies are being made on the biology of *A. crucians* with particular reference to winter breeding conditions and thermal characteristics of breeding places. Parallel data are being obtained on larval production and adult density in daytime resting places.

At the Arkansas station, development of facilities for maintaining *Anopheles* in the laboratory has been completed preparatory to work on the biology of the local *Anopheles*.

## ECTOPARASITE-BORNE DISEASES

**Murine Typhus Activities.** During the quarter, some 2,400 rats were examined from the 10 percent DDT dusted projects in 44 counties of nine Southern States. Data from Virginia, consisting of records on 190 rats from two counties, are not included in these figures. These data covering the typhus infection in rats show, when compared to the nondusted group, an over-all reduction of 46 percent from the group of rats dusted 1 to 6 months previously, and no reduction in rats from premises dusted more than 6 months previously. Considering the actual degree of ectoparasite infestation in the rats from premises dusted within 6 months, significant reductions occurred in some of the flea and mite species, namely, *Xenopsylla cheopis*, *Laelaps nuttalli*, and *Polyplax spinulosa*. These

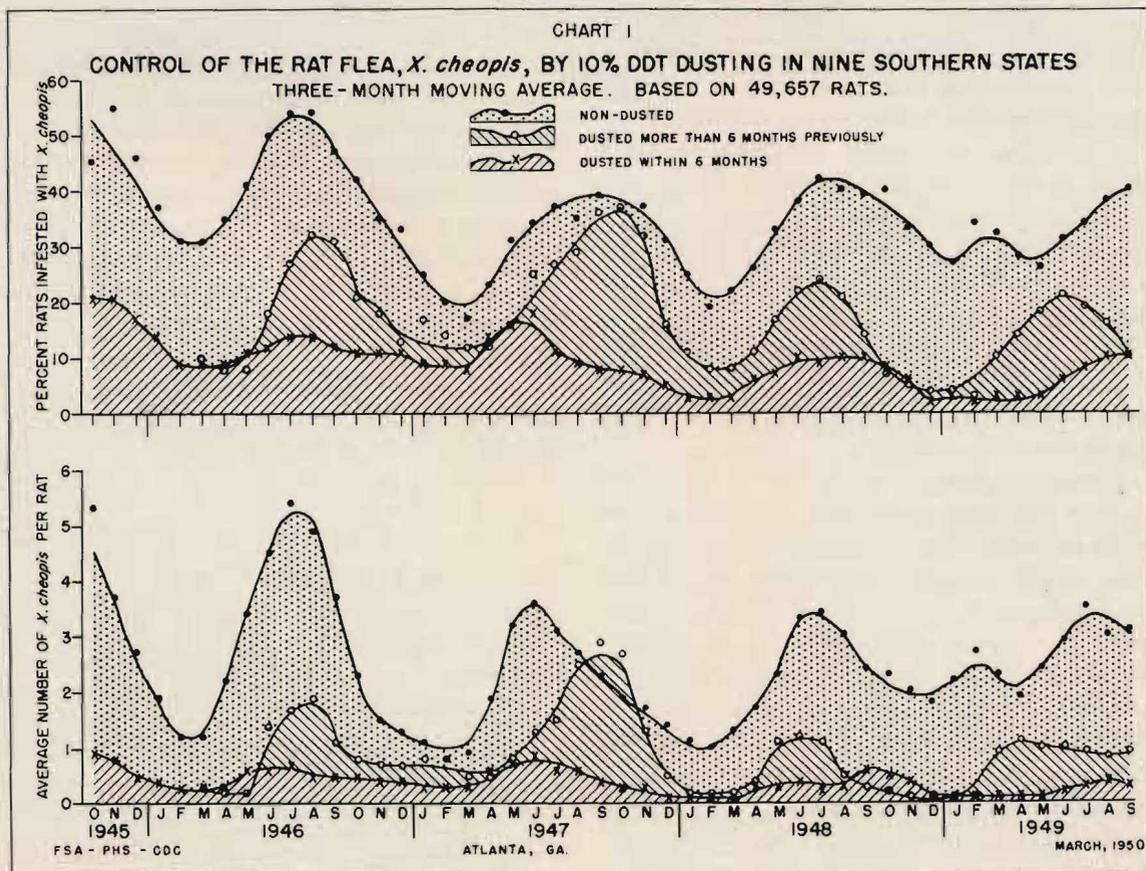
data, therefore, show continued good control of the oriental rat flea, *X. cheopis*, and of the mite, *L. nuttalli*, but no control or even slight increases in the case of some of the other ectoparasites; no ready explanation of these developments is offered at the present time.

The evaluation of the effectiveness of 5 percent DDT dust during the quarter (October to December 1949) was limited to 10 counties of Georgia. A total of 1,052 rats was examined for ectoparasites, and successful complement fixation tests were made on sera for 939 rats. None of the premises from which these rats were taken had been dusted within 3 months prior to trapping. Reductions occurred in typhus infection in rats of 41 percent during the period 3 to 6 months after dusting, and of 23 percent during periods of more than 6 months after dusting; these percentages of reduction are quite comparable to those obtained where 10 percent DDT dust was used.

Tabulations and analyses of all rat ectoparasite control data from the beginning of DDT dusting operations in the fall of 1945, to the end of 1949, now are being made. A summary of the data on the oriental rat flea for the 4-year period, 1946 through

1949, based on a total of 52,960 rats from 10 percent DDT dusted projects, indicates that the average number of *cheopis* per rat in nondusted areas, ranges from a high of 4.1 and 4.0 in June and July, to a low of 0.9 and 1.0 in February and March, respectively. In areas dusted within 6 months, however, the number of *cheopis* was reduced to less than 0.5 during all months except May and June, both of which averaged 0.5. Moreover, in areas dusted more than 6 months previously, these average *cheopis* numbers were above 0.5 from April through November, and 1.0 or above from June through October, but were never above 1.6 per rat. Therefore, these data for all the months combined show that better control of *X. cheopis* has been obtained during each successive year. This increasingly better control probably was correlated with increased skill in operational technique, and also apparently indicates that no resistance to the insecticide DDT is being developed by these oriental rat fleas.

A chronological picture of the above data for each month from October 1945 through September 1949, based on nearly 50,000 rats, is indicated in chart 1. This chart covers only the 10 percent



DDT dusting, and even a casual perusal will indicate immediately the marked degree of control obtained (as judged by the percentage of rats infested with *cheopis*) in the nondusted, as compared to the dusted, areas.

#### **ENCEPHALITIS INVESTIGATIONS (In Cooperation with Hooper Foundation, University of California)**

Laboratory tests on arthropods and blood sera collected in the Yakima Valley in Washington during August 1949 are continuing, and some 8,400 mites and 3,400 mosquitoes have been inoculated into mice in attempts to isolate virus. As yet, no material positive for the encephalitis viruses has been found from that area.

Observations on caged doves infested with the mite, *Liponyssus sylviarum*, during the past summer, indicate that the mites did not continue to occur on the birds over the winter, or into the present spring season.

#### **FLY-POLIO INVESTIGATIONS**

Full-scale control operations were initiated at the Phoenix, Ariz., project during March. The field activities on the four other poliomyelitis investigations-fly control projects consisted of routine identifications of flies trapped during the past season, as well as the collection of flies for virological and species composition studies. In addition, considerable time was spent in detailed observations on the overwintering habits of all species of flies, and these activities included searching likely places for hibernating adults and larvae, periodic examination of breeding areas previously known to be heavily infested, and the making of trap collections of adults during suitable weather.

At Troy, N. Y.; Topeka, Kans.; and Charleston, W. Va., fly activity was limited largely to the outdoor occurrence of adult blowflies during periods of favorable weather.

In Muskegon, Mich., adult house flies and others were collected in sheltered locations around dump areas until early in December; during the previous month minimum temperature ranged from 15° to 36° F., with a maximum of 45° F. In mid-January, fly larvae were detected in garbage covered by several inches of frozen dirt which had been stored in an uncovered metal container.

Observations at Phoenix indicate that breeding in this area may occur in a continuous cycle. Traps operated through the short winter period (3 months) at the county dump area yielded volumes of flies ranging from 10 cubic centimeters

in early January to 1,346 cubic centimeters in late February. At a poultry plant and the dump, heavy fly breeding was observed throughout January and February. Traps permanently placed over breeding media revealed that small numbers of house flies emerged from the same site continuously from late December through early February. As many as 12 species of flies were collected in a trap located over a breeding medium of pig excrement mixed with feed.

With the advent of warmer weather at Phoenix in early March, initial surveys before control operations began revealed relatively high fly densities in those residential areas having low sanitary levels. From the high grill counts obtained, it was apparent that in these areas the dieldrin treatments applied in the fall (1949) no longer exerted any suppressive effect on the fly population. However, at certain problem sites such as the rendering plant and pig farm, also treated last fall, "sick" flies were still in evidence.

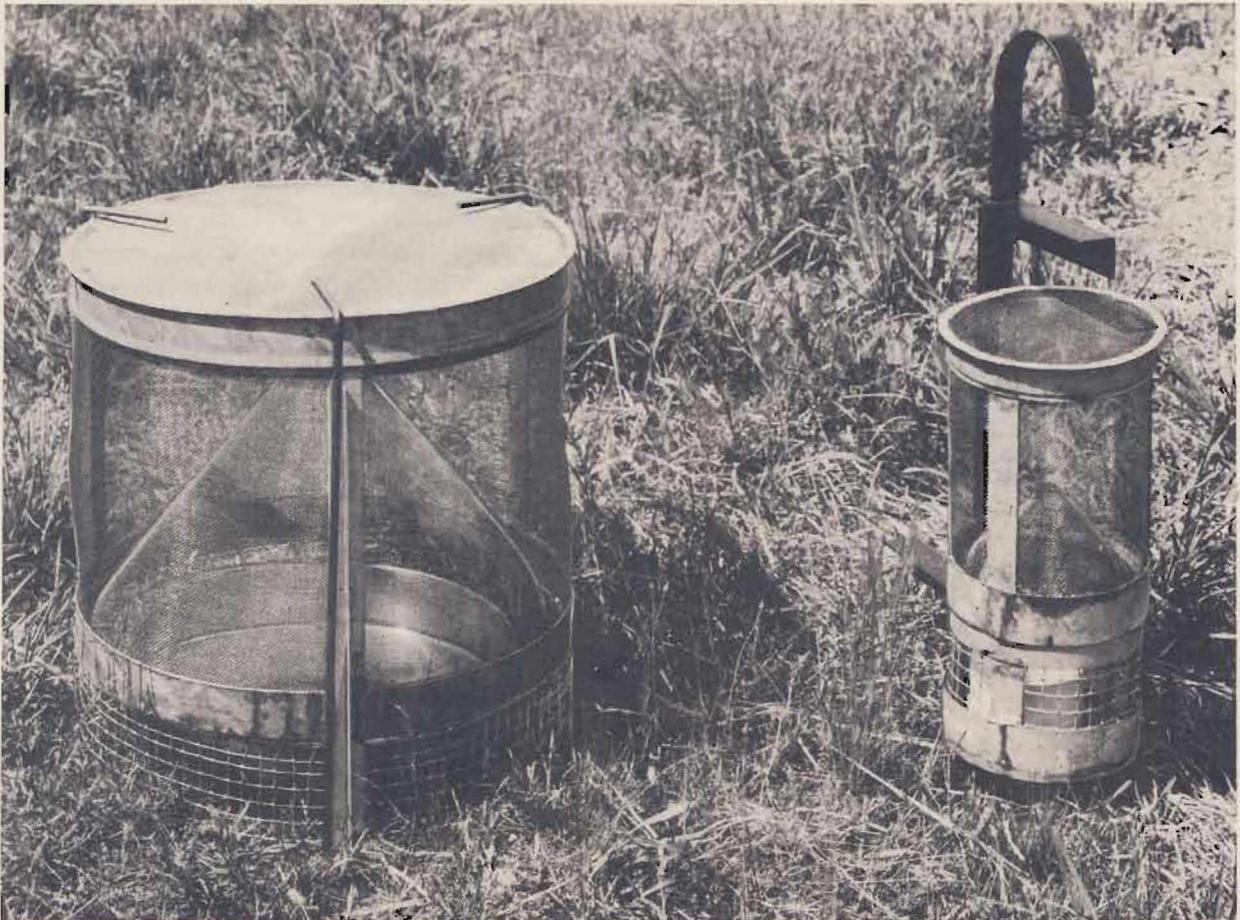
Tests were conducted during the latter part of the 1949 fly season to determine the suitability of a smaller fly trap (the attached-bait pan type) as compared with the standard trap, in making qualitative measurements of the fly population. The results show that the same species of flies are collected by both types of trap, and in approximately the same percentage as to composition. The smaller trap can be disassembled and has definite advantages over the standard trap, being easier to handle in transporting, in killing and removing the specimens, and in storing. It can be suspended from trees as well as inserted in the ground. A number of these traps will be placed in operation during the coming season.

