

CDC SEPTEMBER 1950 BULLETIN



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

Courtesy of the David A. Sencer CDC Museum

Contents

CENTER HIGHLIGHTS

Administrative Services	1
Audio-Visual Production Services	4
Engineering Services	8
Entomologic Services	15
Laboratory Services	22
Technical Development Services	27
Training Services	34
Veterinary Public Health Services	38

BOOK REVIEW:

Malariology. Edited by Mark F. Boyd	44
---	----

MORBIDITY DATA	Outside Back Cover
--------------------------	--------------------

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

Administrative Services

REVISION IN PROCEDURES FOR USING VEHICLES

Under date of May 1, 1950, revision was made of the procedures for securing authorization for the use of Government-owned vehicles by officers and employees between their domiciles and places of employment. The new procedures require a quarterly utilization report by all employees holding such authorizations.

FISCAL ACCOUNTING CONFERENCE

Key personnel of the Budget and Fiscal Section, together with representatives from Public Health Service stations in the Southeast, attended a fiscal accounting conference in Atlanta on June 13-15, 1950, conducted by members of the Subcommittee on Fiscal Accounting of the P.H.S. Committee on Organization, from Washington, D.C.

DECENTRALIZATION OF FISCAL FUNCTIONS

Decentralization of CDC fiscal accounting functions has been effected to Little Rock, Ark.; Kansas City, Mo.; San Francisco, Calif.; and Austin, Tex. Personnel from these points received intensive orientation at headquarters with emphasis on auditing, certification and scheduling of vouchers, and maintenance of accounts.

NEW PROCEDURES IN MEMORANDUM ACCOUNTS

New procedures and forms were devised to simplify the maintenance-of-memorandum accounts by the Services and field operating units. This should result in better budgetary control of allocated funds. A simplified payroll procedure, similar to that for Civil Service personnel, was instituted for commissioned officers.

ELIGIBILITY OF PERSONNEL FOR STATUS

The final check for eligibility of personnel for permanent Civil Service status pursuant to Executive Order 10080 was completed, resulting in five conversions processed and four still pending approval by the Civil Service Commission.

DELEGATIONS OF AUTHORITY

Delegation to the Center of unlimited contracting authority and an increase to \$500 in the open-market purchasing authority is resulting in more expeditious and economical handling of necessary procurement documents.

Permission was obtained for a change in the responsibility for license-plate assignment from the Central Office and Perry Point to CDC headquarters. Tags may now be obtained in blocks of 50 for immediate assignment upon procurement of new vehicles or for replacement in the event of loss and destruction of old tags. Such an arrangement will eliminate cumbersome and voluminous paper work and facilitate operation of CDC vehicles under proper identifying insignia.

MANUSCRIPTS EDITED, CLEARED

The following manuscripts were edited and cleared for presentation and-or publication:

- Ajello, Libero: The nature of the so-called macroconidia observed on microsporium-infected hairs.
- Andrews, J. M.: Current status of malaria eradication in the South.
- Andrews, J. M.: A Public Health Biology Section for the American Public Health Association.
- Andrews, J. M.: How the Communicable Disease Center can serve the Western States.
- Andrews, J. M.: Sanitarian relationships in an expanding public health program.
- Bradley, G. H.: Book review, *Medical Entomology*, by Robert Matheson, 2nd edition. Ithaca, N.Y.: Comstock Publishing Company, Inc. 1950. Pp. 612, Illustrated. \$7.50.
- Brookman, Bernard, and Reeves, W. C.: A new name for a Californian mosquito (Diptera, Culicidae).
- Carroll, L. D.: Book review, *Communicable Disease Nursing*, by Theresa I. Lynch, 2nd edition. St. Louis, Mo.: The C. V. Mosby Company, 1949.
- Chamberlain, R. W., and Sikes, R. K.: Laboratory rearing methods for three common species of bird mites.

- Douthirt, C. H., and Link, V. B.: Plague - I. Epidemiology.
- Edwards, P. R.: Unusual types of enteric bacteria.
- Edwards, P. R.: Unusual antigenic variation in an enteric bacterium.
- Edwards, P. R., and West, H. G.: A new *Salmonella* type: *Salmonella duval*.
- Ewing, W. H.: *Shigella* grouping antiserums.
- Ewing, W. H., and Hucks, M. C.: Two intermediate members of Enterobacteriaceae.
- Faust, E. C., Scott, J. A., and Taylor, J. E.: Malaria mortality and morbidity in the United States.
- Goldman, Morris: Iron alum-picric acid-hematoxylin, a progressive, sequence stain for tissues.
- Gordon, M. A.: Rapid permanent staining and mounting of skin scrapings and hair.
- Hayes, W. J., Jr., and Gaines, T. B.: Control of Norway rats with the residual rodenticide, compound 42.
- Hess, A. D.: Some recent developments in the control of animal reservoirs and vectors of disease.
- Howitt, B. F.: Isolation and differentiation of the Cocksackie group of viruses.
- Jeffrey, G. M.: Incidence of *Enterobius vermicularis* in Puerto Rican children, with a comparison of diagnostic methods.
- Kissling, R. E., and Rubin, Harry: Pathology of Eastern equine encephalomyelitis.
- Link, V. B.: Plague epizootic in cottontail rabbits.
- Link, V. B.: Plague in the United States.
- McNeel, T. E.: The newer insecticides and rodenticides and their use.
- McNeel, T. E.: Interest in fly control in the Southwestern States.
- Maldonado, J. F., Acosta-Matienzo, Josefina, and Velez-Herrera, Freddy: Biological studies on the miracidium of *Schistosoma mansoni*. Part III. The role of light and temperature in hatching.
- Markos, B. G.: Rice field studies in Stanislaus County, California, with reference to mosquitoes.
- Menges, R. W.: Meat inspection - past, present, future.
- Miles, V. I.: Insect ectoparasites and disease.
- Paffenbarger, R. S., Jr.: Tick paralysis: Implicating *Amblyomma maculatum*.
- Parsons, E. I., and Frobisher, Martin, Jr.: Studies on type-specific immunization with somatic antigens of *C. diphtheriae*.
- Parsons, E. I., and Frobisher, Martin, Jr.: Studies of the somatic antigens of *C. diphtheriae*.
- Pratt, H. D., and Lane, J. E.: Rediscovery of *Tarsopsylla coloradensis* (Baker) in Colorado (Siphonaptera: Dolichopsyllidae).
- Prince, F. M., and Stark, H. E.: Three new fleas of the genus *Dactylopsylla* Jordan 1929 (Siphonaptera).
- Quarterman, K. D., and Hess, A. D.: Current investigations on mosquito control.
- Robinson, J. H., Cummings, M. M., and Patnode, R. A.: Comparison of two solid media for testing sensitivity to streptomycin.
- Rowe, J. A.: Entomological aspects of public health problems.
- Schoof, H. F.: Insects and poliomyelitis.
- Schoof, H. F.: Community fly control.
- Schubert, J. H., and Herndon, J. F.: A study of certain factors affecting the agglutination test for brucellosis.
- Simmons, S. W.: Some current developments in the use of economic poisons.
- Simmons, S. W., and Upholt, W. M.: A resume of disease control with insecticides.
- Sooter, C. A.: Insects and encephalitis.
- Steele, J. H.: Human health hazards from animal diseases.
- Steele, J. H.: World scope of veterinary medicine.
- Steele, J. H.: Tropical veterinary public health.
- Thurman, E. B., and Johnson, P. T.: The taxonomic characters of the larvae of the genus *Culiseta* Felt, 1904, in California (Diptera, Culicidae).
- Tisdale, E. S.: Supplementary field training of sanitary engineers for a public health career.
- Tisdale, E. S., and Crawford, J. H.: Field training for sanitary engineers and sanitarians.

SOME CURRENT BOOKS RECENTLY ADDED TO LIBRARY

With the following additions, the library's collection has now passed the 8,000-volume mark:

- Addis, Thomas: Glandular nephritis, 1948.
- Alaska (Ter.) Health Department: Public health progress in Alaska, 1949.
- Amateur Cinema League, Inc.: ACL movie book, 1949.
- American Gas Association, Natural Gas Department, Gas Measurement Committee: Report No. 2, 1948.
- American Ornithologists Union: Check-list of North American birds, Supplements. Published in the Auk, 19th-24th, 1944-49.
- Armed Forces Chemical Association: Chemical

- warfare service in World War II, 1948.
- Asociacion Oftalmologica de Guatemala: Onchocercosis (enfermedad de Robles), 1947.
- Bauman, Louis: Diagnosis of pancreatic disease, 1949.
- Benetti, Joseph: Clinical chemistry methods, 1948.
- Best, Charles Herbert: Diabetes and insulin and the lipotropic factors, 1948.
- Biology of the melanomas, 1948.
- Biometric Society: Proceedings of the biometrical clinic - Entomological problems, 1950.
- Birch, C. A.: Emergencies in medical practice, 1948.
- Bolduan, C. F.: Public health and hygiene, 1949.
- Bourdillon, R. B.: Studies in air hygiene, 1948.
- Brackett, George Sterling: Coccidiosis (N.Y. Academy of Sciences. Annals v. 52 no. 4), 1949.
- British Mycological Society: Proceedings of the jubilee meeting held in London, 20-25 October 1946. v. 30, 1948.
- Brown, F. A.: Selected invertebrate types, 1950.
- Brownlee, K. A.: Industrial experimentation, 1949.
- Cantril, Hadley: Invasion from Mars, 1947.
- Chambers, Robert: Structure in relation to cellular function (N.Y. Academy of Sciences. Annals v. 50 no. 8), 1950.
- Chenoweth, L. B.: Community health, 1949.
- Coca, A. F.: Allergy (Annals of the New York Academy of Medicine, v. 50, art. 7), 1949.
- Dubos, Rene Jules: Louis Pasteur, 1950.
- Ebeling, Walter: : Subtropical entomology, 1950.
- Elkins, N. B.: Chemistry of industrial toxicology, 1950.
- Elliker, Paul Reuben: Practical dairy bacteriology, 1949.
- Emerson, Haven: Selected papers of Haven Emerson, 1949.
- Fairhall, L. T.: Industrial toxicology, 1949.
- Fessenden, George Russell: Preservation of agricultural specimens in plastics, 1949.
- Fisher, Ronald Aylmer: Statistical tables for biological, medical, and agricultural research, 1948.
- Forbus, W. D.: Granulomatous inflammation, 1949.
- Frazer, William Mowll: Textbook of public health, 1948.
- Frear, D. E. H.: Agricultural chemistry, a reference text, v. 1 - Principles of agricultural chemistry, 1950.
- Friedman, Reuben: The story of scabies, v. 1, 1947.
- Green, T. H.: Manual of pathology, 1949.
- György, Paul: Vitamin methods, 1950.
- Hammer, B. W.: Dairy bacteriology, 1948.
- Handbook of chemistry.....1949.
- Hardenbergh, William Andrew: Sewerage and sewage treatment, 1950.
- Harris, Harold Jerome: Brucellosis: clinical and subclinical, 1950.
- Hertzberg, Gerhard: The achievements of BCG vaccination, 1948.
- Hiscock, I. V.: Community health organization, 1950.
- Hoar, Roger Sherman: Patent tactics and law, 1950.
- Howard-Jones, N.: Applied biophysics, 1949.
- Institute of Public Health, N.Y.: Ecology of health, 1949.
- Jaeger, E. C.: Source-book of biological names and terms, 1950.
- Jensen, Lloyd B.: Meat and meat foods, 1949.
- Karsner, Howard Thomas: Human pathology, 1949.
- Kirk, P. L.: Quantitative ultramicroanalysis, 1950.
- Lemberg, R.: Hematin compounds and bile pigments, 1949.
- Linebarger, P. M. A.: Psychological warfare, 1948.
- Malnutrition and starvation in western Netherlands: September 1944 to July 1945. 1948.
- Matheson, Robert: Medical entomology, 1950.
- Metcalf, R. L.: The mode of action of organic insecticides, 1948.
- Mountin, Joseph Walter: Health service areas, 1949.
- National Health Assembly, Washington: America's health, 1949.
- New York (City) Ordinances, etc.: Sanitary code of the City of New York, 1948.
- Pelton, Walter J.: Dentistry in public health. 1949.
- Pincus, Gregory: Hormones, v. 1-2, 1948-50.
- Pringsheim, Peter: Fluorescence and phosphorescence, 1949.
- Puffer, Ruth Rice: Practical statistics in health and medical work, 1950.
- Royal Entomological Society of London: Transactions, v. 11-99, 1862-1948.
- Royal Society of London: Scientific Information Conference. Report and papers. June 21 to July 2, 1948, 1948.
- Shapiro, Shephard: Coagulation, thrombosis and dicumarol, 1950.
- Singer, Jacob Jesse: Differential diagnosis of chest diseases, 1949.
- Siri, William E.: Isotopic tracers and nuclear radiations, 1949.
- Soskin, Samuel: Progress in clinical endocrinology, 1950.