#### **THOMASVILLE (GA.) STATION**

**General.** Mild temperatures and low rainfall throughout most of the third quarter allowed uninterrupted fly breeding, although a general decline throughout the quarter occurred.

**Dysentery Studies.** A new fly density survey method was inaugurated early in the quarter. This survey method, composed of three distinct units, was designed to fulfill the following basic functions of a fly density survey:

- (1) To establish an index to the fly population in an area that has a constant relationship to the population;
- (2) To be sensitive enough to reflect any changes in the fly population regardless of the cause for such change;



Tests showed that the smaller fly trap (attached-bait pan type) at right has certain advantages over the standard-type fly trap at left.

- (3) To be comparable to epidemiological data from the same area; and
- (4) To have sufficient scope to be useful in guiding control operations.

Ten percent of all blocks are sampled on a fixed or stationary block survey; 10 percent on a strictly randomized block survey; and in addition, a rapid visual survey is conducted throughout all the blocks in the towns undergoing chemical treatment: A complete description of the above method appeared in the CDC Bulletin for May 1950 (pages 32-33).

Breeding material studies indicated a preponderance of the house fly in commonly-occurring breeding materials. Breeding studies indicated a high degree of control of fly breeding in Thomasville garbage. The three-collections-per-week schedule had virtually eliminated effective fly breeding; a total of 12 flies emerged from three test cages during the 3 months of January, February, and March. A similar test from Moultrie,

where garbage was collected for disposal on a twice-weekly schedule, allowed emergence of 1,281 flies, and over two-thirds of these were *Phaenicia pallescens*.

Epidemiological data were collected on schedule, with 2,624 children and 2,700 animals cultured by the rectal swab method, and the cultures processed for determination of shigellosis and salmonellosis infections. In addition, two revisits of the study area population were made to record the history of illness.

**Eye Gnat Conjunctivitis Studies.** Evaluation of previous trappings of the *Hippelates* eye gnats was completed, and a new sampling technique was inaugurated, in conjunction with epidemiological studies on human conjunctivitis. A total of 651 individuals was cultured for *Hemophilus* organisms involved in the clinical conjunctivitis disease, and a surprisingly high number of positive cultures was found for this time of year. Five cultures, one from each eye, each nostril,

and the throat, were taken from each individual cultured. A total of 68 individuals had positive eye cultures, while *Hemophilus influenzae* organisms were recovered from nose and throat cultures of 199 other individuals.

**Typhus Investigations.** Four human cases of murine typhus fever were confirmed from Grady County, the undusted check county, during March. Two cases reported from Brooks County on clinical evidence are being checked.

The long-lasting effect of DDT dust in preventing human typhus infections is clearly shown by the following records of confirmed cases in the three-county experimental area during 1949:

Grady County (undusted check)	28
Thomas County (last dusted early summer 1947)	1
Brooks County (last dusted late summer 1947)	2

Evaluations of the project are to be continued during the current year.

**Histoplasmin Skin Tests.** In collaboration with a group of investigators from the Laboratory of Infectious Diseases, Microbiological Institute, National Institutes of Health, histoplasmin skin tests were made on 1,200 school children in the area during the week of February 27 to March 3, 1950.

## Laboratory Services

Dr. Ralph B. Hogan, formerly Chief of Clinical and Laboratory Research for the Division of Venereal Disease, in Washington, assumed duties as Chief, Laboratory Services, effective February 10, 1950. Dr. Seward E. Miller, former Chief of Laboratory Services, is now Federal Security Agency Regional Director, Region V, with headquarters in Chicago, Ill.

Dr. F. William Sunderman assumed duties as Pathologist in Charge, Clinical Pathology Section, on February 1, 1950. Prior to assuming his new duties, he served as Professor of Experimental Medicine and Clinical Pathology in the Postgraduate Medical School of the University of Texas and as Director of Clinical Research of the M. D. Anderson Hospital for Cancer Research at Houston, Tex.

In February, the Office of the Chief was moved from 291 Peachtree Street to Building 25 at Lawson Veterans Administration Hospital.

The Venereal Disease Research Laboratory has been moved from Staten Island, N. Y., to occupy quarters adjacent to Laboratory Services installations at Lawson Veterans Administration Hospital.

### TRAINING

The third 1-week course in "Serological Diagnosis of Rickettsial Diseases" was given January 9-13, 1950, with an attendance of five students, who represented four Veterans Administration

hospitals and one State health department laboratory.

The 15th 6-week course in the "Laboratory Diagnosis of Parasitic Diseases" began on March 27, 1950, with an enrollment of 22 students for Part 1, "Intestinal Parasites." Ten students represented Veterans Administration hospitals; two, National Institutes of Health; one, Communicable Disease Center; two, State health department laboratories; two, city hospitals; one, county health department; one, university medical center; two, private hospitals; and one from an office of a private physician.

Part 2, "Blood Parasites," of the 15th course in the "Laboratory Diagnosis of Parasitic Diseases" was scheduled to begin on April 14, 1950.

### FIELD TRAINING COURSES

Under the auspices of the North Dakota State Department of Health, a refresher training course in "Diagnostic Microbiology of Communicable Disease" was given in Grand Forks, N. Dak., March 6-8, 1950. For this course, there were 50 registrants from State and local laboratory personnel.

A similar course, sponsored by the Montana Society of Medical Technologists, the Montana State Board of Health Hygienic Laboratory, and the Montana Society of Pathologists was given in Missoula, Mont., March 9-11, 1950. Some 140

registrants attended this course, with a daily attendance of 75 to 90 persons.

A third similar course, under the auspices of the State Department of Health and Idaho State College, was given in Pocatello, Idaho, on March 16-18, 1950. The 20 registrants were personnel of the State Department of Health Laboratory, the State college, and local laboratories.

#### EXTENSION SERVICE

Specimens, keys, and charts were sent each month to 314 laboratories throughout the United States, Alaska, Hawaii, Canada, and Puerto Rico. These specimens contained cysts of *Endamoeba histolytica* (small race), *Endamoeba coli* cysts and trophozoites, *Endolimax nana* cysts, *Iodamoeba butschlii* cysts; *Ctenocephalides felis*, *Phaenicia pallenscens*; *Eimeria perforans*, sporulated and unsporulated oocysts.

#### CONSULTATION SERVICES

Program reviews of the laboratory facilities for the State department of health were made for the

following States:

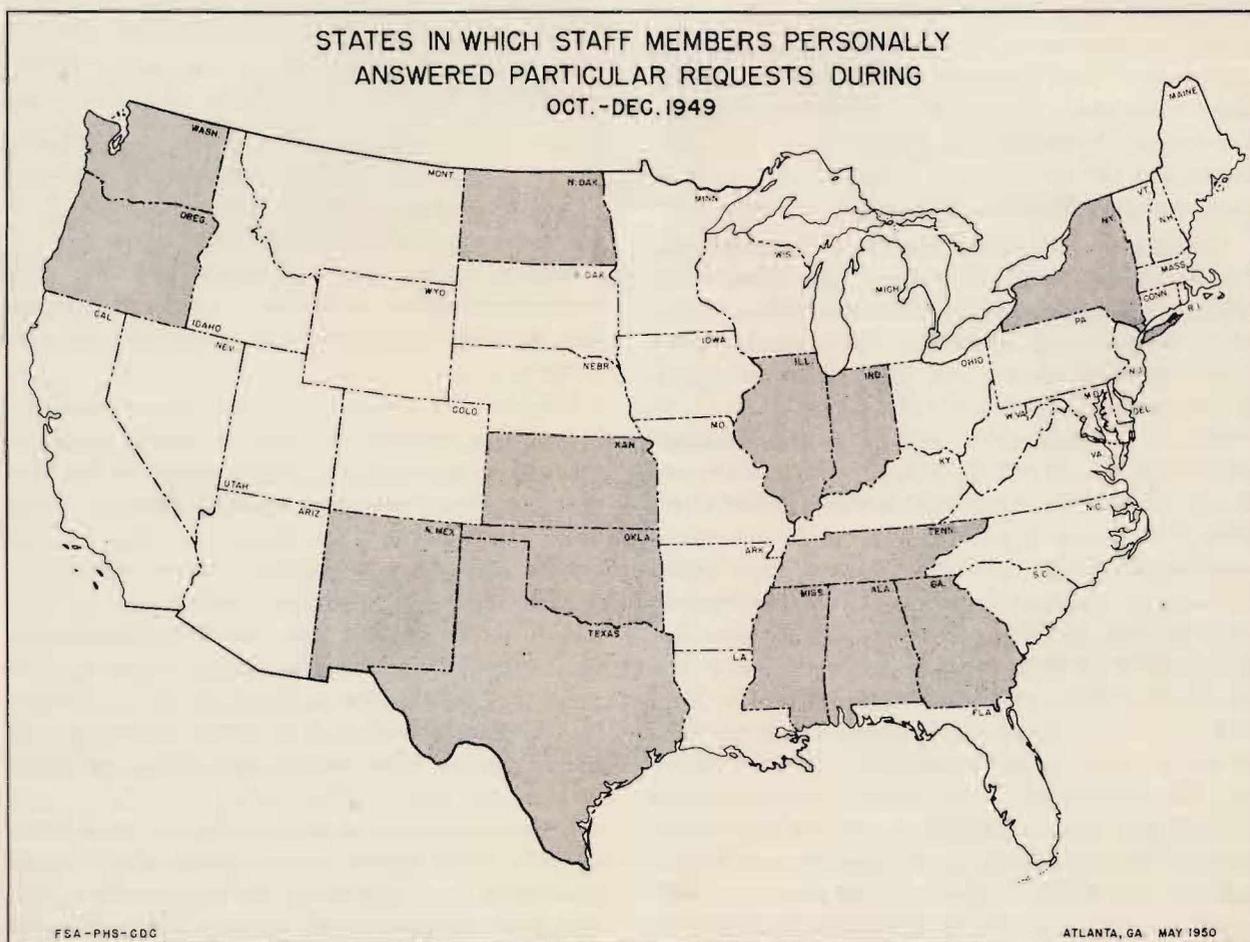
1. Ohio, January 10-13, 1950
2. Mississippi, January 23-25, 1950
3. South Carolina, February 6-7, 9, 1950
4. Oklahoma, February 13-15, 1950
5. Arizona, February 16-17, 1950
6. Pennsylvania, March 6-10, 1950
7. New York, March 20-24, 1950

A conference was held in Cincinnati, Ohio, March 16, with Mr. MacKenzie and staff of the Environmental Health Center, for the purpose of coordinating State laboratory program reviews in diagnostic and sanitary bacteriology. The fields to be surveyed by the Environmental Health Center and by the CDC were discussed during this conference.

Poliomyelitis epidemics in Denver, Colo., and Cheyenne, Wyo., were the subjects of visits in January 1950.

#### PARASITOLOGY

Sodium azide, an inhibitor of aerobic oxidation,



has been added to culture media used for isolating and maintaining *E. histolytica* in an attempt to enhance growth of the organism. In some instances, very heavy cultures have resulted from the use of this chemical.

The cultures of certain of the more "fastidious" amebae were inoculated into culture media with added human sera. Human sera did not improve the quality of the preparations for stock culture techniques.

Beemer's vital stain in methocel has been tested to demonstrate diagnostic morphological characteristics of intestinal flagellates. Results from this technique were far superior to those from any staining solution previously used. The stain is a brilliant cresyl blue in citrate-mercuric chloride solution.

Dr. Brooke served as chairman of the subcommittee on the diagnosis of amebiasis of the American Society of Tropical Medicine at the first called meeting in Washington, D. C., March 23, 1950.

#### VIRUS AND RICKETTSIA STUDIES

At the beginning of this quarter the rabies laboratory of the Veterinary Public Health Services was transferred to the Virus and Rickettsia Section, Laboratory Services, at Montgomery, Ala. Dr. Rubin and the technical staff became members of the Laboratory Services staff in this transfer.

Coxsackie virus can be recovered from monkeys, blood, serum, nasal washings, and feces when injected simultaneously with the poliomyelitis virus. Neutralizing antibodies for Coxsackie virus have appeared when virus was no longer demonstrable in the peripheral blood.

Work with colonies of arthropods has continued during this quarter in an effort to demonstrate acquisition of Eastern equine encephalomyelitis (E.E.E.) virus by *Liponyssus bursa*, *L. sylviarum*, and *Culex quinquefasciatus*. Studies have begun in order to demonstrate virus in these arthropods after feeding on infected chicks, and to determine persistence of virus in virus-fed arthropods, persistence within a colony and transmission by bite.

E.E.E. virus from mouse brain has been used to infect horses twice and chicks once. Mosquitoes (*C. quinquefasciatus*) fed on these animals failed to transmit virus subsequently. In one experiment a horse showed viremia for 8 hours. Some 155 mosquitoes fed during this time, and after extrinsic incubation periods of 7, 8, 9, and 10 days, a total of 52 mosquitoes were test-fed on a susceptible

horse. No virus was demonstrable in the horse, and no virus was demonstrable in the mosquitoes upon inoculation into mice. E.E.E. virus was not demonstrable in feces from the mouse-brain-infected horse; virus was not present in strongylid ova, nor in larvae which hatched from strongylid ova passed in the feces of the infected horse. No virus was demonstrable in adult strongylids and *Gasterophilus* collected at autopsy.

The second mouse-brain-infected horse developed a viremia which lasted for 50 hours. More than 1,200 mosquitoes fed during this time, and after extrinsic incubation periods of 6 to 15 days, 292 mosquitoes were re-fed on a susceptible horse. No infection resulted. Feces of the mouse-brain-infected horse showed no virus.

One-day-old chicks were injected with mouse brain and subsequently developed a high-titered viremia. Among the mosquitoes which fed on these chicks, 116 were re-fed on a susceptible horse after extrinsic incubation periods of 7, 8, and 9 days. This horse failed to develop the disease.

The ability of *Dermanyssus gallinae* to acquire E.E.E. virus from chicks and to harbor or to transmit this virus was tested during the quarter. Transmission by bite was shown to take place, and briefly (2 to 4 hours) after feeding on infected chicks, mouse inoculation gave positive results. Mouse inoculation of mites which had fed 1, 2, 3, or 4 days previously failed to reveal virus.

Studies on the virus of equine influenza were begun this quarter. At present, there is no evidence that the virus of equine influenza has been adapted to mice.

Studies with typical swine influenza virus were begun; four suspected cases of swine influenza resulted in lung material being submitted for diagnostic study. From this material, two specimens from Georgia, one from Illinois, and one from Sweden, failed to show virus in chick embryo test, or after intranasal mouse inoculation.

A total of 249 dogs was vaccinated intramuscularly with four experimental rabies vaccines. Virus was not demonstrable in blood or saliva from representative individual dogs among the four experimental groups when these specimens were tested for 41 days after vaccination.

Complement fixation tests to detect evidence of infection with mumps or with lymphocytic choriomeningitis were performed on 35 specimens submitted for mumps antibody testing. These 35 specimens came from 15 States; 12 of the sera gave

positive reaction. Forty-one sera, submitted from 20 States, were tested for lymphocytic choriomeningitis antibodies; 14 of these were positive.

In mouse protection tests, 93 sera were submitted for neutralization tests against E.E.E. virus antigen. Of these 93 sera from 30 States and Cuba, only one, from the State health department in Louisiana, was positive. Sera tested for Western equine encephalomyelitis virus antibodies totaled 94. Among these specimens from 23 States there were 9 positives; 7 of 28 specimens from Colorado and 1 of 2 specimens from Alabama reacted with the virus.

Tested against St. Louis virus were 98 sera from 22 States, of which 4 were positive; 3 of 44 specimens from Colorado and 1 of 2 specimens from Utah reacted with this virus.

Two specimens from Cuba were tested against Venezuela virus; neither reacted.

**Virus Isolations.** Throat washings and swabs from six patients in Hayesville, N. C., yielded influenza virus A-1 from all six specimens. Five similar specimens from St. Paul, Va., yielded no virus.

Paired sera from humans were submitted for hemagglutination inhibition tests against the influenza viruses. From seven States, 14 specimens were submitted; four sera showed a fourfold increase in titer against A and four sera showed a fourfold increase in titer against A-1. No rise in titer was evident in any specimens tested with B antigens.

As was to be expected, no virus was found in 13 spinal fluid specimens submitted for virus isolation from 10 States.

Two parakeets were received from Ohio for psittacosis virus isolation. One of these was very badly decomposed and no virus was found. The second parakeet contained virus in spleen, liver, and brain, as revealed by mouse inoculation and demonstration of typical elementary bodies in the mouse tissues.

From four States, seven fecal specimens and five water specimens were submitted for isolation of poliomyelitis virus. All the fecal specimens produced poliomyelitis in monkeys; none of the water specimens produced symptoms.

The rabies laboratory has examined 47 specimens submitted for virus isolation. Forty specimens from dogs, coming from Alabama, Florida, Tennessee, and Alaska, contained only two positives. Both were from Tennessee. One of two bovine

specimens from Alabama was positive for rabies, the other negative. Two specimens from cats in Alabama, one horse specimen from Alabama, and two fox specimens from Maine were negative.

## BACTERIOLOGICAL STUDIES

**Diphtheria.** The studies of antibacterial resistance to *Corynebacterium diphtheriae* in guinea pigs were completed. The study of factors affecting the *in vitro* test for virulence of *C. diphtheriae* was continued, as were all the carrier surveys and the case culture studies at the local hospitals and pediatrics clinics. Meningococcus typing serum preparation was continued during the quarter. Requests for teaching materials were received from eight States and Norway.

**Agglutination Tests for Brucellosis.** During the quarter, 38 requests for this test were received; 7 of the requests (8 specimens) came from Federal institutions in six States and the District of Columbia, 31 requests with 32 specimens came from physicians in nine States and the District of Columbia. Of the 40 sera tested, 7 were positive.

**Agglutination Tests for Tularemia.** Requests for this test came from State health departments of Arkansas and Rhode Island, Federal institutions in Maryland and Ohio, private physicians in Alabama, Florida, Maryland, Massachusetts, New Jersey, North Carolina, South Carolina, and Virginia. Of the 14 specimens, 2 from North Carolina and 1 from Alabama were positive.

**Serology.** Parasitological serological tests totaled 1,697. From State public health departments came 84 requests; from local public health agencies, 79 requests; Federal institutions, 459 requests; and private physicians, 993 requests; 82 requests came from other sources. There were 1,533 tests for amebiasis with 387 positives (25.2 percent positive); there were 214 tests for trichinosis of which 22 were positive (10.3 percent); and there were 53 requests for echinococcosis of which 4 were positive (7.6 percent).

Twenty-four of the 277 typhoid agglutination tests were positive. One serum from Arizona and one serum from Missouri gave positive reactions with Q fever antigens. Rocky Mountain spotted fever antigen tests showed three positives from Georgia, two positives from Mississippi, and two positives from New York, among the total of 274 sera tested against this antigen. Among 214 sera tested with lygranum antigen, 45 were positive. Of the 58 sera tested for reaction with *Histoplasma* antigen, 3 tests were positive: 1 from Wisconsin,

1 from New York, and 1 from Louisiana; 2 sera gave doubtful reactions with this antigen (1 from Indiana and 1 from Ohio).

For the diagnosis of leptospirosis, 264 specimens have been received for serological examination from 33 States, Alaska, and Puerto Rico. Of these specimens, 26 were unsatisfactory. Of the 238 satisfactory specimens, 17 were from dogs in Anchorage, Alaska. All were positive in some dilution against *Leptospira canicola* antigens. The titers were found to range between 1:32 and 1:4000.

One interesting group of human sera came from nine members of a family in North Dakota. One serum of the group was unsatisfactory, but the remaining eight all gave positive reactions with *L. canicola* antigen. One showed a titer of only 1:32; the remaining seven were positive at 1:128, 1:256, 1:512, 1:1024 or 1:4000.

Of the total (238) number of sera tested, 27 showed a titer of 1:256 or higher against *L. canicola* antigens, 17 showed a titer of 1:256 or higher against *L. icterohaemorrhagiae* antigens. Of the specimens submitted, 63 came from State and local public health organizations, another 73 from Federal agencies, while only 25 were submitted from physicians.

**Nursing Research.** Intensive study of the effect of disinfectants on pathogenic organisms and tuberculosis sputum specimens was begun during the quarter.