- Steinhaus, E. A.: Principles of insect pathology, 1949.
- Stevens, W. J.: How to prepare art and copy for offset lithography, 1948.
- Streptomycin Conference: Minutes, 1st-4th, 6th-7th, 1946-47, October 1948-April 1949.
- Studies in Social Psychology: Experiments on mass communication, 1949.
- Thompson, L. R.: Introduction to microorganisms. 2d ed., 1949.
- Thorn, G. W.: Diagnosis and treatment of adrenal insufficiencies, 1949.
- Traub, Robert: Siphonaptera from Central America and Mexico: a morphological study of the Aedeagus with descriptions of new genera and species. Fieldiana; Zoology memoirs, v. 1, 1950.
- Uber, F. M. (ed.): Biophysical research methods, 1950.
- Ultracentrifuge (N.Y. Academy of Sciences. Annals v. 43 no. 5), 1942-43.
- U. S. Atomic Energy Commission: Atomic energy and the life sciences, 1949.
- U. S. Bureau of Agricultural Economics: Preparation of statistical tables; a handbook, 1949.
- U. S. Bureau of the Census: Manual of tabular presentation, 1950.
- U. S. Laws, Statutes. Postal laws and regulations, 1949.
- U. S. Library of Congress: Descriptive cataloging division - Rules for descriptive cataloging in the Library of Congress, 1949.
- U. S. Livestock Sanitary Association: What is known about brucellosis, 1949.
- Whipple, G. H.: Hemoglobin, plasma protein and cell protein, 1948.
- Who knows - and what, 1949.
- Who's who in American education, 1949-1950.
- Who's who in the Midwest:....Central and mid-western states, 1949.
- Wilson, H. W.: Filmstrip guide: annual volume, 1st, 1948.
- Wiltshire, S. P.: Annotated bibliography of medical mycology, 1943, 1944, 1945, 1948.
- World Health Organization: Manual of the international statistical classification of diseases, injuries and causes of death, 1948.
- World Health Organization: Official records. No. 1-20; 1947-1949.
- Yearbook of dentistry, 1949.
- Zeisel, Hans: Say it with figures, 1950.

Audio-Visual Production Services

MAJOR PRODUCTIONS RELEASED DURING THE QUARTER

Motion Pictures

- 4-043.0 Life Cycle of *Diphyllobothrium latum*. 16mm, sound, B&W, 16 minutes, 573 feet.
- 4-080.0 The Fight Against the Communicable Diseases. 16mm, sound, color, 18 minutes, 641 feet.
- 4-087.0 Striking Back Against Rabies. 16mm, sound, B&W, 12 minutes, 420 feet.
- 4-088.1 Laboratory Diagnosis of Diphtheria, Part III - Tests for Virulence of *C. diphtheriae* in Animals. 16mm, sound, B&W, 13 minutes, 477 feet.
- 4-105.0 Intraoral and Pharyngeal Structures and Their Movements (VA-CDC Cooperative Project). 16mm, sound, color, 17 minutes, 600 feet.
- 4-106.0 Laboratory Diagnosis of Diphtheria, Part IV - The *in vitro* Test for Virulence of *C. diphtheriae*. 16mm, sound, B&W, 11 minutes, 411 feet.
- 4-111.0 The Laboratory Diagnosis of Rabies. 16mm, sound, B&W, 6 minutes, 206 feet.
- M15 Interviewing (First Film for FSA, SSA, OASI) (SSA, OASI - CDC Cooperative Project). 16mm, sound, B&W, 20 minutes, 725 feet.

- M16 Claims Control (Second Film for FSA, SSA, OASI) (SSA, OASI-CDC Cooperative Project). 16mm, sound, B&W, 32 minutes, 1,150 feet.
- M17 Interviewing (Third Film for FSA, SSA, OASI) (SSA, OASI-CDC Cooperative Project). 16mm, sound, B&W, 18 minutes, 650 feet.

Filmstrips

- 5-061.0 Identification of U. S. Species of *Anopheles* Larvae. 35mm, sound, B&W, 16 minutes, 78 frames.
- 5-130.0 Identification of U.S. Genera of Adult Ticks. 35mm, sound, B&W, 14 minutes, 81 frames.
- 5-138.0 Municipal Sewage Treatment Plants, Part I - Primary Treatment Plants. 35mm, sound, B&W, 7 minutes, 47 frames.
- 5-141.0 Taking Care of Diabetes, Part I - What Is Diabetes? (Division of Chronic Disease - CDC Cooperative Project) 35mm, sound, color, 46 frames.
- 5-142.0 Taking Care of Diabetes, Part II - Eating for Good Health (Division of Chronic Disease - CDC Cooperative Project) 35mm, sound, color, 42 frames.
- 5-143.0 Taking Care of Diabetes, Part III - Insulin and Its Use (Division of Chronic Disease - CDC Cooperative Project) 35mm, sound, color, 69 frames.
- 5-144.0 Taking Care of Diabetes, Part IV - Planning Good Meals (Division of Chronic Disease - CDC Cooperative Project) 35mm, sound, color, 49 frames.
- 5-145.0 Taking Care of Diabetes, Part V - The Effect of Insulin (Division of Chronic Disease - CDC Cooperative Project) 35mm, sound, color, 36 frames.
- 5-146.0 Taking Care of Diabetes, Part VI - Buying Good Food (Division of Chronic Disease - CDC Cooperative Project) 35mm, sound, color, 48 frames.
- 5-147.0 Taking Care of Diabetes, Part VII - Tests in Diabetes (Division of Chronic Disease - CDC Cooperative Project) 35mm, sound, color, 37 frames.
- 5-148.0 Taking Care of Diabetes, Part VIII - Cooking Good Meals (Division of Chronic Disease - CDC Cooperative Project) 35mm, sound, color, 46 frames.
- 5-149.0 Taking Care of Diabetes, Part IX - Keeping Out of Danger (Division of Chronic Disease - CDC Cooperative Project). 35mm, sound, color, 33 frames.
- 5-150.0 Taking Care of Diabetes, Part X - Care of Your Feet (Division of Chronic Disease - CDC Cooperative Project). 35mm, sound, color, 39 frames.
- 5-151.0 Taking Care of Diabetes, Part XI - Selecting Meals for All Occasions (Division of Chronic Disease - CDC Cooperative Project) 35mm, sound, color, 48 frames.
- 5-153.0 PVA Fixative Technique in the Diagnosis of Amoebiasis. 35mm, sound, color, 7 minutes, 72 frames.
- 5-155.0 The Diagnosis of Intestinal Protozoa by Means of Hematoxylin Stained Smears. 35mm, sound, B&W, 8 minutes, 69 frames.
- 5-158.0 Municipal Sewage Treatment Plants, Part II - Chemical Precipitation Treatment Plant with Two-Stage Digestion. 35mm, sound, B&W, 7 minutes, 63 frames.
- 5-159.0 Municipal Sewage Treatment Plants, Part III - Trickling Filter Plants, 35mm, sound, B&W, 9 minutes, 94 frames.
- 5-160.0 Municipal Sewage Treatment Plants, Part IV - Activated Sludge and Vacuum Filtration Plant with Vacuum Filtration and Incineration, 35mm, sound, B&W, 8 minutes, 75 frames.
- 5-163.0 Laboratory Diagnosis of Diphtheria - The *in vitro* Test for Virulence of *C. diphtheriae*. 35mm, sound, color, 7 minutes, 53 frames.
- 5-164.0 Diagnosis of Enterobiasis. 35mm, silent, B&W, 40 frames.
- 5-168.0 Insanitary Premises. 35mm, silent, B&W, 100 frames.
- F13a Histopathology of Human Fungus Infections, Part I - Superficial Infections. 35mm, silent, color, 15 frames.
- F13b Histopathology of Human Fungus Infections, Part II - Cutaneous Infections. 35mm, silent, color, 16 frames.
- F13c Histopathology of Human Fungus Infections, Part III - Subcutaneous Infections. 35mm, silent, color, 17 frames.

2x2-Inch Slide Series

- 9-035.0 Ten-Eighty, A Rat Poison for Professional Use. B&W, 73 slides.
- 9-037.0 Q (Query) Fever. Color, 75 slides.
- 9-039.0 Quantitative Measurements in Radiological Health. B&W, 9 slides.
- S3 CDC Activities. Color, 74 slides.

CREeping ERUPTION

CAUSED BY DOG HOOKWORM

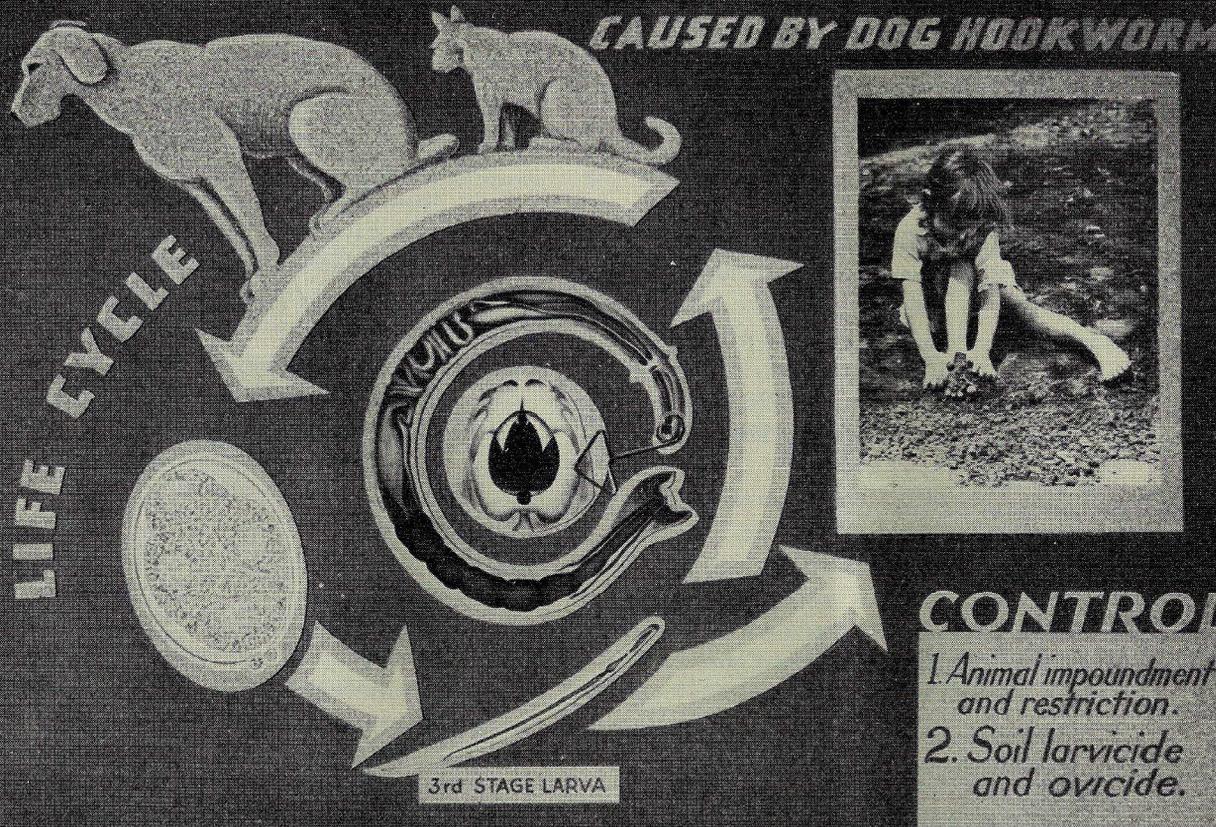


Figure 1. Above and at right are shown exhibits on creeping eruption prepared for display at the American Veterinary Medical Convention, August 1950.

OTHER PRODUCTIONS COMPLETED AND RELEASED DURING QUARTER

Utilization Guides

- G 4-089.4 The Laboratory Diagnosis of Tuberculosis, Part IV - Typing of Tubercle Bacilli by Animal Inoculation.
- G 5-124.0 Ten-Eighty, a Rat Poison for Professional Use.

Exhibits

- 6-013.0 Creeping Eruption. Three panels, masonite background, cork cut-outs, photographs, overall dimensions 4 feet high, 12 feet wide (figure 1). The exhibit was prepared for showing at the American Veterinary Medical Convention in Miami, Fla., August 20-25, 1950.)