Ethyl alcohol and isopropyl alcohol as disinfecting agents were contrasted with the efficiency of phenol against the diphtheria bacillus, coliforms, typhoid organisms, and *Staphylococcus aureus*.

**Enteric Bacteriology.** In typing, it was noted that the *Salmonella paratyphi* B. var. odense (i.e., those strains which lack antigen V) were susceptible to the "Vi" bacteriophages of Felix used in typing that species. This result contradicts published descriptions of the phages.

Phages active for 13 of the 14 recognized capsular types of *Klebsiella* were isolated and subjected to purification procedures. In all, 81 lines of phage were carried through this process. It remains to compare these phages and to select representative races for the identification of *Klebsiella* as a routine typing procedure.

The serological form of 129 cultures of *Salmonella pullorum* was determined. This organism and Arizona paracolon bacteria continued to appear as infections of man. Work on the serological classification of the Bethesda and Ballerup groups of

paracolon was continued. Progress in this group is satisfactory, although from the nature of the task, it is necessarily slow.

**Seven Fungus Strains Obtained.** Seven strains of a lipophilic fungus have been obtained in pure culture from cases of tinea versicolor in a special oil medium, and the physiological properties of this fungus are being investigated. *Coccidioides immitis* has been subject to four concentration procedures used in the identification of tubercle bacilli in sputum, with the following results: no growth resulted from either of two sodium hydroxide treatments of the specimens, while fungus was recovered after sulphuric acid treatment and after trisodium phosphate treatment. Studies on the nutritional requirements of *Trichophyton tonsurans*, *T. ferrugineum*, and *T. megnini* were begun.

It has been found that fungus cultures stored under mineral oil at room temperature remain viable and morphologically unchanged over periods of as much as 2 years. The use of this procedure will reduce greatly loss of cultures and will further reduce handling time in maintaining culture collections in diagnostic laboratories.

**TB Specimen Preservation.** Studies continue on the methods of preservation of diagnostic specimens, sputum, and gastric fluids, with the idea of developing some method whereby specimens may be mailed over long distance without reducing the viability of tubercle bacilli. Disodium phosphate added to gastric fluids increases viability of organisms, and sodium fluoride maintains viability of tubercle bacilli and is inhibitory to non-acidfast bacteria. Studies on the determination of type and viability of tubercle bacilli have continued. Virulence testing and improved methods of specific identification of tubercle bacilli continue under study.

#### CLINICAL PATHOLOGY

Preliminary evaluation of two methods for determining blood sugar levels have been made. The Anthrone method has been evaluated in studies with other laboratories. This laboratory has developed a modified picric acid method which is now under final evaluation. These procedures were designed for incorporation in multiphasic screening programs.

#### WESTERN CDC LABORATORY

**Wild Rodent Survey.** Wild-rodent survey activities were carried on in Washington by the State unit and in New Mexico by the CDC unit. From Washington,

plague-infected fleas from the sagebrush vole (*Lagurus curtatus*) are still received. It appears that this vole is a good year-round reservoir host for plague. From the same vicinity, infected fleas from chipmunks (*Eutamias minimus*) were received from the same area in Grant County. Intensive surveys in New Mexico were made as the result of the fourth New Mexico case since July 1949. The patient lived in a rat-infested community, so a survey unit was sent to Lea County in February. Rats trapped in the city where the case occurred had no fleas on them. In the vicinity, plague was recovered on nine occasions from cottontail rabbits (*Sylvilagus auduboni*); from wood rats (*Neotoma albigula*); wood rat nests; and grasshopper mice (*Onychomys leucogaster*). In other communities, the unit found plague near Eunice and Hobbs, in Lea County, and once in Eddy County. There are two points of interest in these findings: plague has never been found before in either Lea County or Eddy County, and this represents the first time that cottontail rabbits have been implicated in an active epizootic. Previously, cottontail rabbits rarely have been found positive, and then only as single, isolated, apparently accidental infections.

**Human Plague.** On January 6, 1950, a 27-year-old white male shot and cleaned five cottontail rabbits. Three days later he became ill and was given penicillin intramuscularly on January 11, 12, and 13. Streptomycin and sulfadiazine therapy was

started on January 15, and, although for a time critically ill, the patient eventually recovered. Diagnosis of plague was confirmed by the New Mexico State Public Health Laboratory as well as by CDC.

**Domestic Rodent Control.** On January 1, 1950, all CDC domestic rodent control personnel in Regions IX and X were transferred to the supervision of this section. Since domestic rodent control is the only practical method of plague prevention, this laboratory now has a logical plague program:

1. Active surveillance of a plague foci.
2. Active prevention of plague infection of domestic rodents by wild rodents.

Rats and rat fleas from San Francisco, Calif., Seattle and Tacoma, Wash., and Lea County, N. Mex., were tested for plague. No positive results were obtained.

Some 4,308 rats were checked and from these, 9,809 fleas were obtained; 321 inoculations yielded no plague. From the San Francisco collections, 85 cultures were made from large, live Norway rats for histoplasmosis studies for the National Institutes of Health Microbiological Institute.

Bacteriological examinations by animal inoculation were made for 192 mouse tissues, of which none were positive; 4 Aschheim-Zondek tests of which 3 were positive; and 26 tuberculosis examinations of which 6 were positive.

## Technical Development Services \*

*(The following information is the result 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 by the U. S. Public Health Service.)*

### TOXICOLOGY

**Toxicity of Dieldrin.** The effects of topical applications of various insecticide formulations were determined. Finely ground technical dieldrin

powder and 6.25, 2.50, 1.25, and 0.62 percent emulsions have been tested using rats, rabbits, dogs, and monkeys for all or part of the formulations. Doses were applied to the clipped skin of the shoulder area at the rate of 400, 100, 40, 20, and 10 milligrams of technical dieldrin per kilogram of body weight. The volume of emulsion applied at a single dose was in all cases equivalent to a dose of 112 cubic centimeters for an average (150-pound) man. Rats now have received up to 175 doses of 0.62 and 1.25 percent emulsions for a total of 1,750 and 3,500 milligrams per kilo-

\*Abstracted from Technical Development Services Summary of Activities No. 21, January, February, and March, 1950.

gram, respectively. This serves to confirm earlier reports on the ability of rats to withstand repeated small doses of dieldrin amounting in time to a dose many times greater than that necessary to kill most rats in a single exposure. The 2.5 percent emulsion (40 milligrams per kilogram) is at the upper limits of endurance for rats submitted to repeated applications. Dogs treated with 1.25 percent emulsion all were brought to convulsions by an average of 51 doses; monkeys receiving the same treatment all were brought to convulsions by 58 or fewer applications. Finely ground dieldrin powder applied at the rate of 400 milligrams per kilogram killed all of 10 rats to which it was applied. Like rabbits treated earlier, 10 rabbits were killed by repeated doses of 1.25 percent emulsion.

Studies show that the 6.25 percent paste-type emulsion may be efficiently removed from the skin merely by wiping. Such removal did not insure complete survival but increased it by 90 percent or more.

It is possible to account for the observed weight loss in poisoned animals rather satisfactorily on the basis of starvation due to loss of appetite. Factors of imbalance of water metabolism or greatly increased metabolism did not appear to be significantly involved.

Among a significant number of rats, rabbits, and mice, 21, 32, and 5 percent, respectively, have been observed in convulsion. It appears that dogs and monkeys may have a greater number of convulsions so that the chance of observing at least one of them in each animal is increased. There is a tendency for animals brought to convulsion by very small repeated doses to survive longer after the first convulsion than do animals on larger doses. Rabbits show more convulsions and survive longer after the first convulsion than do rats, but a smaller dosage is required to produce convulsions in rabbits. Animals which are going to die of dieldrin poisoning usually do so within 2 weeks after the first convulsion even though no more applications are made after the first convulsion. Even so, the cases of an exceptional rabbit and a monkey demonstrate that enough dieldrin and/or tissue damage may be present to cause convulsions 40 to 46 days after the last topical application. In all the animals observed, there was a marked tendency for convulsions to follow a period of more or less rapid weight loss. In acute or subacute poisoning, the weight loss generally was due directly to the influence of dieldrin on the appetite;

in animals which show convulsions separated from the first convulsion by a considerable interval, the weight loss often appeared due to intercurrent infection or some other factor and not directly to the influence of dieldrin. There was some reason to associate the cause of death in most dieldrin-poisoned animals under the conditions of these tests with a combination of nervous and nutritional disturbance. The fact that the nutritional disturbance depends on a loss of appetite which may be of central nervous system origin does not make it less important to consider both factors - weight loss and convulsions.

Three species of animals poisoned topically by dieldrin have been treated by barbiturates. The technique for the different species has varied and the results also have varied. Small numbers of dogs and monkeys brought to convulsion by standard multiple doses of dieldrin apparently have been benefited by medication while larger numbers of rats poisoned with a single large dose of dieldrin have failed to show any difference from control rats which received no antidote.

**Toxicity of Chlordan.** Seven of 15 rats have died following the repeated topical application of 2.5 percent emulsion and 3 of 10 following the single application of 25 percent concentrate.

**Toxicity of DDT.** Rats have been treated topically with 2.5 percent emulsion at the rate of 40 milligrams per kilogram per day. Under the conditions of testing, DDT is strikingly less toxic than dieldrin.

**Toxicity of Lindane.** Twenty-five and 6.25 percent solutions and 1.25 percent emulsion were tested topically on rats at the rate of 400, 100, and 20 milligrams per kilogram per day, respectively. The results were similar to those with DDT and indicate that lindane is less toxic than dieldrin under the conditions of the test.

**Sodium Monofluoroacetate.** Nineteen drugs were tested singly or in combination and by various routes for their effects on rats previously given lethal oral doses of compound 1080. The results were not conclusive.

**Rodenticide Studies.** As in earlier laboratory tests, wild Norway rats previously sublethally poisoned by ANTU in bait still showed selective bait refusal after 3 months. There was some indication of an advantage of using a different bait from that in which the rats first encountered ANTU.

Studies of rats sublethally poisoned by ANTU in baits showed that under simulated field condi-

tions there was selective bait refusal after 4 months.

Field investigations with compound 42 (an anticoagulant rodenticide) in bait against Norway rats in stores and other establishments continue to be successful.

Poor results were obtained in most tests using compound 42 against roof rats living in fodder and hay that provided both harborage and abundant food. Where the baiting problem was overcome, roof rats were controlled successfully by compound 42 in corn meal at the rate of 0.25 mg./gm. and in water at the rate of 0.06 mg./ml.

Eleven solid foods and three liquid attractants were tested as baits for roof rats. Corn meal containing 10 percent pecan crumbs was the only bait tested in the laboratory and in the field which was preferred by rats to untreated corn meal.

Corn meal colored by lake green pigment was as acceptable to Norway rats as untreated meal. Carbon black reduced acceptance.

#### CHEMICAL STUDIES

**Formulations for Chlordan.** Thirty-six formulations for chlordan were found to have satisfactory emulsion stabilities. These include concentrates containing conventional solvents and others containing only emulsion solubilizers.

**Paste Concentrate for Dieldrin.** Of the paste-type dieldrin formulations tested so far, only a paste containing a synthetic gum has been found satisfactory as regards stability both as a concentrate and after dilution.