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

Motion Pictures

- 4-088.0 Laboratory Diagnosis of Diphtheria, Isolation

of Pure Cultures

- 4-088.2 Laboratory Diagnosis of Diphtheria, Determination of Type

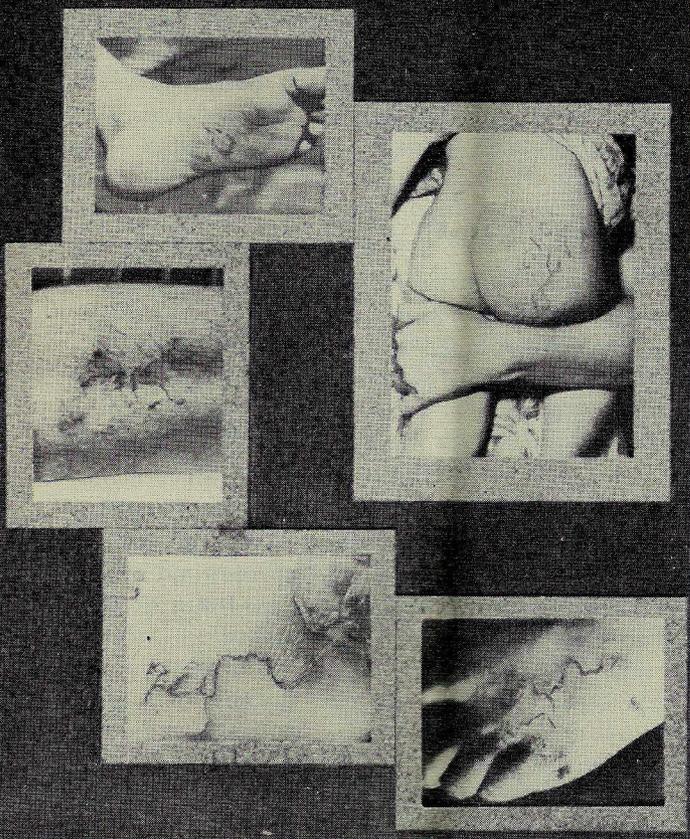
Filmstrips

- F 13d Human Fungus Infections, Part IV Systemic Infections

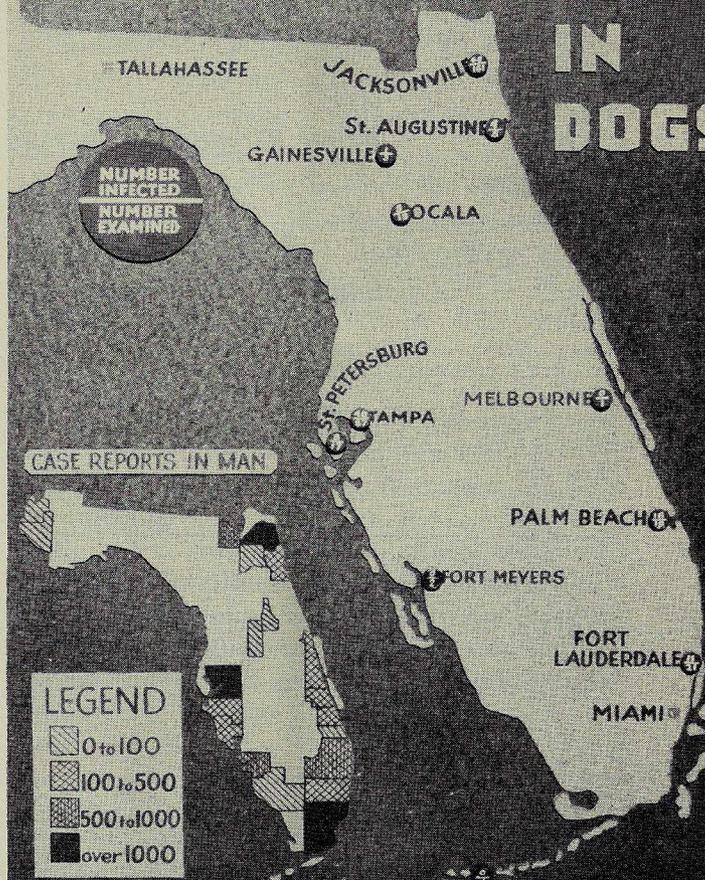
NEW TECHNIQUE FOR COLOR TRANSPARENCIES

A new technique put into practice during the quarter was the masking of 2x2-inch color transparencies, to improve the quality in the reproductions. This masking procedure is a method of evening-up tones in color. It is accomplished by making a black-and-white mask which will register with the color transparency. Prior to this quarter, no masking was done on 2x2-inch transparencies. The only masking done previously was on the larger size, and was performed by a commercial contractor. The new technique provides a better master transparency from which improved quality release prints are possible.

TYPICAL LESIONS



ANCYLOSTOMA BRAZILIENSE IN DOGS



ROLLER MECHANISM

In the motion picture processing laboratory, a roller mechanism to hold film loops of any length from 6 to 60 feet was constructed for use on the 35mm printer. Tests were made and a method was perfected to get good results in enlargement of 16mm Kodachrome to 35mm black-and-white dupe negative, through the achievement of considerable increase in exposure.

UTILIZATION

In the utilization program, the number of loans made by the film library is shown by the following table:

Month	CDC Filmstrips	CDC Motion Pictures	Outside Source Motion Pictures	Totals
April	346	291	70	707
May	263	186	66	515
June	215	194	66	475
Totals	824	671	202	1,697

The total distribution, amounting to 1,697 films for the quarter, represents increases of 21, 73, and 200 percent, respectively, over the preceding third, second, and first quarters of fiscal year 1950.

Revised loan and sales regulations governing CDC audio-visual training aids were prepared for inclusion in the forthcoming CDC catalog of motion pictures and filmstrips for professional use.

Production, utilization, and evaluation data were analyzed, and the results were expressed in a series of 16 charts, from which color slides were made to illustrate talks on the Services' activities. Other charts were prepared to rank all CDC films

according to number of times used during the quarter and to show audience and field evaluations. Following is a table showing field evaluations in the various rating categories, together with utilization data:

Category	Motion Pictures	Filmstrips
Excellent	56.0%	55.5%
Good	38.0%	34.8%
Total "good" or better	94.0%	90.3%
Fair	5.5%	8.1%
Poor	0.5%	1.6%
Average showings per short loan	1.6	1.8
Average audience per showing	35	45

To determine the effect of utilization materials on field evaluation, data were analyzed for a group of films which had been used both with and without utilization materials. The field evaluations for

films released from 1944 through 1948 averaged "good-excellent" during the period when little utilization material was available (to 1949). During 1950, when utilization material was available, the field evaluation ratings averaged 14 percent above "good-excellent" (toward "excellent") for the motion pictures and 8 percent for filmstrips of the same group of films, although all of them were two years nearer obsolescence.

TRAINING COURSES GIVEN

In the utilization program, two short audio-visual training courses were given during the quarter; one on April 14 for laboratory technicians and the other on June 15 for 18 doctors who are to be stationed at various points in the Public Health Service. By request of the Department of State and other Washington offices, short audio-visual orientation courses were given to one or more public health personnel from each of the following countries or territories: Austria, Ceylon, Norway, Japan, Philippines, Puerto Rico, Turkey, and Uruguay.

Engineering Services

Sanitary Engineer Director Frank Tetzlaff was transferred on May 1, 1950, to Region II, New York, as Regional Engineer. Mr. Tetzlaff was replaced as Chief of the Engineering Services by Senior Sanitary Engineer Chris A. Hansen, formerly assistant to the Executive Officer of CDC. Succeeding Mr. Hansen in the Executive Office was Mr. Howard W. Spence. Mr. Spence came to CDC from the University of Minnesota, where he worked on his Master of Public Health degree. Previously, he had worked with the Public Health Service in various capacities.

Boy Scout Jamboree. Arrangements were made during the quarter for the Region II CDC Representative to conduct insect control activities for the International Boy Scout Jamboree which was held at Valley Forge, Pa., in late June and early

July. Spraying equipment, both hand and power, and insecticides were requisitioned and shipped to Region II for use at the Jamboree.

Career Planning Program. J. A. Sanitary Engineer Walter L. Dunn was transferred on June 15 from the Division of Water Pollution Control, Washington, D. C., for detail to CDC Activities. Mr. Dunn has been assigned to the Fly Control Section, Engineering Services, where he will participate in fly control activities.

Employees Handbook. A handbook for use by employees of the Engineering Services was issued during the quarter. Its purpose is to promote uniformity in practices and procedures in the Services and to provide a source of basic information relative to questions on procedures, for both supervisory and other personnel. Periodical revi-

sions of the handbook are contemplated so that current procedures and practices always will be at hand in an easy reference form.

MALARIA CONTROL ACTIVITIES

Program Plans. In connection with program revisions, visits were made during the quarter to most of the States to assist in the formulation of immediate and long-range malaria control plans. This planning involved (1) the reduction of CDC personnel before the end of the fiscal year, (2) reclassification downward of certain positions in line with reduced responsibilities, and (3) the release of surplus equipment in accordance with reduced program requirements.

In view of the reduced operations contemplated for fiscal year 1951, the States were urged to improve malaria case reporting so that "pin point" control activities may be carried out when confirmed malaria cases are found.

Program Accomplishments. DDT residual spray operations for the 1950 season were continuing in all 13 States during the quarter and will be completed in the near future. Because of inclement weather the beginning of seasonal spraying operations was delayed for 2 to 3 weeks in most States. A late beginning, together with a considerable increase in premises spraying activities, prevented all except one State from completing seasonal operations by June 30, and partially accounted for a decrease of 26 percent in house spray applications for the period January 1 to June 30, 1950, as compared with the same period of 1949. From July 1, 1949, through June 30, 1950, there were

842,509 DDT house spray applications made as compared with 1,055,503 in fiscal year 1949, a decrease of 20 percent. Table 1 summarizes residual spray operations for the quarter and includes a cumulative total by States of residual house spray applications during fiscal year 1950.

Experimental Chlordan Projects. These projects were in operation in Alabama, Arkansas, and Mississippi during the quarter, and evaluation of the effectiveness of the chlordan treatment for fly control has been initiated. Reports covering these projects will be released at a later date. In addition, six States used chlordan on restricted portions of premises in conjunction with regular operations.

Time-Motion Study. During the quarter, a motion and time study was conducted in a South Carolina county by Headquarters Malaria Control personnel in cooperation with State program personnel. Objectives of the study were to determine the comparative efficiencies of (1) one- versus two-man spray crews, using conventional hand spraying equipment, and (2) various types of hand and power spraying equipment. In addition, State program personnel in Arkansas and Florida conducted time-motion studies during the quarter. The results of these studies will be released prior to the beginning of 1951 seasonal spraying operations.

TYPHUS AND RODENT CONTROL ACTIVITIES

Typhus Control. The number of reported cases for the first 3 months of calendar year 1950 was 136 as compared to 182 for the same period in

Table 1
SUMMARY OF DDT RESIDUAL SPRAY OPERATIONS
April 1 to June 30, 1950

State	No. Counties	No. House Spray Applic.	Lb. DDT Used	Lb. Chlordan Used**	Operation Man-hours				Lb. DDT Per Applic.	Man-hours Per Applic.	Man-hours Per Lb. DDT	Total Applic. FY 1950
					CDC	Local	Percent Local	Total				
Alabama	26	60,930	62,034*	2,507	49,486	21,813	30.6	71,299	1.02	1.17	1.15	77,931
Arkansas	37	49,312	61,250	10,288	9,672	57,950	85.7	67,622	1.24	1.37	1.10	65,220
Florida	18	20,789	27,205	0	-	21,372	100.0	21,372	1.31	1.03	0.79	40,344
Georgia	21	49,899	40,137	4,496	9,017	32,162	78.1	41,179	0.80	0.83	1.03	109,227
Kentucky	10	4,120	4,971	1,790	3,904	7,008	64.2	10,912	1.21	2.65	2.20	5,984
Louisiana	15	37,725	48,360	0	6,100	38,206	86.2	44,306	1.28	1.17	0.92	38,584
Mississippi	21	89,795	115,252	5,366	5,875	83,427	93.4	89,302	1.28	0.99	0.77	109,233
Missouri	8	15,654	18,470	0	12,812	21,307	62.4	34,119	1.18	2.18	1.85	24,029
North Carolina	21	25,081	23,138	345	2,332	22,890	90.8	25,222	0.92	1.01	1.09	53,664
Oklahoma	12	22,304	22,345	0	2,680	18,137	87.1	20,817	1.00	0.93	0.93	34,334
South Carolina	46	102,409	112,057	337	1,560	105,839	98.5	107,399	1.09	1.05	0.96	171,716
Tennessee	3	17,825	20,288	5,397	1,700	20,534	92.4	22,234	1.14	1.25	1.10	26,888
Texas	26	39,313	35,979	0	15,510	38,311	71.2	53,821	0.92	1.37	1.50	85,355
Totals	264	535,156	591,486	30,526	120,648	488,956	80.2	609,604	1.11	1.14	1.03	842,509

*Excluding 17,683 pounds of rosin-based DDT.

**Including experimental projects.

1949, a favorable reduction of 46 cases for the current period.

Typhus and Rodent Control Memoranda, Rodent-Borne Disease News No. 1, "Recent Court Decisions Concerning Responsibility for Rat Control," and Poisons and Eradication No. 11, "Compound 1080," were released and distributed to the field personnel.

Table 2 summarizes typhus and rodent control operations for the quarter (see pages 12 and 13).

Premises dusted totaled 129,472, with 50,822 man-hours or an average of 0.4 man-hours per premises. During the same quarter for fiscal year 1949, 150,705 premises were dusted, with an average of 0.4 man-hours. The total premises dusted for fiscal year 1950 was 321,023, with an average of 0.4 man-hours per premises, compared to 381,755 premises dusted for fiscal year 1949, with an average of 0.5 man-hours for each premises.

During the quarter 1,182 premises were ratproofed in the 11 typhus States, with 45,748 man-hours or an average of 39 man-hours per premises. This makes a total of 6,153 premises ratproofed with 175,063 man-hours, or an average of 28.5 man-hours per premises for the 1950 fiscal year. In fiscal year 1949, the average was 42 man-hours per premises for ratproofing, 4,548 premises using 190,516 man-hours.

The man-hours spent on "Sanitation Activities" continued to increase during the fourth quarter. A total of 6,835 man-hours was spent on anti-rat sanitation during this period. A total of 85,262 man-hours was spent on anti-rat sanitation in fiscal year 1950, compared to 31,877 for fiscal year 1949.

The total CDC and local man-hours for the fiscal year 1950 in the typhus States were 719,215. The local services contributed 64 percent of the total man-hours.

Rodent Control. Rodent Control in northern and western cities was continued as a cooperative program with State and local health departments. Rodent control specialists are assigned to State health departments. The State furnishes office space, clerical help, travel, and, in most States, means of conveyance. Surveys are made of cities to determine the rodent infestation and the program necessary to cope with the problem. These programs vary from ratproofing in conjunction with anti-rat sanitation to just anti-rat sanitation with occasional supplementary poisoning.

Thirteen States are cooperating in the rodent-control-in-cities program with the hope of accom-

plishing the objectives necessary in the control of rat- and mouse-borne diseases. As a result of the many accomplishments through these programs, other States and cities are requesting that local sanitarians be trained in detecting rat infestation and survey work, and to initiate rodent control problems. Basic sanitation problems are corrected through the rodent control program which makes it a very popular program.

During the fourth quarter, 582 premises were ratproofed on five projects. This makes a total of 2,367 premises from 11 projects reported ratproofed for the 1950 fiscal year.

Tabulations of man-hours spent on rodent control in cities during the fourth quarter showed a total of 69,039, of which 58,033, or 84 percent, were local man-hours (see table 2). This makes a total of 236,457 man-hours for fiscal year 1950, of which 188,123, or 80 percent, were local.

FLY CONTROL ACTIVITIES

Polio-Fly Control Projects. Spraying operations began early in April at the Phoenix, Ariz., project. All the high potential areas selected from last year's data were given a residual treatment with dieldrin at the rate of 25 milligrams per square foot. Premises-wide and garbage-station spraying comprised the major portion of the spray activities, with a small amount of space spraying with DDT at some dump areas. The early fly breeding and emergence at Phoenix began the upgrade of the spring fly peak early in April, and continued throughout the remainder of the quarter.

Early activities of all other projects were confined to preparation for the approaching operational season. Seasonal personnel were hired and trained in field techniques. High potential areas were mapped from the preceding season's data for guidance of spraying operations and inspection. Maps of collection routes, schedules of collection, and other pertinent data relating to garbage collection systems of the project cities were compiled in order to devise orderly schedules of garbage-station spraying. Budget requirements of the project cities were prepared and submitted to municipal authorities. Almost without exception, the local authorities agreed to participate financially in the activities.

Full-scale fly trapping was delayed at most of the projects until late April by inclement weather. However, sewage sampling was started on the summer schedules early in the quarter.



Establishing a sanitary land fill for economic and efficient disposal of garbage and refuse.

In May, spraying activities were begun in Troy, N. Y.; Topeka, Kans.; Muskegon, Mich.; and Charleston, W. Va. The single applications of dieldrin in Troy and chlordan in Muskegon were completed during the last part of June. No further spray operations will be carried out at these cities, except for occasional space spraying of dump areas. Entomological evaluation will be continued through September, at which time CDC participation in these cities will be withdrawn. Special tests are being conducted in Charleston to compare the effectiveness of residual applications of rosin-based dieldrin with that having a non-rosin base.

In Phoenix, although dieldrin residuals were effective in sections of the city where this chemical was not sprayed last season, in those areas that were sprayed with the chemical during the tests conducted last year, an apparent resistance to dieldrin by fly populations is evident. Fly eggs collected in these sprayed areas were shipped to the University of California for testing of the flies hatched from these collections for dieldrin resistance, and reports indicate that such flies have a marked resistance to the chemical. Additional

tests are under way at Savannah and the Julius Hyman laboratories to determine the extent and validity of the reported resistance.

At the request of Technical Development Services, examinations of selected crew personnel on two projects are being made at Marine Hospitals to determine the toxicity, if any, of dieldrin to personnel spraying the chemical. The examinations will be continued throughout the spraying season.

Land Fill Operations. The land fill operation in Charleston, W. Va., is progressing in a satisfactory manner. City and county officials, after less than a year of operation, have purchased heavy equipment to expand operations, indicating their approval of this method of garbage disposal.

St. Albans, the check city for Charleston, is proceeding with plans for the establishment of a land fill.

As a result of evidence presented by CDC of the desirability of a properly operated sanitary land fill as an economical and efficient method of garbage and refuse disposal, the city of Phoenix has tentatively allocated funds for the develop-

Table 2(a)

TYPHUS CONTROL
March 19 to June 24, 1950 (From May-

STATE	GARBAGE AND REFUSE						SUPERVISION				RAT REDUC-TION TRAP		LAY INVESTI-GATIONS	ECTOPARASITE CONTROL						EVALU-ACTIV- U. S. P. H. S. M. H. L&LF*				
	Sanitary Land Fill		Disp. Areas		Storage and Collection		P. H. S. Man-hours				Est.	Man-hours	Man-hours	Residual Dusting			DDT Spray							
	No. Insp.	M. H.	No. Insp.	M. H.	No. Investi-gated	M. H.	State Super. & Adm.	Regional Super. & Entom.	Ware-house & Shop	Other Man-hours				Cos. Rep.	Premises Dusted	Lb. DDT & Lb./ Prem.	M. H. & Prem. L&LF*	Premises Treated	Gal. & Prem.		M. H. & Prem. L&LF*			
Alabama							700	168	0	560				7	38,675	160,027	11,840							736
Arkansas							560	0	0	0				0	0	0	0							0
Florida							1,006	244	392	2,493		438		15	22,438	110,662	11,820							252
Georgia							5,504	2,577	0	980			227	24	18,190	61,599	8,927							1,288
Louisiana							800	0	746	1,120				1	9,174	26,804	2,428							234
Mississippi							980	760	560	524				10	7,159	7,820	3,033							1,402
North Carolina							560	0	0	722				6	21,239	33,103	4,109							753
South Carolina							1,456	560	588	0				2	225	760	355							0
Tennessee	52	1,248			52	1,248	0	0	0	0				1	450	1,650	128							202
Texas							4,080	2,220	1,520	560				12	11,718	33,281	8,025							642
Virginia							1,965	0	0	0														192
Total	52	1,248			52	1,248	17,611	6,529	3,806	6,959		438		78	129,268	435,706	50,665							5,701

Table 2(b)

STATE	GARBAGE AND REFUSE						SUPERVISION				RAT REDUC-TION TRAP		LAY INVESTI-GATIONS	ECTOPARASITE CONTROL						EVALU-ACTIV- U. S. P. H. S. M. H. L&LF*					
	Sanitary Land Fill		Disp. Areas		Storage and Collection		P. H. S. Man-hours				Est.	Man-hours	Man-hours	Residual Dusting			DDT Spray								
	No. Insp.	M. H.	No. Insp.	M. H.	No. Investi-gated	M. H.	State Super. & Adm.	Regional Super. & Entom.	Ware-house & Shop	Other Man-hours				Cos. Rep.	Premises Dusted	Lb. DDT & Lb./ Prem.	M. H. & Prem. L&LF*	Premises Treated	Gal. & Prem.		M. H. & Prem. L&LF*				
California							0	0	0	0															
Colorado							24	0	0	0															
District of Columbia							560	0	0	0															
Hawaii							0	0	0	0				2	204	262	157			731	964	808			1,039
Idaho							0	0	0	0															
Illinois							347	0	0	113															39
Kentucky							0	0	0	0															
Midwest							192	0	0	286															640
New Jersey							0	0	0	0															
New Mexico							0	0	0	0															
Ohio							128	0	0	280															
Washington							0	0	0	0															
Utah							215	0	0	172															
Wyoming							0	0	0	0															
Oklahoma							0	0	0	0															548
Oregon							560	0	0	150															
Minnesota							480	0	0	188															
Montana							0	0	0	0															
Total							2,507	0	0	1,189				2	204	262	157			731	964	808			2,266
GRAND TOTAL	52	1,248			52	1,248	20,118	6,529	3,806	8,148		438		80	129,472	435,968	50,822			731	964	808			7,967

*Labor and labor foreman.
**Alabama uses arsenic water.
***Not included in average (area or dump poisoning).

ment of a land fill during the coming fiscal year. CDC personnel will provide technical assistance in the initiation and operation of the fill.

Educational Activities. Educational phases of the fly control program were continued throughout the quarter at all projects. The dominant theme has been good sanitation, i.e., adequate garbage storage, collection, and disposal, and proper maintenance of animal shelters. The press and radio have been utilized regularly, and the cooperation of educational leaders and civic organizations in educational programs and clean-up campaigns has been obtained.

Dysentery-Diarrhea Fly Control Projects. Active operation of the CDC dysentery-diarrhea fly control program was begun during the quarter in three States, Arizona, Texas, and New Mexico, and arrangements were made to begin this program in Kentucky early in fiscal year 1951. Positions were established for supervisory personnel at the State and project levels, and problem areas where control measures will be undertaken were tentatively selected. Two projects were initiated in Texas in May, one at Seguin and the other, which includes two small cities, at Sinton and Taft. In June, the project at Yuma, Ariz., began operation, while another, comprising Coolidge and Casa Grande, was scheduled for initiation in early July. Only one project area has thus far been definitely selected in New Mexico—the city of Carlsbad—and operations were not expected to begin in this city until July. Two other New Mexico cities are desirous of participating in the program. No definite project has, as yet, been selected in Kentucky, although preliminary planning for the program is under way.

IMPOUNDED WATER STUDIES

Reconnaissance malaria-control survey reports for the Canyon Reservoir and Victoria Navigation project in Texas and the Joanna Reservoir in Missouri were completed and forwarded to the Corps of Engineers during this quarter.

Assistance was rendered the Oklahoma State Health Department in the preparation of a draft of a proposed law governing the impoundment of water in that State. Conferences were held with officials of the Georgia, South Carolina, and Tennessee State Health Departments regarding suggested modifications of existing laws or regulations governing the impounding of water in these States.

A visit was made to the Midwestern CDC Services office to discuss public health problems arising from water impoundments or irrigation projects in that area, with emphasis on the encephalitis hazard associated with the above-mentioned type of projects in the Midwestern and Western States. Following the conference, field investigations were conducted on several Bureau of Reclamation and Corps of Engineers artificial lakes and irrigation districts located in Colorado, Kansas, and Nebraska.

SPECIAL SERVICES

Disaster Aid. Truck-mounted Water Purification Units No. 3 and No. 4 were placed in operation at the Atlanta Water Works Reservoir during the early part of the quarter to insure a good operating condition. It was necessary to operate the units several times before pumping defects in both of them were satisfactorily analyzed and complete overhauling of both was accomplished.

Spare parts necessary to complete these units were received during the quarter, and there was prepared a tabulation which showed the spare parts on each unit.

Water Purification Unit No. 3 was transferred to the Western CDC Laboratory at San Francisco, Calif. In addition, the following supplementary equipment also was transferred:

- 1 – 1/4-ton trailer for the water purification unit
- 1 – 3/4-ton power wagon
- 1 – 3,000-gallon glass-fabric tank
- 4 – 1,000-gallon glass-fabric tanks

One 1,000-gallon and one 3,000-gallon glass-fabric tanks (part of the West Coast quota) were shipped to the State Health Officer of Oregon in accordance with his request which had been approved by Regional Office X of Public Health Service.

In carrying out the decision made last quarter to distribute all disaster-aid equipment equally among the field stations to which the truck-mounted water purification units had or would be sent, one 1/4-ton trailer and five 1,000-gallon glass-fabric tanks were shipped to Kansas City, Mo.

The Consultant of Special Services accompanied the Chief of the Epidemiologic Services to Winnipeg, Canada, to observe environmental sanitation plans and procedures in connection with the April-May flood of the Red River. This assignment stemmed from an invitation from the Civil Defense

Liaison Officer, of the Office of the Secretary of Defense, to the Public Health Service, to have a medical officer and an engineer officer accompany him on a mission to Manitoba to observe the relief work and other aspects of the flood.

The manuscript of the Water Supply Section of the Disaster Aid Manual was completed and reviewed by several persons in Engineering Services. It will be reproduced for limited distribution in the near future.

Entomologic Services

MANUAL OF OPERATIONS

The Entomology section of the manual was made current by the issue of one new item, No. 18, and revisions of Entomology Nos. 12 and 17. These revisions were made necessary by the changing scope of the mosquito and fly control activities in certain States.

Entomology No. 12 details procedures for determining the effectiveness in operational areas (1) of DDT and/or other residual insecticides as applied on the Residual Spray Program for keeping houses free of malaria vectors and flies, and (2) of anti-larval measures in reducing anopheline densities. The changes for 1950 call for increasing the percentage of sprayed houses inspected but eliminating the inspection of unsprayed natural resting places. Fly inspection procedures call for the recording of certain additional information regarding fly densities.

Entomology No. 17 (Rev.) outlines specific recommendations for investigating and determining the reasons for unsatisfactory fly control. Changes and procedures incorporated in this revision include the provision for recording the 24-hour mortality rather than knock-down for all tests involving the use of the field fly-testing kit. Also, standard panels are to be prepared in each State rather than by the Technical Development Services. State CDC Entomologists are requested to carry out as many tests with the fly-testing kit as possible during 1950 whether or not complaints of unusual fly abundance are received.

Entomology No. 18 is concerned with entomological procedures for evaluating community fly control programs, which include (1) measurement of fly densities to provide data for guiding control

operations and for measuring the effectiveness of such operations, and (2) for determining the species composition of the fly population so that seasonal trends in relative abundance of the several fly species will be established for epidemiological and entomological analyses. The procedures outlined were developed as a result of conferences among the several CDC Services interested in fly control programs.