#### INSECTICIDE STUDIES

##### INVESTIGATIONAL WORK ON ADULT FLIES

**Possible Dieldrin Resistance.** Further studies on the development of dieldrin resistance in adult *Musca domestica* have been made by exposing large numbers of insects to dieldrin residues on different portions of the available resting surfaces in colony cages. The adults from 22,000 pupae placed in three colony cages having 25 percent, 5 percent, and 1 percent of the available resting surface treated with dieldrin deposits of 50 milligrams per square foot failed to produce eggs, and complete mortality occurred within 6 days after the first adult fly was observed. Similar results were obtained with a second batch of 22,000 pupae exposed to the same dieldrin deposits. No survival or oviposition occurred in adults from 22,000 pupae placed in two colony cages having a 1 percent coverage with dieldrin deposits of 25 and 10

milligrams per square foot. Survival and oviposition occurred in three colony cages having a 1 percent coverage with 2.5, 5.0, and 7.5 milligrams dieldrin per square foot. The eggs obtained from these colonies were reared in the insectary and the resultant pupae were placed in freshly treated colony cages. The F<sub>1</sub> generation showed slight increase in survival for 1 percent coverage with 5 milligrams dieldrin per square foot and a marked increase in survival with 1 percent coverage of 7.5 milligrams of dieldrin per square foot. The F<sub>1</sub> adults from the colony cage having a 1 percent coverage with 2.5 milligrams of dieldrin per square foot showed good survival and oviposition when tested against 1 percent coverage with 10 milligrams dieldrin per square foot. The F<sub>2</sub> adults from the colony cage having a 1 percent coverage with 10 milligrams per square foot when exposed to 25 milligrams per square foot resulted in very few survivors and eggs. A fair survival was obtained with F<sub>2</sub> adults from the colony cage having a 1 percent coverage with 7.5 milligrams which were exposed to 10-milligrams-per-square-foot coverage.

**Residual Effectiveness of Dieldrin.** Based on 48-hour mortalities and 15-minute exposures, deposits of technical dieldrin of 50 or more milligrams per square foot against *M. domestica* gave over 90 percent kill for 19 weeks. For the same exposure period, 25 milligrams per square foot gave 48-hour mortalities of 90 percent or better for 13 weeks. Deposits of 12.5 and 6.25 milligrams per square foot showed relatively rapid loss of effectiveness.

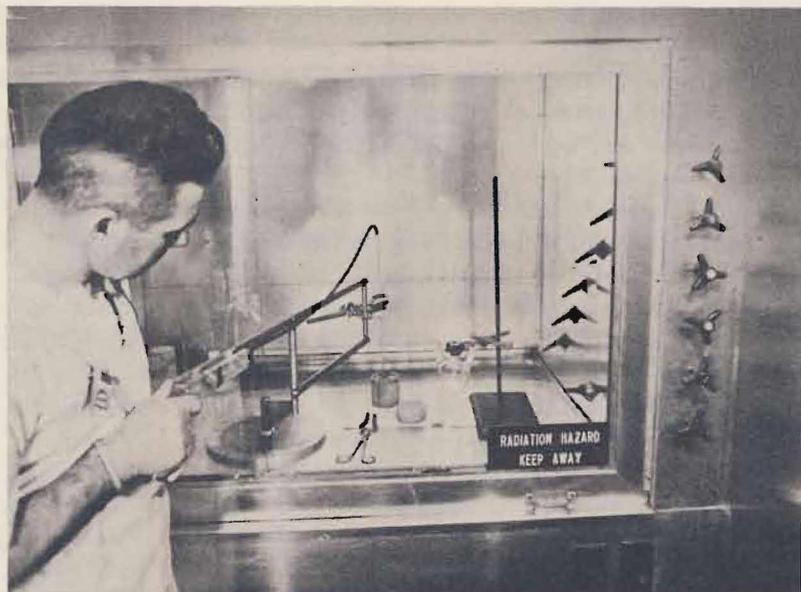
**Radioisotope Studies on Milk Consumption by Flies.** The daily rate of milk consumption of each sex of each species, adult *M. domestica*, *Callitroga macellaria*, and *Phaenicia pallescens*, was studied to determine the quantity of phosphorous 32 which must be added to milk to produce a given degree of radioactivity in adult flies. Cotton pads soaked with milk were placed in holding cages containing 25 males or females. Weight differences of the pads, corrected for evaporation, determined the milk consumption. The addition of orthophosphoric acid to the milk to duplicate the amount necessary to produce the desired radioactivity had no repellent effect. The daily amount of milk consumed increased through the 3d day after emergence. On the 4th day, males of *M. domestica* and *C. macellaria* showed a decline in milk intake while the females showed further increase. For the 1st day after emergence, the males consumed

a slightly greater amount of milk than the females.

#### Extraction and Bio-assay of Dieldrin from Animal Tissue.

A method for extracting dieldrin from animal tissue was investigated, utilizing liver samples obtained from white rats as the tissue, and benzene as the solvent. In determining the efficiency of the procedure, bio-assay tests of three extracts and two standard solutions of different concentrations were performed. In extract 1, the liver was contaminated by adding 10 milliliters of 0.003 percent dieldrin-benzene solution to the ground liver. In the preparation of extract 2, 10 milliliters of 0.003 percent dieldrin-benzene solution was added to the final extract instead of the ground liver. Extract 3 contained no dieldrin, only the products of the extraction. Standard 1 was 0.003 percent dieldrin-benzene solution, and standard 2 was a 0.0024 percent dieldrin-benzene solution. Three complete series of extracts and standards were tested against 1- and 3-day-old *M. domestica* by the microloop method. The resultant mortalities indicated that 80 percent or more of the dieldrin was recovered; however, in a majority of the observations, the extract gave a slightly higher kill than the standard of equal strength. Further exposures of insects to extracts containing dieldrin and dieldrin-benzene solutions of the same concentration are necessary to determine more precisely the relationship of the resultant mortalities.

**Extraction and Bio-assay Tests of Liver from a Rabbit Treated with Dieldrin.** The liver sample for an extraction test procedure was obtained from a rabbit which had been treated with eight doses of a 1.25 percent dieldrin emulsion applied topically on the shoulder area at the rate of 20 milligrams per kilogram per dose. Bio-assay tests were performed with the extract and two dieldrin-benzene solutions applied with microloops. A graded series of dosages was obtained by using microloops of different sizes and solutions of different strengths. The 48-hour female mortalities provided suitable data for plotting a probit regression line and determining the value of the unknown.



Shown above is a laboratory for the study of biological problems through the use of radioisotopes.

**Residual Effectiveness of Dieldrin against Adult Mosquitoes.** A series of evaluations was run using deposits of 25, 50, and 100 milligrams of dieldrin per square foot against *A. quadrimaculatus*. With 30-minute exposures, the 48-hour mortalities were 90 percent or better for 5 to 8 weeks with 25-milligram deposits, and for 17 weeks with 100-milligram deposits. The 48-hour mortalities with 60-minute exposures were 90 percent or higher for all deposits checked over the 18-week period.

**DDT Resistance Studies on Adult Fleas.** Oriental rat fleas (*Xenopsylla cheopis*) of known age (1 to 4 days) were exposed for 4-minute periods to deposits of 50 milligrams of 5 percent DDT dust per square foot and the 24-hour mortalities noted. The results indicate the building up of some resistance with the average mortality of succeeding generations gradually dropping through the  $F_3$  generation. The  $F_4$  generation showed no increase in resistance, but at least the degree of resistance obtained through the  $F_3$  generation was retained. The accuracy of the higher mortalities shown for the  $F_4$  generation, and the results for fleas of the  $F_5$  generation used in the initial tests are questionable due to erratic insectary conditions. With 32 replications of the  $F_5$  generation, in which fleas were reared under controlled conditions, the average mortality was below the 30 percent level. With this indication of a high resistance level in  $F_5$  generation, the exposure period

was increased to 8 minutes to provide a higher selection pressure. Limited tests of 32 replications with the F<sub>5</sub> generation at 8-minute exposures gave a 38 percent average mortality.

#### **DISINSECTIZATION OF AIRCRAFT**

**Comparative Insecticidal Effectiveness of Various Aerosol Formulations.** Lethane was tested at 4 percent in four formulae (S-61, 52, 63, and 66) for insecticidal value. In three formulae (S-62, 63, and 66) either VanDyk 264 or piperonyl butoxide was employed as a pyrethrum synergist. The DDT content was 3 percent, and Freon-12, 85 percent in all formulae. Formula S-63 gave the highest average index, 1.52 for 12 replications. Further experiments comparing S-43 and the standard G-382 showed the former to be more effective against a resistant strain of house flies.

**Effects of Repeated Applications of Freon-12 and Insecticidal Aerosols on Various Laboratory Animals in Peet-Grady Chambers.** A total of 420 doses (105 experimental days) of Freon-12, standard aerosol formula G-382, and experimental formula S-58 were applied respectively to animals (white rats, mice, guinea pigs and rabbits) in each of three Peet-Grady chambers, all applications at the rate of 5 grams per 1,000 cubic feet. At the end of the experiment, all animals were weighed and killed, and a gross autopsy was performed. During the entire experiment, 11 animals died in the control test, 7 in the S-58 test, and 6 in the G-382 test. In general, it may be concluded that under these test conditions the animals exposed to aerosol formula S-58 fared as well as those exposed to the standard formula G-382 or Freon-12 alone. Essentially, all animals that died during the test were found to have fairly clear-cut pathology of intercurrent infection to a degree sufficient to account for their deaths. Also, the survivors in each of the three chambers were found to be in good physical condition, and to have made average normal weight gains over the test period.

#### **EQUIPMENT DEVELOPMENT**

**Atmospheric Pollen and Dust Sampler (Continuous Recording Type).** A pollen and dust collecting device has been constructed at the request of Communicable Disease Center engineers assigned to the Region II office in New York City. The device is to be used for the collection of ragweed pollen and is designed to provide a continuous record of atmospheric pollen density for periods up to 3½ days without attendance. Operation of

the collector in its present stage requires a source of 110-volt electric current.

**Rubber Hose Tests.** Tests were conducted on 14 types of 1/4- to 3/8-inch inside diameter spray hoses to ascertain their potential suitability for use in residual spray operations. The basis of the tests was the ability of the test materials to withstand a 7-day soaking in commercial grade xylene.

**"Packaged Unit" Aircraft Insecticide Spraying System.** The CO<sub>2</sub> package unit, which has been developed as a lightweight portable airplane spraying system for emergency use in small airplanes, has undergone a series of minor modifications for simplification of installation and operation. Use of the unit has been approved formally by CAA for both Piper J-3 and Piper PA-12 airplanes. This approval now allows installation of the unit in any airplane of the above designations by a licensed airplane mechanic without further inspection.

**Use of Water-Wettable DDT in Thermal Aerosol of Airplane Exhaust.** At the request of the Greek Division of the Economic Cooperation Administration, a test was made to determine the feasibility of dispersing a water-wettable DDT suspension through the exhaust aerosol system of the PT-17 airplane for mosquito control. The results indicated that the formulation was unsatisfactory for use in this equipment for several reasons, such as the difficulty of keeping the material in suspension, stopping of the wind-driven gear pump, and lack of a visible vapor trail to aid the pilot in spraying an area.