MALARIA INVESTIGATIONS

Malaria Morbidity Observations. Routine visits to residents of selected areas were continued. Blood films were collected from all persons, or an evaluation was made of symptoms attributed to malaria; no cases were diagnosed clinically as malaria, nor were any positive blood films obtained.

Measurements of "Anopheles" Density. Unusual weather conditions greatly reduced populations of *Anopheles* mosquitoes in the South Carolina and Georgia areas. The drought in South Georgia is unprecedented in the climatological records. Continued deficient rainfall has been accompanied by progressive reduction of surface water areas in western Baker and eastern Early Counties, so that temporary and semipermanent bodies of water, for the most part, have remained dry during the quarter; even those bodies of water usually considered the most permanent have receded to foul residual pools which support very little mosquito life. Accordingly, the collections and counts of mosquitoes reflect an all-time low, there being far fewer *Anopheles* in the area than in any previous spring and early summer for the past 8 years. Barns and rural residences are virtually free of adult *Anopheles* at a season when these mosquitoes normally are

abundant at such stations. Conditions at the South Carolina station also are extreme. The number of adult *Anopheles* available has been insufficient for routine dissections and for host preference determination.

Studies on Malaria Parasites. At the South Carolina laboratory particular attention has been given to work on identifying sporozoites found in *Anopheles crucians*. More than 1,600 blood films have been taken from domestic animals, and 130 from wild animals. So far, no malaria parasites have been found, but other blood parasites, including microfilaria and trypanosomes, have been observed. Efforts are being made to infect mosquitoes with some of these forms.

At both the South Carolina and Georgia laboratories, attention is being given to testing the susceptibility of local *Anopheles* to different malarias of lower animals. Most of the work has been done with bird malaria parasites. At the Georgia station, a field investigation of the natural seasonal incidence of a lizard malaria parasite was completed. The vector of the *Plasmodium* was not discovered, but there is no indication that sporozoites in *crucians* are related to the lizard parasite.

Studies on "Anopheles" Biology. Colonies of four species of mosquitoes are maintained to provide adults for use in avian and saurian malaria transmission studies; these include *Anopheles quadrimaculatus*, *Aedes aegypti*, *Culex quinquefasciatus*, and *Aedes triseriatus*. At the Georgia laboratory, observations were made on the fertility and mating habits of a domesticated strain of *quadrimaculatus*, and field observations were made on the chemical characteristics of natural ponds in which mosquitoes breed.

Efforts to colonize additional mosquito species were continued, and some promise is in sight in the case of *Anopheles perplexens*. Small numbers of reared adults were obtained of *A. crucians*, *A. punctipennis*, and local wild *A. quadrimaculatus*, and these were used in the malaria infectivity and transmission studies.

Standards of Technique for Studies of Larval Development. The most uniform results thus far achieved in rearing *quadrimaculatus* larvae at 85° F. in a water bath with control temperature, resulted from rearing lots of 25, 40, and 50 larvae in bowls of water taken from a nearby creek. In the screening experiment, the creek water was replaced by fresh creek water every few days; it was evident

from this experiment that crowding was a measurable factor in reducing time of development, as the larvae developed faster with only 25 to the bowl, than with 40 or 50 to the bowl.

At the Arkansas laboratory, more than 10,000 *C. quinquefasciatus* pupae were reared on a controlled production basis, and these supplied the mosquitoes necessary for transmission studies, particularly with birds.

Filarial larvae have been noticed rather frequently in the wild-caught anopheline dissections, and some attention has been devoted to them in South Carolina in order to explore the somewhat remote possibility that finding the vertebrate host or hosts of the filaria would aid in the eventual identification of the unknown sporozoites in the wild-caught anophelines. Table 1 summarizes the results obtained during the quarter, and indicates the frequency with which various blood parasites were encountered in the more common domestic animals.

ECTOPARASITE CONTROL

Murine Typhus Activities. Typhus control evaluation work during the quarter was diverted from the customary analysis of the results from the previous quarter, to the compilation and analysis of the over-all results, from the beginning of DDT dusting activities in the fall of 1945, through 1949. Data from 10 percent DDT dusting projects relating to the effectiveness of control, duration of control, and seasonal abundance of each of the three species of nonsticktight fleas, *Xenopsylla cheopis*, *Leptopsylla segnis*, and *Nosopsyllus fasciatus*, have been summarized. This information is based on results of the examination of nearly 60,000 rats, of which 55,775 were taken during the 4-year period, January 1946 through December 1949; 49 percent of these rats were from undusted premises, 41 percent from premises dusted within 6 months, 7½ percent from premises dusted from 6 months to 1 year previously, and 2½ percent from premises dusted more than 1 year previously. The geographical area covered is that south and east of a line running from Richmond, Va., to north-central Texas. Data were contributed by each of the 11 States in this area.

The oriental rat flea, *X. cheopis*, is by far the most numerous species of nonsticktight flea occurring on rats in this area. Of a total of 101,200 fleas of the three species taken in connection with 10 percent DDT dusting projects, 1945 through 1949, 78 percent were *X. cheopis*,

Table 1

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

Animals	No. animals sampled this quarter	Total animals sampled to date	Microscopic examinations this quarter	Cumulative examinations	Micro-filaria	Trypanosome	Leucocytozoon	Negative
Mammalian								
Equine	0	300	42	300	4 ^a			296
Bovine	0	400	58	400	8 ^b	3 ^c		389
Canine	0	400	50	150	49 ^d			101
Porcine	80	106	50	50				50
Avian								
Chicken	392	392	98	98			12	86
Duck	13	13						
Goose	7	7						
Guinea	2	2						
Turkey	10	10	2	2			2 ^e	
Total	504	1,630	300	1,000	61	3	14	922

^a*Setaria equina* (?)^d*Dirofilaria immitis*^b*Setaria cervi* (?)^e*Leucocytozoon smithi*^c*Trypanosoma theileri*

16 percent were *L. seignis*, and 6 percent were *N. fasciatus*.

A study of the results obtained in controlling *X. cheopis* showed that satisfactory reduction (to an average of 1.0 flea or less per rat examined and an infestation of 20 percent or less) was maintained for at least 4 months at all seasons of the year; for 6 months during all periods except that ending in July; and for 1 year except for those periods ending in June, July, and August. A smaller percentage of *L. seignis* reduction was obtained, which, however, resulted in very satisfactory control for at least 1 year. This was true irrespective of the month in which each yearly period ended.

Surveys to determine natural ectoparasite infestation of, and typhus infection in, rats have been made in cities in several States and territories in areas other than the 11-State area described above at various times during the past 4 years; for the most part, these were surveys only and did not include chemical control measures. Some surveys of this type also were made within the general limits of this area. These surveys show the current rate of typhus infection in rats and, by showing the ectoparasite infestation, indicate the potential danger of typhus transmission to man. Significantly

high percentages of typhus infection in rats and/or high rates of infestation by *X. cheopis* were found in Hawaii; Puerto Rico; Bowling Green, Ky.; Kansas City and St. Louis, Mo.; Wichita, Kans.; and Cheyenne, Wyo. No significant correlation between typhus infection in the rats and the abundance of either *X. cheopis* or *N. fasciatus* could be established from the relatively small amount of data available.

Tick - Tularemia Activities. Investigations by the epidemiologist of the State Health Department of Arkansas, extending over a period of more than 10 years, have indicated that in Arkansas, the majority of human cases of tularemia appears to be caused by tick bites (56 percent) rather than by contact with infected rabbits (31 percent), or other causes (13 percent). As a result of this evidence, a joint project between CDC and the Arkansas State Health Department was established in the early part of April 1950 to study this problem. Other agencies, including the State Game and Fish Commission, the State Livestock Board, and the Agricultural Extension Service, have agreed to cooperate. The aims are to determine (1) the importance of ticks in the transmission of tularemia, (2) the species of ticks involved and

the importance of each, and (3) the species of ticks found in Arkansas and the distribution, habitat, hosts, and seasonal abundance of each. No additional investigations on the mechanism of transmission nor on tick control are contemplated for this season.

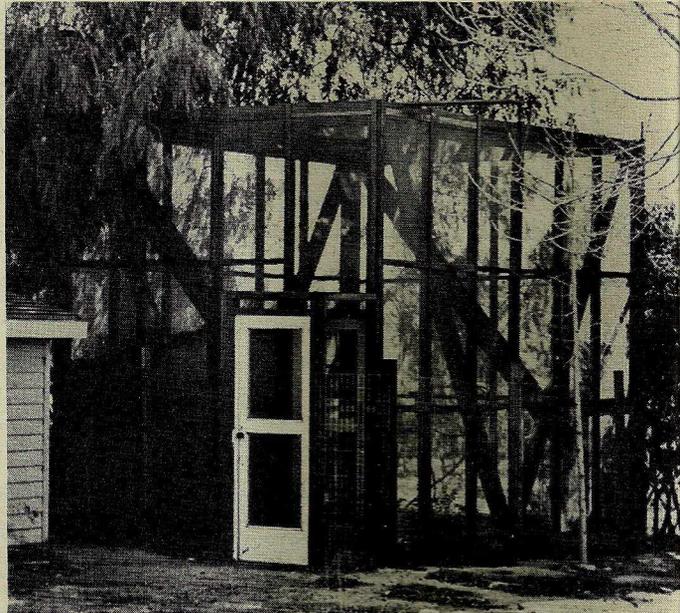
When the number of cases of tularemia in Arkansas in recent years is plotted by counties, a striking geographical or topographical distribution is shown. The great majority of cases occurs in the mountainous regions of northwestern and west-central Arkansas with very few originating in the Delta or flat country of the eastern and southeastern portions of the State. Cases associated with tick-bite are even more definitely delimited, whereas those associated with rabbit contact are generally distributed over the State.

Ticks are collected by several methods, including dragging a large piece of white flannel over tall grass and weeds and by examining rabbits and other small mammals. The collected ticks are identified, counted, and forwarded to the CDC Laboratory Services in Atlanta to be tested for tularemia. During the period April 11 through June 9, a total of 750 ticks was collected by dragging, with an average of 1.5 per drag period (100 steps). The great majority of the ticks collected proved to be adults and nymphs of the lone-star tick, *Amblyomma americanum* (94 percent), which was found in each of 19 counties. The American dog tick, *Dermacentor variabilis*, was found in 11 counties, but only 5 percent of the total number of ticks proved to be this species. The black-legged tick, *Ixodes scapularis*, was taken in four counties, but only five specimens were found up to June 9. All of the specimens of *D. variabilis* and *I. scapularis* were taken by dragging.

ENCEPHALITIS INVESTIGATIONS (In cooperation with Hooper Foundation, University of California)

During the quarter, emphasis was placed on completing attempts at isolation and identification of viruses from arthropods collected during the past summer season, and of neutralization tests on sera taken from various wild and domestic animals.

In order to conduct experiments on the rearing of mites and mosquitoes, as well as transmission of encephalitic viruses by these arthropods, one of the rooms at the Bakersfield Laboratory is being converted to a controlled temperature-humidity chamber.



Encephalitis studies, California. Insectary used in transmission studies.

Routine entomological surveys were started on June 1, and more than 9,000 specimens of five species of mosquitoes were collected for virus isolation purposes.

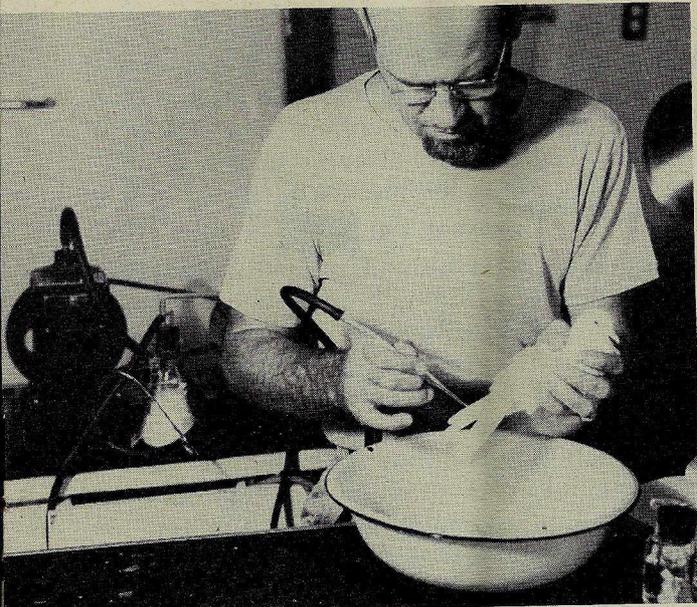
Nine cases of encephalomyelitis (not diagnosed as to type) in horses have been reported. The onset of the first case occurred on May 21. Five of these horses have died and one has been sacrificed. Portions of three brains have been frozen for later attempts at isolation of virus. No human cases of virus encephalitis have been reported to date.

Attempts again are being made to transmit the Western equine and St. Louis viruses from bird to bird in the colony hybrid doves by means of the mite *Liponyssus sylviarum*. Nearly 500 mites have been collected from bird nests and frozen for virus tests.