**Ratproofing Studies.** A commercial model of the Tiger Rat Guard for protecting ship's hawsers against rat passage was tested and found to be ineffective in stopping rat travel along the hawser. Several modifications were made to the guard which rendered it quite effective in stopping rats.

**Rubber Storage Bins.** The miniature inflated rubber storage bins subjected to exposure for effectiveness against rat gnawing have been penetrated by rats chewing holes in the rubberized canvas tops of the bins.

#### **CONTROL METHODS AND EVALUATION**

**Field Investigations on House Fly Control.** Technical dieldrin applied at the rate of 200 milligrams per square foot on outdoor surfaces in April 1949, still gave excellent kills of insectary-reared flies on all test surfaces except painted and unpainted wood in the sun 47 weeks after

treatment. On surfaces treated in September 1949, average 24-hour kills of at least 50 percent for all treated surfaces combined were obtained for 12 weeks with a standard DDT emulsion at a dosage rate of 200 milligrams of DDT per square foot; for 19 weeks with a similar dosage of DDT to which rosin had been added to give 2 percent rosin in the finished emulsion; for 12 weeks with a standard emulsion of recrystallized dieldrin applied at a dosage of 50 milligrams per square foot; and for 10 weeks with a similar dosage of dieldrin to which rosin was added to give 0.5 percent rosin in the finished spray. Similar treatments with homogenized emulsions of recrystallized dieldrin with rosin added gave 24-hour kills above 50 percent for 23 to 30 weeks although the emulsifier was reduced to only 5 percent of the quantity normally used or eliminated entirely.

**Mosquito Larvicide Investigations.** A flotation technique was developed for sampling for larvae of *Mansonia perturbans*. Field tests with a variety of insecticidal formulations failed to effect satisfactory larval control of this species.

#### PHARR, TEX., SECTION

##### ENVIRONMENTAL SANITATION STUDIES.

##### **Relative Fly Populations in Study Towns.**

Relative fly populations in Anglo and Latin sections of Pharr, Mission, and Edinburg, Texas, were plotted as 3-week moving averages from March 1949 to March 1950. The usual bimodal peaks did not occur in 1949, possibly because of the absence of a fall rainy season. A midwinter rise in populations is shown. There are two minor population increases which appear to be due to fly migration from city garbage dumps. Peak fly populations appear to have been lowered in these three cities by the elimination of extensive dumping of fruit and vegetable wastes in peripheral areas. A wide and persistent difference in fly populations between Latin and Anglo areas is shown.

##### **Evaluation of Premises Sanitation Improvement.**

Premises sanitation improvements as related to fly control were measured by monthly surveys (September 1949 through February 1950) in Pharr, Mission, and Edinburg. The surveys recorded a marked difference in basic sanitation between Anglo and Latin areas. They also show a spectacular increase in the provision of approved-type garbage containers in the Latin areas of Pharr. The increase, however, is not accompanied by a similar reduction in the use of nonapproved-type containers. There were no other important changes in the frequency of occurrences of fly attractants

or in the basic sanitation facilities available.

##### **Importance of Fly Attractants as Breeding Media.**

The principal fly attractants observed within the city limits of Pharr, Mission, and Edinburg are arranged in the following order according to percent with fly breeding: (1) mixed garbage in containers, (2) scattered mixed garbage, (3) human excrement, (4) melons, and (5) dish and wash water wastes. The order of frequency of occurrences of the principal attractants is: (1) dish and wash water wastes, (2) mixed garbage in containers, (3) scattered mixed garbage, (4) animal pens, (5) scattered fruit, (6) human excrement, and (7) melons. The only important source of fly breeding in Anglo areas in these towns is mixed garbage in containers.

##### CHEMICAL FLY CONTROL INVESTIGATIONS.

**Dieldrin as an Outdoor Residual Spray.** Mixtures of dieldrin and water-white rosin were applied to the principal outdoor fly resting places in Donna and La Villa, Tex., in October 1949, at dosages of 25 milligrams and 10 milligrams of dieldrin per square foot of surface treated. In Donna, treated with 25 milligrams of dieldrin, relatively low fly populations are being maintained in the 22d week. Wall cage tests with field-collected flies exposed for 30 minutes to exterior-treated surfaces showed an average of 43 percent kill 48 hours after exposure. In La Villa, treated with 10 milligrams of dieldrin, grill counts made 20 weeks after treatment were much lower than in the nearby check town of Edcouch. Wall cage tests at 18 weeks on various exposed surfaces that had been treated showed a 22.8 percent kill.

**Fly Resting Habits.** Procedures for studying day and night resting places of flies have been established. Observations based on the first 11 blocks studied show that 71.7 percent of the house flies were found on ground surfaces during the day. At night, 37.9 percent were in trees and bushes and 31.8 percent were on ceilings of utility buildings which had been heated by indoor open fires. For *Phaenicia* spp., 75.6 percent were found on ground surfaces during the day and 94.8 percent were found on grasses and weeds at night. Large numbers of *Drosophila* were observed in privies. Data recorded from seven blocks showed that during the day, 86.7 percent of the *Drosophila* were in privy pits and 6.0 percent in garbage containers. At night, 77.8 percent of the *Drosophila* were on privy ceilings, 3.9 percent on privy walls, 9.9 percent in privy pits, and 1.1 percent in garbage containers.

# Training Services

## FIELD TRAINING

**Amherst, Mass.** The first 12-week course for sanitation personnel was begun at this station on January 3 with 12 employees of State and local health departments enrolled. The course was completed on March 24, with all trainees satisfactorily completing the course and receiving certificates to that effect.

Six trainees expressed a desire to obtain a Massachusetts Babcock testing license. Arrangements were made with the Agricultural Experiment Station of the University of Massachusetts to give the necessary 14 hours of instruction. The six trainees obtained licenses on March 16.

A 5-day course on "Milk - Laboratory Procedures" was given March 27-31. Seven trainees attended. This course was formerly given each year by the Department of Bacteriology and Public Health of the University of Massachusetts. Future courses will be given by the New England Field Training Center as part of its program of topical courses.

The second 12-week course for sanitation personnel is scheduled to be given April 10 to June 30, 1950, and 16 students have been accepted for it. Fifteen of the students are employees of health departments in Massachusetts and one is from the Rhode Island State Department of Health.

This station has under consideration a 5-day course for health department personnel on the subject of "Food Handlers Training Courses." It is planned to offer this course sometime in the fall of 1950.

**Buffalo, N. Y.** The activities of the quarter centered around the transferring of the sanitary inspectors training school from Troy to Buffalo, and the arranging of the subject-matter content of the proposed course. Suitable quarters for the school were obtained in a county building located one block from the Erie County Health Department headquarters. The station will be convenient to the western part of the State and particularly Erie County, which includes the city of Buffalo.

The first course will be conducted from April 24 to July 15, 1950. Recruitment for enrollees in the course will be confined to New York State. The Erie County Health Department will assign 10 of its sanitary inspectors to attend each course, allowing six others per course for other cities and counties of the State. The Erie County Health Department staff will assume the majority of the instruction load in courses formerly carried by officials of the New York State Department of Health Central Office.

**Cincinnati, Ohio.** "An Advanced Training Course for State Bacteriologists Primarily Concerned with Water or Milk Analyses or Food Utensil Examinations" was conducted from February 27 to March 17. Eight persons attended the entire course and two participated in the first week's activities.

During the period March 20-31, 20 trainees were enrolled in "An Advanced Sanitary Engineering Training Course in Water Pollution Abatement Programs."

Training courses in radiological health are being planned for this station. The length of the course and the time has not been set, but present plans call for the first courses to be held early next fall.

Three trainees from Hawaii, India, and Ecuador received training in stream sanitation during the quarter.

**Columbus, Ga.** On February 9, 1950, the "Sanitarians Course" was begun with 16 trainees enrolled. Guest lecturers from four agencies participated in this course.

During the period March 13-17, three trainees attended the short course for milk sanitarians.

As a result of a request from the Arkansas State Health Department for assistance in organizing a State field training program, the training officer spent several days in Arkansas studying its training needs and outlining a practical sanitation field training program which should satisfy the essential training needs. The State since has placed this plan in operation and, with a minimum amount of assistance, the program

should be quite successful.

Four visitors from foreign places - India, the Philippines, and Japan - received individual training during the quarter.

**Denver, Colo.** A course on "Insect and Rodent Control," sponsored by the Colorado Municipal League and the Colorado Department of Public Health, was held the week of February 27. This short course was given primarily for persons who are responsible for garbage and refuse and insect and rodent control in small towns without organized health departments. Eleven persons attended this course.

A milk sanitation seminar sponsored jointly by the U.S. Public Health Service and the Idaho State Department of Health was held in Pocatello, Idaho, March 6-8. A representative of this station participated in the seminar. Fifty-one sanitarians, sanitary engineers, and other health officials were present. Subject matter included milk sanitation and a general discussion of the U. S. Public Health Service Milk Ordinance and Code. Public health officials of the area were familiarized with the activities of the Rocky Mountain Training Center through radio and newspaper publicity.

The regular 12-week course in environmental sanitation began March 6 with 10 enrollees. Three of these trainees are from Canada and one is from Alaska.

On March 2, the Area Director and Chief Medical Officer of the Bureau of Indian Affairs, Albuquerque, N. Mex., visited this station to solicit help in formulating a sanitation program for the reservation. Personnel of this station plan to visit Albuquerque sometime during the month of June in order to become familiar with the many acute public health problems existing on the reservation.

**Topeka, Kans.** A short course in "Eating and Drinking Establishment Sanitation" was held January 9-21, 1950. Twenty-two persons were in attendance.

A 12-week environmental sanitation course began February 9, 1950. Twelve trainees are enrolled for the entire course, and two participated in only that part devoted to milk sanitation. On March 23-24, the milk sanitarians of Kansas were invited to sit

with the training class for a discussion on milk houses, milking machines, clarifiers, and separators.

On March 27-28, the training officer assisted Region V in conducting a 2-day food handling course for air line carrier food purveyors. One hundred and thirty-seven employees, representing 5 commissaries and 10 air lines, attended the course.

Conferences were held with Region VII regarding projected training courses in fly control, housing, and milk sanitation to be conducted during the coming quarter. The development of a health officer training program in Kansas is under way. It is anticipated that the preliminary details will be completed in the near future.

On March 31, a representative of this station gave a talk on "Why Be a Sanitarian" at the Kansas Sanitarians Association meeting in Topeka. During January, he lectured to a class of approximately 25 home nursing students at the Topeka High School.

#### **STATE FIELD TRAINING (COOPERATIVE ENTERPRISES)**

Requests for assistance in organizing State field training programs continue to be received. The States of California, Washington, Oklahoma, Texas, South Carolina, Illinois, and Wisconsin have requested the assignment of training officers. Plans are under way to lend assistance to these States to the limit of available funds and personnel.

**Maryland.** The first 12-week course in "Environmental Sanitation" began February 20 with six men enrolled. The schedule was modeled after the Columbus field training course, with lectures being given on specific subjects. Most of the lectures are held in the Prince Georges County Health Department, and the Central Bacteriological Laboratory in Baltimore is being used for the laboratory work.