Two stable traps of the Magoon type have been constructed, and are being used for the routine collection of mosquitoes for virus test purposes, as well as for mosquito biology studies. Preliminary results with these traps using dry ice (CO₂) alone, indicate that larger mosquito catches are secured than when calves are used for bait. These interesting preliminary results will be explored further.

FLY-POLIO INVESTIGATIONS

Full-scale control operations were begun at the Phoenix, Ariz., project late in March; similar



Encephalitis studies, California. Collecting bird mites with an aspirator.

activities were initiated in the Troy, N. Y., Topeka, Kans., and Muskegon, Mich., areas during early May.

At Phoenix, tests were conducted to determine the efficiency of a single dieldrin residual in suppressing fly densities under optimum conditions of fly breeding. In experiments in the fall of 1949, dieldrin applications produced effective control for 8 to 9 weeks in low-class residential areas exhibiting extremely low sanitation levels. Because of a possible natural decline in the replenishment rate of the fly population, however, the significance of this sustained residual efficacy was open to question. In 1950, treatment at the rate of 25 milligrams per square foot* was accomplished in the same area utilized in the fall (1949) tests. Results from the key evaluative units (figure 1, page 20) indicate little control; densities steadily rose from 6 to 51 flies per grill count over a 9-week period, as compared to a level of three flies per grill count for an equal period in 1949. Other tests also have shown the dieldrin treatment to be less effective than in 1949. Explanation for this reversal in the control picture lies in the greater fly potential present during April and May and in the appearance of dieldrin resistance in the

fly population (primarily *Musca domestica*). This resistance, first evident from field observation, now has been proved definitely by laboratory tests. The rapid acquisition of dieldrin resistance by the fly population after a single residual treatment portends possible widespread usage of exterior space sprays as a more economical and effective means of chemical control, and it again emphasizes the need for greater reliance upon sanitation measures to obtain a substantial and long-lasting degree of fly abatement.

At Topeka, Kans., intensified efforts on improvement of premises sanitation, together with a single residual application of dieldrin, have reduced the fly population to minimum levels; average densities in all sections being within the range of 1.0 to 2.0 flies per grill count. Densities in the untreated town for the same period indicate the degree of control to be above that obtained during the 4th quarter of 1949.

Through a study of data from areas subjected to blanket surveillance in 1949, it has been shown that similar trends in the fly population occur in treated and untreated towns whether the analysis is based on data from all the blocks inspected or upon block data selected on basis of the 10-20-percent sampling technique of fixed and random block stations as is now being employed on Poliomyelitis Investigation-Fly Control Program. The smaller-sample size tends to produce higher average densities in both treated and untreated towns and more pronounced fluctuations in the weekly readings.

Three positions have been established, one each at the Arizona, West Virginia, and Kansas projects, for research entomologists to conduct biological investigations on the flies common in those areas and of possible significance in disease transmission.

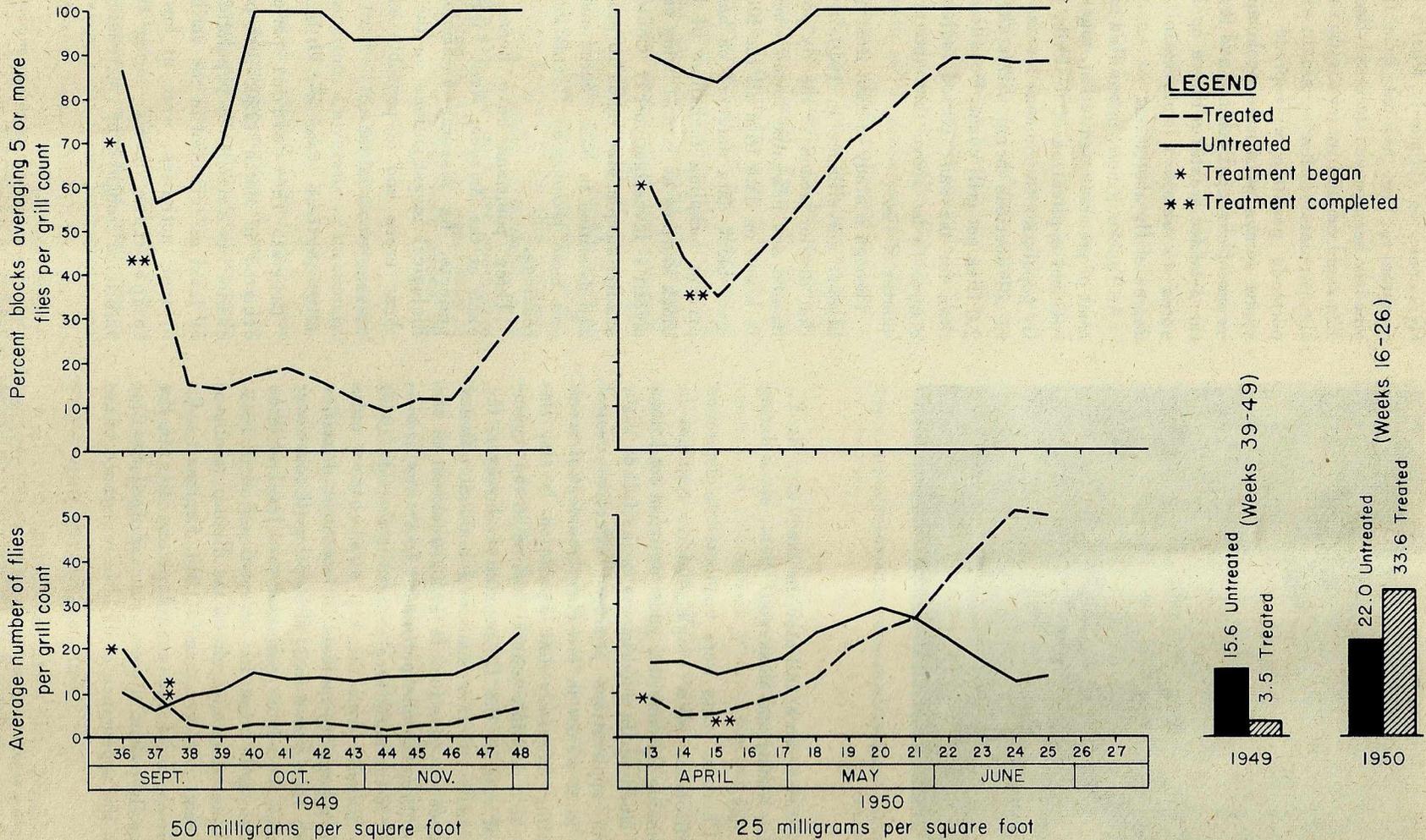
THOMASVILLE (GA.) STATION

General. The coldest period of the winter occurred in March 1950, just preceding the 4th quarter. As a result, fly populations in early April, at least as reflected in the various measurements of their activities, were at low ebb. Increasing temperature levels during this quarter were paralleled roughly by increasing fly abundance

*In 1949 a dosage of 50 milligrams per square foot was employed in this area, but other tests showed an application of 25 milligrams per square foot to be equally effective. Rosin also was omitted from the 1950 formulation.

Figure I

The effects of a single outdoor residual spray application of a 1.25 percent dieldrin-rosin-xylene emulsion (50 milligrams per square foot) in the fall, 1949- versus a similar application of 0.625 percent dieldrin-triton-xylene emulsion (25 milligrams per square foot) in the spring, 1950- upon the fly densities in Section F, unit r and t (22 blocks), Phoenix, Ariz., as compared to those in untreated Mesa (10 blocks). Based on 3-week moving average.



until mid-June. The subnormal rainfall of the preceding quarter developed into drought conditions in this quarter, and the general situation was very favorable to fly breeding. Because of the low rainfall, the residual deposits of insecticides applied in the field were probably of maximum effectiveness for the locality.

Dysentery Studies. Entomological studies were intensified during the quarter. Comparison studies were continued on the large grill (9 square feet) versus the small grill (4 square feet) and on grill counts versus estimates as used on the visual survey. Studies also were continued upon the effects of moisture as precipitation on the various life stages of the housefly *M. domestica*, and upon the relative proportions of known fly populations which can be grilled upon certain attractants.

Tests of the relative resistance of wild flies from all study areas to DDT, chlordan, and dieldrin residual deposits, as compared to that of colony flies from the laboratory, were begun during the quarter. These tests will be continued on a routine basis. The discontinuance of DDT became necessary as a result of its lack of effectiveness when used in ordinary amounts.

The development of handling methods for the new insecticides was the primary operational problem; under the method adopted, contact with spray materials is minimized at all points of operation. Although the man-hours per acre of application were increased by one-third to one-half in the initial application of the new insecticides (as compared to DDT hand-spray application rates in use just prior to the change in insecticides), the added effectiveness of the spray residual much more than compensated for the additional time of application.

The intensified garbage collection and disposal program carried on with the cooperation of the City of Thomasville progressed satisfactorily. The study has pointed out the need for sanitational improvements in the handling of both industrial wastes and animal excrement in order to curtail fly breeding.

Epidemiological evaluations were continued without interruption. Some 3,069 human swab cultures were processed, and enteric pathogens were isolated from 30. Two revisits per home were made throughout the study area for history-of-illness records, making 5,180 home visits in all. More than 6,300 individuals were included in these histories, 270 of these reporting an onset of diarrhea during

the period and 129 reporting conjunctivitis. Records of the latter were referred to the Conjunctivitis Studies staff.

Conjunctivitis Studies. Vectoring studies were expanded during the quarter. Routine trapping was performed weekly in all blocks of the nine communities where *Hemophilus conjunctivitis* is under study. Aside from the intrinsic limitations of trapping as a means of determining prevalence, the data thus obtained show apparent inconsistencies tentatively ascribed to variation in the bait. In one instance, however, an outbreak of conjunctivitis at the Thomas County Vocational School coincided very suggestively with a marked increase in the captures of eye gnats.

Study of the conditions necessary for the development of attractiveness in the liver bait has led to investigation of effective ways to test baits in the field, and to the construction of a turntable holding four traps for simultaneous comparison of different baits. The purpose of this apparatus is to minimize such factors as wind and the sources of the gnats. A study of the nocturnal resting places of gnats also has been started.

Bacteriological studies were continued in the schools until their closing, as well as in homes where symptomatic individuals were found, and in a comparable asymptomatic control group. As previously described (CDC Bulletin, June 1950), 918 individuals were cultured and 196 yielded positive eye cultures of *Hemophilus* organisms. Staff nurses made 218 revisits to homes. Some 731 cultures were identified in the laboratory.

Typhus Investigations. Entomological and serological studies of rodents were reinaugurated in the three Georgia study counties of Brooks, Thomas, and Grady in mid-June. These field studies will be continued until a full coverage of the area has been accomplished, so that comparisons with previous ectoparasite and rodent typhus rates can be made.

Two cases of typhus fever in April and two in May have occurred in Grady County. This brings the total for the first half of the calendar year to 10 cases with complement fixation tests greater than 1/4 in Grady County where no DDT dusting has been done, as compared to no cases in either Thomas County (last dusting cycle completed July 30, 1947) or Brooks County (last dusting cycle completed September 30, 1947). A 9-year-old boy in Grady County showed a positive complement

fixation test of 1/1024 for Rocky Mountain spotted fever, and an additional case in the same county

also has been tentatively so diagnosed, pending blood reports.

Laboratory Services

Program reviews of the laboratory facilities of State departments of health were completed in Iowa, Louisiana, Massachusetts, Nebraska, and Wisconsin during the quarter. In June the laboratories of Oregon and North Carolina were visited for review.

By special request a complete survey of the laboratory facilities of the Louisville-Jefferson County, Ky., Board of Health was made May 29 to June 2.

During this quarter decision was made to base officers and laboratories of the Clinical Pathology Section in the old Transportation Building adjacent to Grady Hospital in downtown Atlanta, Ga. In this location the Section, in addition to its investigative activities and scheduled training activities, will give direction to the Grady Hospital Diagnostic Laboratory in order to screen and develop clinical materials essential to the developmental research program in clinical pathology.

TRAINING

Courses presented during the quarter are indicated in table 1.

FIELD TRAINING COURSES

Dr. M. M. Brooke participated in a refresher course, "Diagnosis of Intestinal Parasites," sponsored by the Florida State Board of Health at Tampa, Fla., May 15-19. There was a regular attendance of 24 persons for this course.

EXTENSION SERVICE

Specimens and keys were mailed each month to 313 laboratories in the United States, Alaska, Territory of Hawaii, Canada, and Puerto Rico. These specimens contained *Plasmodium malariae*, *Trypanosoma lewisi*; *Ascaris lumbricoides* eggs, *Trichuris trichiura* eggs, and *Taenia saginata* eggs; *Trypanosoma cruzi*, and *Plasmodium vivax*.

Loan sets of parasitological slides were sent

to 11 laboratories in Arkansas, Louisiana, Massachusetts, Michigan, Mississippi, Missouri, New Jersey, New York, Texas, Virginia, and Washington. These sets were addressed to two city health departments, five hospitals, and four physicians.

The brochures, "Information on Selection of Specimens for Laboratory Diagnosis," have been made available to the States, together with numerous reprints and training course manuals. These are sent out from Laboratory Training Services upon request.

EPIDEMIC AID

Upon request from the Iowa State Department of Health an epidemiological survey of *Tinea capitis* infections in that State was made during the period April 3-12, 1950. In addition, an epidemiological study of virus hepatitis infections was made in the same State.

PARASITOLOGY

Consultation Services. One staff member spent the week of June 5-9 in Louisiana in consultation with the State Health Department and with private physicians in that area discussing and investigating a reported epidemic of amebiasis.

Dr. Harry D. Pratt, in charge of the Medical Entomology Unit, has been assigned to the Economic Cooperation Administration to serve as a member of a special technical and economic mission to French Indo-China, where he will participate in an antimalarial campaign for approximately 6 months.

Publication and large-scale distribution of an illustrated direction sheet demonstrating the use of the cellulose-tape slide preparation for the diagnosis of pinworm infections was completed.

Evaluation Program, Laboratory Diagnosis of Amebiasis. During this quarter, three shipments

Table 1
TRAINING COURSES PRESENTED BY LABORATORY SERVICES

COURSES	DATE 1950	STUDENTS						TOTALS
		State, County, City Health Depts.	U.S. Public Health Service	Other Federal Organi- zations	Private Insti- tutions	Univer- sities	Foreign Students*	
Laboratory Diagnosis of Parasitic Diseases, Part I (Fifteenth course)	Mar. 27 to Apr. 14	5	3	10	3	1		22
Parasitology, Blood Parasites, Part II	Apr. 17 to May 5	3	1	5	2	3	2	16
Laboratory Diagnosis of Rabies (Fourth course)	May 8- 12	2	1		1	1	1	6
Laboratory Diagnosis of Bacterial Diseases (Second directors' course)	May 22- 26	10	1	4	1	2	4	22
Laboratory Diagnosis of Mycotic Diseases (Second directors' course)	May 19 to June 2	5	1	3	3		4	16
Laboratory Diagnosis of Tuberculosis (Third directors' course)	June 5- 9	2			1		4	7
Laboratory Diagnosis of Parasitic Diseases (Fifth directors' course)	June 12- 16	2		1	1	2	6	12

*Foreign students represented the following countries: Australia, Brazil, Bolivia, Canada, Liberia, Mexico, and Philippine Islands.

of specimens were sent to 42 State and Territorial laboratories and to the three referees. The 30 specimens included 22 unpreserved specimens, 5 formalin preserved specimens, 2 specimens preserved in PVA (vials), and 1 stained smear.

The eleventh shipment, mailed during June, ended the present evaluation program, with each laboratory having received 110 specimens.

Methodology Research. Hamsters and mice inoculated with nonvirulent strains of *Leishmania donovani* in mucin produced no infections in the animals.

Liver extract material "catalase" prepared in the Bacteriology Section was added to culture mediums used for hemoflagellates and for one strain of *Endamoeba histolytica* without effect on growth.

The effect of sodium azide in culture mediums has been inconsistent when tested on stock cultures of amebae. The effect of this reagent on isolation of amebae from fecal specimens is now being tested.

Completed Projects. Streptomycin and penicillin

in large doses (250 units each per milliliter) were added to mediums used to isolate and grow *T. cruzi*. The protozoa grow well in this medium, and by use of antibodies, bacterial contamination usually encountered during class culture by students was greatly reduced.

An analysis of 500 stool specimens from a local hospital showed, in part, that the PVA-fixative technique detected far more protozoa than any other single technique, although in no case did it detect 100 percent of the organisms found by combination of all methods. It was noted that trophozoites of amebae were as likely to be found in formed as in soft stools.

Statistical analysis of the parasitological surveys conducted in Pharr, Tex., and at a local pediatrics clinic was made, with particular reference to familial infections with *E. histolytica*. The results indicate that familial infections with *E. histolytica* are demonstrable in the Atlanta survey, but not in the populations of the Pharr survey.

Training Services. Two technicians from the Mississippi State Board of Health were given a special 1-week course of instruction, June 19-23, in identification of malaria parasites and thin blood films.

Malaria Survey. Of the 804 slides on hand and the 7,311 slides collected during the quarter, 5,140 were examined for malaria parasites. No new cases of malaria were detected.

From South Carolina came 4,465 slides, of which 52 were unsatisfactory. Among these slides were 57 "check" smears already known to be positive. From Arkansas 670 slides were examined, with no positive findings.

VIRUS AND RICKETTSIA STUDIES

Methodology Research (Eastern Equine Encephalomyelitis). Investigations of mosquito virus transmission have been completed for the potential vector, *Culex quinquefasciatus*. Mosquitoes were fed on a chick whose blood contained a very high titer of virus, and later were test-fed on a susceptible horse; the mosquitoes were tested subsequently for evidence of virus by injection into mice. Three lots of *Culex* were tested on days 7, 8, and 9, respectively, after engorgement on infected chicks. The horse on which these mosquitoes were fed did not develop infection or serological evidence of infection. There were 12 mosquitoes tested on day 7, which gave no evidence of virus content when tested by injection; 87 mosquitoes tested on day 8 contained E.E.E. virus; the 17 mosquitoes tested on day 9 apparently did not contain virus.

Two mosquito transmission attempts from horse to horse failed, and one attempt at transfer from chick to horse with this mosquito has been negative. This study will be continued, using other genera of mosquitoes.

Two horses were injected with E.E.E. virus subcutaneously, and thereafter were tested for presence of virus in peripheral blood and to determine the time of appearance of neutralizing and of complement-fixing antibodies. One of these horses showed a viremia only at hours 22 and 30 after injection. Neutralization index of this horse serum was 35.5 on initial test at 46 hours and increased until 168 hours. This horse did not develop complement-fixing antibodies. Virus was recovered from all parts of this horse brain, but not from spinal cord or viscera. The second horse showed a viremia at hour 6 after injection, and this viremia continued through hour 56. The first

test subsequently, at 71 hours, showed a significant neutralization index which increased one-hundred-fold by the 14th day, after which neutralization titer continued at about the same level through day 56. Complement-fixing antibodies were demonstrated for the first time on the 6th day. These rose to a titer of 32 during the 14th-49th days.

All laboratories in the Virus Unit are participating in a field study of E.E.E. in Louisiana. Three areas, closely associated with past epidemics, have been selected, and two visits have been made to each for collection of materials. Previous years' collections indicated that water fowl or wading birds may serve to maintain encephalomyelitis in the areas. Collections of birds have been concentrated largely on these groups.

The Louisiana State Fish and Wildlife Commission has been very helpful in collecting this material by providing personnel and equipment which make possible larger and more complete collections than otherwise could have been obtained.

Thus far virus isolation attempts from arthropods and from wild birds have yielded no positive results. Serum neutralization tests on wild birds showed significant titers of antibodies against E.E.E. in white ibis from Pontchatoula, La. One adult snowy egret collected at Jennings, La., showed a neutralization index against E.E.E. of more than 10.

Equine influenza virus has been carried through 21 serial passages in mice by means of intraperitoneal injections. Mice thus injected uniformly show enlarged spleens with occasional mice showing pneumonic consolidation.

Reference Diagnosis Services. Complement Fixation Tests: From 19 States, 62 sera were tested for mumps antibodies; 30 of these sera were positive. Submitted for lymphocytic choriomeningitis antibody tests were 27 sera from 12 States; 5 of these were positive: 1 of 2 specimens from Connecticut, 3 of 7 from Georgia, and a single specimen from Iowa.

Neutralization Tests in Mice: Sera submitted for neutralization tests against E.E.E. virus totaled 41 from 18 States. None of the sera were positive.

To be tested against Western equine encephalomyelitis (W.E.E. virus) 61 sera were submitted from 20 States. One of three specimens from Louisiana, one of three specimens from Oklahoma, and one of three specimens from Utah gave positive reactions against W.E.E. virus.

Agglutination Tests for Tularemia. From 14 States and the District of Columbia came 33 sera for this test, of which a single serum from North Carolina was positive. The majority of these specimens came from private physicians who requested diagnostic aid.

Typhus Survey. Table 2 describes results of complement fixation tests for murine typhus antibodies.

Table 2
RESULTS OF COMPLEMENT FIXATION TESTS
FOR MURINE TYPHUS ANTIBODIES
IN RAT SERA

Source of Sera	Total No. Sera	Total No. Positive Reactors	Percent Sera Positive
Alabama	368	1	0.27
Florida	86	4	4.65
Georgia	446	35	7.85
Hawaii	41	5	12.22
Mississippi	222	0	0
Nebraska	34	0	0
Tennessee	39	2	5.13
Virginia	3	0	0
Total	1,239	47	3.78

Parasitic Serology. There were 2,334 requests, with 2,622 specimens, submitted for serological detection of parasitism, from 42 States, the District of Columbia, Canada, Hawaii, and South Africa. Specimens submitted for amebiasis serology totaled 2,138, of which 439 (20.5 percent) were positive. Trichinosis antibodies were found in 16 of 384 sera submitted (4.2 percent positive) and echinococcus antibodies were present in nine sera (8.9 percent) of 101 specimens submitted. The sera reacting with echinococcus antigen came from California, Illinois, New York, Pennsylvania, and Kansas.

The sera giving positive reactions against Q fever antigen were 1 of 7 from California, 2 of 24 from Maryland, and a single specimen from Rhode Island. Sera which gave a positive reaction against Rocky Mountain spotted fever antigen included 1 of 4 from the District of Columbia, 7 of 96 from Georgia, 1 of 3 from Illinois, both of 2 specimens from Indiana, 3 of 11 from Louisiana, 2 of 11 from Mississippi, 2 of 6 from New Jersey, 1 of 11 from New York, a single specimen from North Carolina, 1 of 9 from Rhode Island, 1 of 11 from South Carolina, both of 2 specimens from Virginia, and a

single specimen from West Virginia. Sera positive against *Histoplasma* antigen included a single specimen from Arkansas, 2 of 9 from Georgia, 1 of 4 from Illinois, 2 of 6 from Kansas, 2 of 5 from Louisiana, and 10 of 93 from Missouri.

Enteric Bacteriology. It was found that the "Vi" bacteriophages of Felix used in typing *Salmonella paratyphi B* gave a variable degree of lysis with a number of *Salmonella* types, and particularly with *S. pullorum* and *S. gallinarum*. Studies of adaptation of these phages are being conducted and will be continued into the future.

Work on *Klebsiella* phages as well as *Klebsiella* serology has continued. A very high percentage of *Klebsiella* cultures from urinary infections do not belong to previously recognized capsule antigen types, so a number of additional sera have been prepared to determine their relationships in the group.

Sera for the types of *Escherichia coli* recently incriminated in infant diarrheas were prepared and are being distributed to selected laboratories throughout the United States. It was found that high-titered sera could be obtained consistently by the use of alcohol-acetone-treated antigens in the production of *Salmonella O* sera, and that loss of animals during immunization was brought to a minimum.

Production of *Salmonella* and *Shigella* sera for complete serologic typing of these genera was completed and the laboratory is ready to begin distribution to such State laboratories as can advantageously use the reagents.

Among the 2,078 specimens submitted for reference diagnosis were 34 cultures from water and sewage, of which 29 were *Salmonella*; 36 cultures from food product isolations, in which were included 30 *Salmonella* and 1 *Serratia*. From animals there were 1,030 cultures, of which 833 were *Salmonella* and 216 were paracolons; 4 cultures were *E. coli*. From human material there came a total of 945 cultures, with 307 *Salmonella*, 190 *Shigella*, 334 paracolon, 64 *E. coli*, and the remainder representing nine other genera.

The examination of 214 cultures of *S. pullorum* for form variation continued. This is a particular service to the poultry industry and to State departments of animal pathology.

Mycology. To date, no spores of *Histoplasma capsulatum* have been discovered on vaseline-covered slides exposed at Franklin, Tenn. Further study of the collected slides is in progress.

Antigen and antiserum production of *H. capsulatum* has continued through the quarter, and thus far nine lots of the antigen and eight antiserum types have been completed for serological comparison.

Reference diagnosis materials totaled 484 items received from 252 requests from 39 States, the District of Columbia, and Canada. From these materials 116 pathogenic fungi were isolated, of which *Candida albicans* was found most commonly (73). *Nocardia* was found three times, *Actinomyces* twice, *Blastomyces* once, *Cryptococcus* once, and *Coccidioides immitis* once.

Clinical Pathology. Study of a screening method for blood sugars using the picric-acid technique was interrupted, but the method is still in use by the Alabama State Health Department as a part of its state-wide diabetes survey. This test, as used, apparently has offered no technical difficulties to the screening survey teams.

Standard methods for chemical analysis of body fluids have been established so that the Clinical Microscopy Unit can begin service on routine and reference diagnosis material in this field as soon as it is called upon to do so.

WESTERN CDC LABORATORY

Wild Rodent Survey Activities. During this quarter, four plague survey units have been in operation in counties near the western borders of Texas, Oklahoma, Kansas, South Dakota, and North Dakota. Counties surveyed were as follows:

Texas, eight; Oklahoma, two; Kansas, six; South Dakota, five; North Dakota, three. From these units, 14,150 wild and domestic rodents were shot and trapped, while 479 rodent burrows yielded 2,501 fleas, 696 lice, 265 ticks, and one tissue specimen to be used in laboratory examination for plague.

For the State of Washington, the State of Oregon, the New Mexico State Cooperative Project, and from the Sandia Army Base, material from 14 counties was submitted for plague examinations.