This center is now under the direction of one of our training officers on loan to the State. However, when the next course begins on June 19, 1950, a State sanitarian will be assigned full time to the center and will replace our officer in January 1951.

**New York.** The health educator training officer participated in the planning and work of the Training Institute of New York

State Division of the American Cancer Society held in Syracuse, February 8-9, for all the local field Army directors and their assistants. An attempt was made to enlarge participation both at the preplanning stage and at the conference itself. Cards were mailed throughout the State to obtain a problem census. The program included four Section discussions on "How to Build an Effective Lay Program."

The first joint conference of personnel engaged in professional training met February 27. Those present represented health officer training, nurse training, sanitation training, nutrition training, health educator training, physician training, and the Office of Professional Training. One more professional category will be added to the group--a representative from laboratory training. This group will meet once each month as it feels a need for orientation to the different training programs. Therefore, at each session, two 30-minute presentations will be made until at least a speaking acquaintance with the several training programs is acquired. At the March meeting, a program was presented on nurse training.

A 1-week orientation program was planned and given to students in health education from Harvard School of Public Health. One of the students is to be the new State Director of Public Health Education in Maine.

#### HEADQUARTERS TRAINING

**Insect and Rodent Control.** The 10th semi-annual field training course "Rat-Borne Disease Prevention and Control" was conducted during the period March 13 to April 1, with the cooperation of the Atlanta City Health Department. Six trainees completed this course. Due to the availability of additional training aids and improvement in training techniques, it was possible to reduce the schedule of this course from 4 to 3 weeks. In addition, the revised schedule included a field survey of a community of 5,000 population. This will assist trainees in recommending specific control measures to solve local problems. Compound 42 was utilized for the first time and additional emphasis was given to sanitation techniques through scheduling a

field trip to observe sanitary land-fill operations and improved methods for storage of garbage and refuse.

A 2-day rodent-control field training course was conducted at Topeka, Kans., on February 23-24. This course was attended by 10 trainees who were enrolled in the regular 12-week field training sanitarian course. Personnel of the Insect and Rodent Control Section participated in the 3-day fly control seminar conducted at the Topeka Field Training Center during the period February 1-3.

A 5-day insect and rodent control field training program was given in New Orleans, La., during the period February 27 to March 3. This course was attended by seven sanitarians who were enrolled in the regular 11-week field training course for sanitarians conducted by the Louisiana State Board of Health Field Training Station.

A similar 5-day insect and rodent control field training course was held in Columbus, Ga., during the week of February 6. Sixteen trainees taking the regular 12-week sanitarian's course at the Columbus Field Training Station attended.



Instructor demonstrating treatment of individual garbage container for fly control.

**Training Public Health Personnel from Foreign Countries.** Special observation and training courses were arranged for 10 public health visitors from eight foreign countries who came to Training Services during the quarter. A break-down is as follows: Argentina, 1; England, 1; Ethiopia, 1; Finland, 1; India, 2; Japan, 2; Philippines, 1; and Venezuela, 1.

**Housing Sanitation.** The field training course in "Evaluation Methods of Housing Sanitation" was conducted during the period March 13 to April 14. Four persons satisfactorily completed this course. A similar course was given in Syracuse, N. Y., during the period January 23 to February 24. Three persons attended this course.

The field training program to be carried on in Kansas City, Kans., during the week of May 8 was clarified further with the Regional Office in Kansas City, Mo. Personnel in the Housing Sanitation Unit are completing the scoring and punching of the key sort cards, and a representative of the Regional Office is doing the field work.

On January 16, the chief of the Housing Sanitation Unit consulted with the professor of public health education at the University of North Carolina and a consultant of the Hygiene of Housing Unit to develop a housing program for State health departments and to complete the program for the 2-day institute at Chapel Hill. On March 19, further conferences were held to work out the details of the institute scheduled for April 17 - 18, to work on questions submitted by interested conferees, and to decide on publications which will be distributed at the institute at Chapel Hill.

Personnel of this unit spent 1 day with health department housing and planning officials in Augusta, Ga., to prepare estimates of cost covering the appraisal technique that may be used in Augusta. A conference was held on March 26 with Regional, State, and city health department officials of Denver, Colo., and Salt Lake City, Utah, regarding the use of the appraisal technique in these cities. At Denver, the Planning Commission and Building Inspection Departments were consulted regarding the preparation of a preliminary budget for the

city of Denver for their projected survey. The methods of training in the appraisal technique were further explained to all interested parties.

The training officer at Syracuse, N. Y., met with the Executive Director of the Providence Redevelopment Agency in Syracuse to discuss the organization of the Providence housing study and the use of the appraisal method. Several conferences were held with regional and State health department personnel to discuss the question of housing quality within a given city and to develop closer cooperation with directors of State regional health departments.

#### **RADIOLOGICAL HEALTH COURSE**

Training Services assisted P. H. S. Region VI and the Radiological Health Branch of the Public Health Service in planning for a 2-day radiological health orientation course. This course, to be given under the auspices of the P. H. S. Regional Office, is designed to give a broad over-all public health concept of ionizing radiation to State and local health department administrative personnel and other interested persons concerned with public health. This orientation course is a forerunner of the planned 3-week training courses in the public health aspects of ionizing radiation scheduled to be given at the Environmental Health Center, Cincinnati, Ohio, later this year.

**Radiant Energy Seminar.** Training Services organized an in-service training seminar dealing with the "Basic Concepts of Radiant Energy." Meetings are held twice monthly, with nonclassified material presented emphasizing the public health concepts and research uses rather than military aspects of the subject. The program consists of directed meetings in which all students participate through special assignments.

**Congress of Inter-American Sanitary Engineers.** Mr. J. H. Crawford, Assistant Chief of Training Services, presented a paper on field training before the Second Congress of the Inter-American Sanitary Engineers held March 16-26, 1950, in Mexico City, Mexico. More than 200 sanitary engineers from 23 countries attended the Congress. They indicated a considerable interest

in the CDC field training program.

**Training Materials.** Small plastic boxes containing fly and mosquito specimens have

been assembled for use in decentralized training and should prove to be a valuable training aid.

## Veterinary Public Health Services

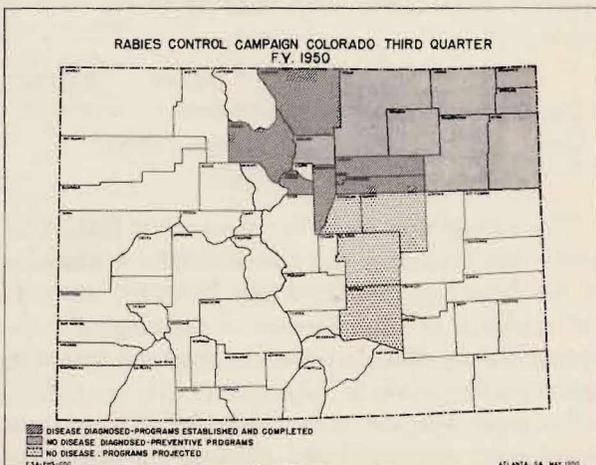
### RABIES EPIZOOTICS

In March 1950, major rabies epizootics were reported in Colorado, West Virginia, and Texas, and a higher than normal incidence in North Carolina, Louisiana, Indiana, Iowa, and Tennessee. In Colorado, epidemic assistance was furnished by CDC veterinary officers, and supplies sent to the State Health Department. A successful rabies control campaign was carried out in the epizootic area of metropolitan Denver in which 22,492 dogs were vaccinated at public clinics and 13,391 at private veterinary hospitals, for a total of 35,883. Based on a dog population of 50,000, 71.8 percent of the dog population was vaccinated. The rabies eradication program has been extended to the northeast and central counties of Colorado (see attached map). The incidence of rabies has declined steadily since the inauguration of the program in March. Previous to the present outbreak, Colorado had been free of rabies for a number of years. It is thought that the disease was introduced during the blizzard of 1949.

The West Virginia outbreak was centered around Charleston and Kanawha County. Twenty-five public immunization clinics were operated in the county. Three veterinary officers and the necessary vaccine and supplies were rushed by CDC to the



A rabies inoculation clinic at Denver, Colo.



State to fight the epizootic. In this program, 19,000 dogs were vaccinated, representing an immunization rate of 76 percent of the estimated dog population.

Following the Mississippi River flood in northern Louisiana, a request was made for rabies vaccine to combat any outbreak that might develop. Two thousand doses were sent. To date, no report of a major disease outbreak has occurred.

**Problem of Major Concern in East Texas.** The problem of fox rabies has been of paramount concern to public health authorities in east Texas. In one county (Kaufman), more than 100 persons have been required to take antirabies treatment. In addition, there was over \$25,000 loss to livestock. This outbreak stimulated an eradication program, and today apparently there is not an unvaccinated

dog in the county. Thousands of skunks and hundreds of foxes were killed during the campaign. Today no rabies is reported in the county. Other counties have carried on similar programs with varying degrees of success. The State Health Department has advised that more assistance will be needed to bring the disease under control throughout the State.

In Indiana, the Governor has appointed Dr. John H. Scruggs, S. A. Veterinarian, as chairman of a special legislative committee on rabies control. One human death occurred in February after a dog was released by a private animal shelter to its owner for observation. The dog attacked the owner, biting him severely on the hand. He died 35 days later, even though he had received antirabies vaccine for 21 days following exposure.

**Record Marred.** A long record of a rabies-free territory came to an end when several canine cases were reported in Puerto Rico, and confirmed by the CDC Virus-Rickettsia Laboratory. Consultant service and emergency aid are being rendered to the Puerto Rico Health Department to assist in development of a rabies control program.

A long-range rabies vaccination study is now under way at the veterinary unit of the Virus-Rickettsia Laboratory at Montgomery, Ala. This experiment is being carried out to determine the comparative antigenic potency and duration of immunity of various canine immunizing agents. It will be at least 3 years before results are available.

Dr. Ernest S. Tierkel, Assistant Chief of Veterinary Public Health Services, was named a consultant to the World Health Organization expert panel on rabies. His duties will be to provide information and consult on animal rabies control and eradication procedures.

#### BRUCELLOSIS STUDIES

The brucellosis studies in Indiana, held in cooperation with the U. S. Bureau of Animal Industry, Indiana State Veterinarian, and State Board of Health, were completed this past winter. The data are being tabulated now and will be presented at the III International Brucellosis Congress in November 1950. A new project has been inaugurated under the Indiana State Board of Health to study the relation of infected carcasses and human infection on the farm of origin. This work will be in cooperation with Purdue University.

All cases of bovine tuberculosis in Indiana are

being reported to the State Board of Health and a follow-up then is being made at the farm of origin to determine if there is any further evidence of disease in man or animals.

**Air Sample Studies.** The Wisconsin State Board of Health, CDC, and the University of Wisconsin have begun air sample studies to determine if *Brucella* are air-borne. Initial tests of 15, 30, and 60 cubic feet volumes are negative.

Dr. James H. Steele, Chief of Veterinary Public Health Services, has been appointed a consultant by the World Health Organization to its panel on brucellosis. This panel will meet in Washington, D. C., in November 1950, following the III International Brucellosis Congress.

#### PSITTACINE BIRD INDUSTRY

Cooperative investigations with the Florida State Board of Health revealed that the psittacine bird industry of south Florida was violating both foreign and domestic psittacine bird quarantine regulations. Fortunately, there have been no human cases of psittacosis in that area. As a result of these investigations, standard quarantine procedures for zoological exhibitors are to be promulgated, both as to length of time of quarantine and satisfactory physical facilities. The California Department of Public Health reports that 50 percent of the human cases of psittacosis reported are attributed to other than psittacine birds. New York and New Jersey have reported similar experiences where pigeons were the cause of human infection. The incidence of psittacosis has continued to drop in the United States along with mortality. In 1949 fewer than 50 cases were reported.

#### HISTOPLASMOSIS STUDIES

In the histoplasmosis studies, a survey was made of 17,400 cattle slaughtered during 23 inspection days. They were made up of the following types:

Types	Percent	Types	Percent
Steers	59	Heifers	7
Cows	14	Heavy calves	6
Yearlings	13	Bulls	1

The survey was made to determine if histoplasmosis was present in any market cattle. A summary of the pathology indicated that 2,095 (12 percent) had evidence of some disease or pathological condition. Liver change was the major cause for rejection. See table 1.

Forty-six specimens were cultured. *Histoplasma capsulatum* was not found although several other

TABLE 1

RESULTS OF SURVEY TO DETERMINE WHETHER  
HISTOPLASMOSIS WAS PRESENT  
IN ANY MARKET CATTLE

Disease or pathological condition*	Number of cattle	Percent cattle**
Carcass abscesses	3	0.02
Actinomycosis and actinobacillosis	247	1.42
Arthritis	1	0.01
Anaplasmosis	1	0.01
Extensive bruises or injuries	26	0.15
Carcinoma (cancer)	18	0.10
Epithelioma (cancer eye)	35	0.20
Cysticercosis (bovis)	8	0.05
Emaciation	13	0.07
Hyaline degeneration	3	0.02
Icterus	1	0.01
Liver-abscess	933	5.40
Liver-telangiectasis	277	1.60
Liver- "sawdust"	107	0.60
Liver-distoma	189	1.00
Liver-miscellaneous parasites	154	0.90
Mastitis	2	0.01
Metritis	5	0.03
Nephritis	1	0.01
Pericarditis	8	0.05
Peritonitis	12	0.07
Pneumonia	28	0.16
Polyarthritis	2	0.01
Pyemia	9	0.05
Prelapse (rectum)	1	0.01
Pyelonephritis	4	0.02
Sarcosporidiosis	3	0.02
Septicemia	3	0.02
Vaginitis	1	0.01
Total	2,095	12.03

\*Diagnosis made by personnel of the Bureau of Animal Industry.

\*\*Percent based on total cattle slaughtered.

evident field fungi were isolated. These are being studied and will be reported on later. An additional case of canine histoplasmosis was reported. The diagnosis was based on histopathological

observations.

#### Q FEVER INFECTIVITY STUDIES

The Q fever studies at Hamilton, Mont., indicate that lactating cows with normal mammary glands are resistant to infection by the application of infectious milk to the teat orifice. Exposure of two cows by inhalation of infectious aerosols caused infection in both. In one animal the *Coxiella burnetii* were isolated from the placenta. The complement fixing antibodies appeared in the serum of this cow about 2 weeks past inoculation but disappeared at or near parturition. This has been observed to occur in brucellosis in cattle; however, following parturition, the antibody level will return.

Tests of 197 milk samples around Lincoln, Nebr., did not reveal any Q fever infection in cattle in that area.

#### Q FEVER PASTEURIZATION PROJECT BEGUN

The Q fever pasteurization studies were inaugurated at the University of California School of Veterinary Medicine with Dr. John B. Enright in charge. The study is being supported by three branches of the Public Health Service: Environmental Health Center, the Milk and Food Section of the Sanitation Division, and the Communicable Disease Center. In addition, the University of California is providing space, utilities, personnel, and equipment. The milk industry has assured its cooperation in providing the larger pieces of dairy pasteurization equipment.

Three strains of *Coxiella burnetii* have been established in the laboratory. These are the Hengerling strain, the Nine Mile strain, and a California bovine strain. These will be used to test thermal resistance. Initial work is on artificially infected milk. Later, naturally infected milk will be used. Pasteurization equipment will be installed in the fall of 1950 for large-scale experiments. A survey of market milk will be carried out with special attention given to milk known to come from infected herds. This work will be coordinated with the California Department of Public Health.

#### CREEPING ERUPTION

The creeping eruption studies in Florida continue with the level of infection varying from 3 percent in Leon County to 68 percent in Palm Beach County. Initial work with chemical hookworm larvicides is being made with infected sand in ice cream cartons. The chemicals being tested are 50 percent DDT, triborate powder, sodium borate, and calcium cyanamide. From the laboratory, the

successful agents will be tested in local dog kennels.

#### SALMONELLA STUDIES

The *Salmonella* studies in Florida have continued on the kennel sickness among greyhound racing dogs. The infection has persisted throughout the racing season. *Salmonella* rates among dog populations in Florida are as follows:-

Dogs tested	Number tested	Percent positive
<b>Miami</b>		
Veterinary hospitals	164	9.0
Greyhounds	239	33.0
<b>Jacksonville</b>		
Veterinary hospitals	160	18.0
Greyhounds	343	36.4
Pound		2.6
<b>Leon County</b>		
Pound	62	20.9

#### SEVEN MONKEYS FROM AFRICA CULTURED

Seven dead monkeys recently imported from Africa were cultured. *Salmonella bredeney* was

isolated from five caecal swab cultures; *Shigella paradysenteriae*, Flexner, from the anal swabs of two animals. The Veterinary Public Health Laboratory also assisted in the investigation of a fatal *Staphylococcus albus* mastitis case.

#### COLUMBIA BASIN STUDY

The Columbia Basin study on animal diseases transmitted to man was approved by the Washington State authorities and will begin operating in April 1950. The laboratory work will be done at the Washington State College, Pullman, and the University of Washington, Seattle. Dr. Monroe Holmes was appointed an adviser on veterinary medicine to the President of Washington State College.

#### LABEL FOR POULTRY

In Colorado, the State Board of Health passed regulations requiring that all poultry which is graded but does not carry an inspection stamp must have a label stating it is not inspected, next to the grade label.

#### CATTLE PINK-EYE INVESTIGATED

In Texas, an investigation of cattle pink-eye revealed it to be a widespread disease. It is reported by investigators at the University of California Veterinary School that the disease is caused by a virus.

## ANNOUNCEMENT

### Veterinary Public Health Seminar in August

The Veterinary Public Health Services will hold a seminar August 14-17, 1950, in Atlanta, Ga., on communicable diseases of importance to veterinary public health. This seminar will be for public health veterinarians and other persons interested in health or veterinary organizations.

Following the conference, arrangements have been made for the seminar participants to visit the laboratories at Atlanta, Montgomery, Ala., or Savannah, Ga.

The conference members will discuss current

disease problems and, in addition, one session will be devoted to exotic animal disease problems that are not of immediate public health concern but which may be introduced by various means. A tentative schedule follows:

Monday morning, general discussions; Monday afternoon, virus disease seminar; Tuesday morning, virus diseases (continued); Tuesday afternoon, rickettsial disease seminar; Wednesday morning and afternoon, bacterial disease seminar; Thursday morning, parasitic disease seminar.

#### CORRECTIONS

CDC Bulletin IX (4), April 1950:

1. Page 5, right column, 11th line from bottom. Read "9 per 100,000" instead of "92 per 10,000" as reported.

2. Page 8, table 1. Reverse the scientific names only in the last two lines. *R. rattus* should be on the bottom line, while *R. norvegicus* should be on the top line of the two.

## CDC TRAINING COURSES

(Continued from inside front cover)

### LABORATORY SERVICES

1. **LABORATORY DIAGNOSIS OF MYCOTIC DISEASES, Part 1, Cutaneous and Subcutaneous Fungi**, July 24 to August 4, 1950. Two weeks. Atlanta, Ga.

2. **LABORATORY DIAGNOSIS OF MYCOTIC DISEASES, Part 2, Systemic Fungi**, August 7-17, 1950. Two weeks. Atlanta, Ga.

3. **LABORATORY DIAGNOSIS OF TUBERCULOSIS**, August 21 to September 7, 1950. Three weeks. Atlanta, Ga.

4. **LABORATORY DIAGNOSIS OF BACTERIAL DISEASES, Part 1, General Bacteriology**, September 11-22, 1950. Two weeks. Atlanta, Ga.

5. **LABORATORY DIAGNOSIS OF BACTERIAL DISEASES, Part 2, General Bacteriology**, September 25 to October 6, 1950. Two weeks. Atlanta, Ga.

6. **LABORATORY DIAGNOSIS OF ENTERIC DISEASES, Part 1, Introductory Enteric Bacteriology**, October 9-13, 1950. One week. Atlanta, Ga.

7. **LABORATORY DIAGNOSIS OF ENTERIC DISEASES, Part 2, Advanced Enteric Bacteriology**, October 16-27, 1950. Two weeks. Atlanta, Ga.

8. **LABORATORY DIAGNOSIS OF PARASITIC DISEASES, Part 1, Intestinal Parasites**, September 18 to October 6, 1950. Three weeks. Atlanta, Ga.

9. **LABORATORY DIAGNOSIS OF PARASITIC DISEASES, Part 2, Blood Parasites**, October 9-27, 1950. Three weeks. Atlanta, Ga.

10. **LABORATORY DIAGNOSIS OF RICKETTSIAL DISEASES**, November 6-10, 1950. One week. Atlanta, Ga.

11. **IDENTIFICATION OF MEDICALLY IMPORTANT ARTHROPODS**, November 13-24, 1950. Two weeks. Atlanta, Ga.

12. **VIRUS ISOLATION AND IDENTIFICATION TECHNIQUES**, November 13-17, 1950. One week. Montgomery, Ala.

13. **LABORATORY DIAGNOSIS OF INFLUENZA**, November 20-24, 1950. One week. Montgomery, Ala.

14. **LABORATORY DIAGNOSIS OF TUBERCULOSIS**, December 4-15, 1950. Two weeks. Atlanta, Ga.

#### *By Special Arrangement:*

**LABORATORY DIAGNOSIS OF MALARIA**, two weeks, Atlanta, Ga.; **LABORATORY DIAGNOSIS OF VIRUS DISEASES**, two to four weeks, Montgomery, Ala.; and **PHAGE TYPING OF SALMONELLA TYPHOSA**, one week, Atlanta, Ga.

### VETERINARY PUBLIC HEALTH SERVICES

1. **COMMUNICABLE DISEASE CONTROL COURSE FOR PUBLIC HEALTH VETERINARIANS**, August 14-17, 1950. One week. Atlanta, Ga.

2. **LABORATORY DIAGNOSIS OF RABIES**, November 27 to December 1, 1950. One week. Montgomery, Ala.

*Material in this bulletin is not for publication.*

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

# MORBIDITY TOTALS FOR THE UNITED STATES \*

## MALARIA, POLIOMYELITIS, TYPHUS

1949 - COMPLETE    1950 - AS REPORTED