Wild rodent plague was demonstrated in five collections from four foci: from Texas County, Okla., a flea collection from grasshopper mice *Onychomys leucogaster*; from Douglas County, Wash., two lots of fleas from a single focus, the fleas coming from sagebrush voles *Lagurus curtatus* and from white-footed deer mice, *Peromyscus maniculatus*; from Kittitas County, Wash., one lot of fleas from *L. curtatus*.

No plague was found in macroscopical autopsy examination of 3,025 Norway rats and 450 *Rattus rattus* trapped in San Francisco, or from two *R. rattus* on vessels. No plague was found when 11,743 ectoparasites collected from 4,603 domestic rats in San Francisco, Seattle, and Tacoma were injected into mice.

Bacteriological examinations of water were completed on 74 samples during the quarter. A sample from the National Park Service, two samples from the Federal Prison Camp, and one sample of water from the U. S. Forest Service were found to be unacceptable for use.

Technical Development Services*

(This report presents results of work in progress and the conclusions reached may not be final. For this reason, the contents should not be published or referred to in articles for publication without

permission. Reference in this report to any commercial materials or equipment does not in any way constitute a recommendation of such materials or equipment by the U. S. Public Health Service.)

* Abstracted from Technical Development Services Summary of Activities No. 22, April, May, and June 1950.

TOXICOLOGY

Toxicity of Dieldrin

Effect of Dermal Applications of Various Formulations. Certain rats on which earlier reports were made continue to receive repeated small doses of dieldrin, so that some of them now have accumulated dosages as high as 4,680 milligrams per kilogram without apparent injury. In new tests, it was found that an occasional rabbit is killed by one application of 0.625 percent emulsion at the rate of 10 milligrams per kilogram while others resist repeated daily applications. Most dogs, but not all, resisted a single dose of dieldrin at the rate of 400 milligrams per kilogram. Convulsion was produced in one heifer after repeated dosage at the rate of 20 milligrams per kilogram per day. Tests with a 6.25 percent paste emulsion applied to rats showed the material to be significantly less toxic than a solution of the same strength applied at the same rate, but somewhat more toxic under experimental conditions than a mayonnaise-type emulsion. Finely ground technical dieldrin applied once at the rate of 400 milligrams per kilogram killed all rats tested and at the rate of 100 milligrams per kilogram produced high, but not complete, mortality.

Use of Barbiturates in the Treatment of Various Species of Dieldrin-Poisoned Laboratory Animals. Further tests have been made of the value of phenobarbital in dogs and monkeys poisoned by dieldrin, as well as in cats, a species not previously employed. Results with dogs and monkeys continue to be moderately encouraging while no success has been achieved in the medication of cats. In general, medication of subacute poisoning was more successful than medication of acute poisoning.

Weight Loss and Its Cause in White Rats. A repeated test confirmed earlier indications that the weight loss suffered by rats poisoned by dieldrin is caused entirely or almost entirely by starvation and not by some more subtle disturbance of metabolism. Previously unreported is the fact that the livers of rats poisoned by dieldrin fail to show the weight loss exhibited by the livers of unpoisoned rats starved to exactly the same extent and for the same period. Kidney weights do not show a corresponding variation.

Tolerance to High Doses of Dieldrin in White Rats Previously Exposed to Lower Concentrations of the Same Poison. The remarkable ability of rats to withstand, without any apparent injury, small

repeated doses of dieldrin totaling many times an acute lethal dose has been demonstrated repeatedly. This ability might be explained on the basis of an adequate, though limited, normal rate of excretion or of detoxification (including inert storage) or by tolerance (an acquired facility to successfully cope with the poison) or by a combination of factors. (The possibility must be considered that the ability to withstand repeated doses depends on a consistent decrease in primary absorption of the poison from the skin, but this does not appear reasonable.)

The results of tests seem to establish that rats develop a small but definite tolerance to dieldrin through repeated small exposure to it; there is no evidence from the present tests that the degree of tolerance is increased by increasing the number of prechallenge exposures above 30, and it may be that maximum level of tolerance is reached after even fewer exposures.

Reproductive Capacity of White Rats Previously Exposed to Mists of Water, DDT Emulsion, or Dieldrin Emulsion in Simulated Field Tests. White rats which were retired from exposure to either water or insecticidal mists under conditions simulating field insect-control programs were paired for an analysis of reproductive potential 18 days following the last test exposure. All animals appeared healthy and mature. The performance of rats previously exposed to dieldrin was inferior to that of rats previously exposed to DDT or to water in regard to the number of litters produced. The performance of the females previously exposed to dieldrin was equal to the performance of controls as regards the number of young per litter, the weight of the young at birth, and the total number of young per litter brought to weaning.

Chemical Studies

The Purification and Chemical Determination of Dieldrin. Methanol and ethanol are satisfactory solvents for the purification of dieldrin. An analytical method based upon the reaction of the oxirane ring of dieldrin with a haloacid to form the corresponding halohydrin was developed. Anhydrous hydrogen bromide in dioxane was found satisfactory for this purpose.

Rodenticide Studies

Field Investigations with Warfarin in Bait against Norway Rats. Tests with corn meal baits containing the same dosage levels of warfarin (0.1 milligrams per gram and 0.05 milligrams per

gram) as previously reported were continued to determine whether the continuous use of warfarin in semipermanent baits will give adequate control of Norway rats. Permanent bait stations with warfarin-poisoned yellow corn meal available in them at all times have been in 28 business establishments for a period of 6 to 12 months. The establishments were checked for rat infestation, and fresh poisoned bait was supplied in the stations every 4 to 6 weeks. The control of rats maintained in all of the establishments was very good.

Toxicity of Warfarin when Administered to White Rats by Stomach Tube. Repeated tests confirmed the results reported earlier. Under the conditions of the experiment, warfarin is capable of killing 90 percent or more of rats in 2 to 12 days when given at a total dosage of 5 milligrams per kilogram over a period of 5 days, and it is, at critical dosage levels, slightly less effective when the separate doses are given on alternate rather than on successive days. A total dosage of 2.5 milligrams per kilogram given on successive days killed 11 of 20 rats, whereas the same total dosage given on alternate days killed only 1 of 20 rats, although it caused symptoms in 7 of them. Undoubtedly, lower concentrations would have killed more rats more effectively if the doses had been repeated more than 5 times.

Laboratory Studies with Warfarin in Bait Fed to Roof Rats. Dosages of 0.05, 0.025, 0.0125, and 0.00625 milligrams of warfarin per gram of food each were offered along with a choice of food to 10 adult roof rats. Feeding was continued until death of the animals or for a maximum period of 40 days.

The group of rats which were fed warfarin at a bait concentration of 0.05 milligrams per gram was the only group in which there were no survivors. None of the roof rats died which were offered poisoned bait at a concentration of 0.00625 milligrams per gram.

These feeding tests indicate that some roof rats are several times more resistant to warfarin than are Norway rats. A much greater individual variation was noted in the reaction of roof rats to warfarin than in the reaction of Norway rats. Even so, other tests indicate that it takes a relatively small amount of warfarin as compared with other rodenticides to kill roof rats.

Field Studies to Investigate the Use of Warfarin in Solid Baits against Roof Rats. Tests were conducted on five farms with warfarin in a bait of

yellow corn meal containing 10 percent pecan crumbs by weight. The bait contained 0.25 milligrams of warfarin per gram. At four of the farms the poisoned bait acceptance and kills were very satisfactory. At one other farm where the rats were harboring in corn and underneath a wood floor the bait acceptance was very poor, and there apparently was no reduction in the rat infestation at this farm. The principal problem involved in using warfarin against roof rats on farms is that of finding a suitable semipermanent bait which the rats will take consistently in the presence of other food.

CHEMICAL STUDIES

Stability of Emulsions Prepared in Power Equipment. Emulsions were prepared in power equipment from 25 percent DDT concentrates containing reduced amounts of emulsifier to determine the feasibility of central mixing of such emulsions. Emulsion stability was determined on 100 milliliter samples. Very good results were obtained from concentrates containing 0.5 percent emulsifier, and where the concentrate contained 10 percent rosin, only 0.1 percent emulsifier was needed. With 6.25 percent dieldrin concentrates, 1 percent emulsifier gave very good results.

Volatility of Various Insecticides from Residual Sprays on Smooth Surfaces. A study was made of the volatility of aldrin, benzene hexachloride (BHC), chlordan, dieldrin, DDT, and lindane from residual sprays on glass panels. Technical BHC (containing 36 percent gamma isomer) was most volatile of the group and DDT least volatile.

Dieldrin Concentrates. Mayonnaise-type emulsions were prepared in which the dieldrin was dissolved in an aromatic solvent, and no gum or adhesive was used. A formula containing 6.25 percent dieldrin, 18.75 percent Solvesso No. 2, 61 percent kerosene, 4 percent Triton X-100, and 10 percent water was deemed worthy of field testing.

Indicator-Type Tracers. Eight indicators were tested for use as tracers in residual spray emulsions. Phenolphthalein (0.08 percent) gave good results when added to the final emulsion in an alcoholic solution.

INSECTICIDE STUDIES

Studies on Dieldrin Resistance in Laboratory Strains of the House Fly. Adult *Musca domestica* of the standard insectary strain were all killed in colony cages with 1 percent of the surface treated

with deposits of 10 milligrams or 25 milligrams of dieldrin per square foot. In colonies with 1 percent of the surface treated with 2.5, 5.0, or 7.5 milligrams of dieldrin per square foot, some survival and oviposition occurred. Subsequent generations showed increasing resistance. In the F_6 generation good survival was obtained under conditions of 5, 25, and 45 percent of the surface treated with 25 milligrams of dieldrin per square foot. With colony conditions of dosage and treatment maintained at the same level for two successive generations, there was a marked increase in survival levels. To maintain a constant survival level, it was necessary to increase the amount of treated surface from 1 percent to 5 percent, and then to 25 percent during the F_3 to F_5 generations.

Determination of the Dieldrin-Resistance of Field Strains of the House Fly. Initial test of strains of house flies from eight dairies treated with dieldrin indicated only slight dieldrin resistance in May 1950, at three locations. In June dieldrin deposits showed failure in controlling flies at several dairies within 1 to 2 weeks after residual applications. Decreased efficiency of dieldrin as a larvicide also was noted. A second collection of fly eggs at one dairy showed the development of a high degree of dieldrin resistance during the 1-month interval between tests. Certain selected strains from Phoenix, Ariz., also have shown high dieldrin resistance.

The Relative Residual Effectiveness of Technical Dieldrin Deposits against *M. domestica*. Laboratory studies on the residual effectiveness of deposits of 12.5, 25, 50, 75, and 100 milligrams of dieldrin per square foot against insectary house flies over a 6-month period showed high mortalities for the 50-, 75-, and 100-milligram deposits. Deposits of 50 milligrams of dieldrin per square foot showed greater differences between the 24-hour and 48-hour mortalities after 16 weeks. Deposits of 25 milligrams of dieldrin per square foot showed gradual loss of effectiveness after 16 weeks. Deposits of 12.5 milligrams of dieldrin per square foot were not satisfactory.

Comparison of the Residual Effectiveness of Technical and Recrystallized Dieldrin Deposits against *M. domestica*. Deposits of recrystallized dieldrin were somewhat superior to deposits of technical dieldrin at all times during a 9-week laboratory observation period showing about 10 to 20 percent higher kill for equal deposition rates.

Comparative Knock-down Efficiency of Various

Chlorinated Hydrocarbons against *M. domestica* Adults. The rapidity of knock-down of adult house flies exposed at 80° F. and 80 percent relative humidity to deposits of 200 milligrams per square foot of various chlorinated hydrocarbons was measured in a knock-down recorder. The materials tested, listed in decreasing order of their rapidity of knock-down, were BHC, DDT, methoxychlor, dieldrin, chlordan, and toxaphene. The difference in susceptibility between the sexes becomes more marked as the insecticides become slower in knock-down action.

Extraction and Bioassay of Dieldrin. The regression of mortality in probability units on the logarithm of dosage for a dieldrin-benzene solution and a liver extract containing dieldrin were compared. The regression lines were found to be reasonably parallel and showed a relative potency ratio of 1.052. The two types of test solutions were not significantly different in their toxicities to *M. domestica*.

Investigational Work on Adult Fleas.

DDT-Resistance Studies on the Oriental Rat Flea, *Xenopsylla cheopis*. Although a definite degree of resistance was developed from selective kills of the parent through F_3 generations of *X. cheopis* by 4-minute exposures to 50 milligrams of DDT per square foot, very little addition in resistance was noted in the F_4 to F_7 generations even with an increase of the exposure period.

DISINSECTIZATION OF AIRCRAFT

Dispersion of Various Solid or Highly Viscous Insecticides by Heating Them to Form Liquids Which Can Be Sprayed under Pressure. A method has been developed for spraying insecticides such as DDT, DDD, DFDT, methoxychlor, BHC, heptachlor, toxaphene, aldrin, and chlordan in a heated liquid state. Either technical grades or purified products may be used without the addition of other diluting materials of any kind. A 1-quart-size sprayer containing a sealed electric heating unit and a variable automatic temperature control was developed (see figure 1). Biological evaluations of residual deposits from these hot liquid insecticides show high toxicity and no material effects from the heating process. Preliminary applications of hot DDT as a space spray also have been made in Peet-Grady chambers. House flies introduced 5 to 7 seconds after discharge were all knocked down in 15 minutes, with pronounced knock-down beginning in 3 to 4 minutes.

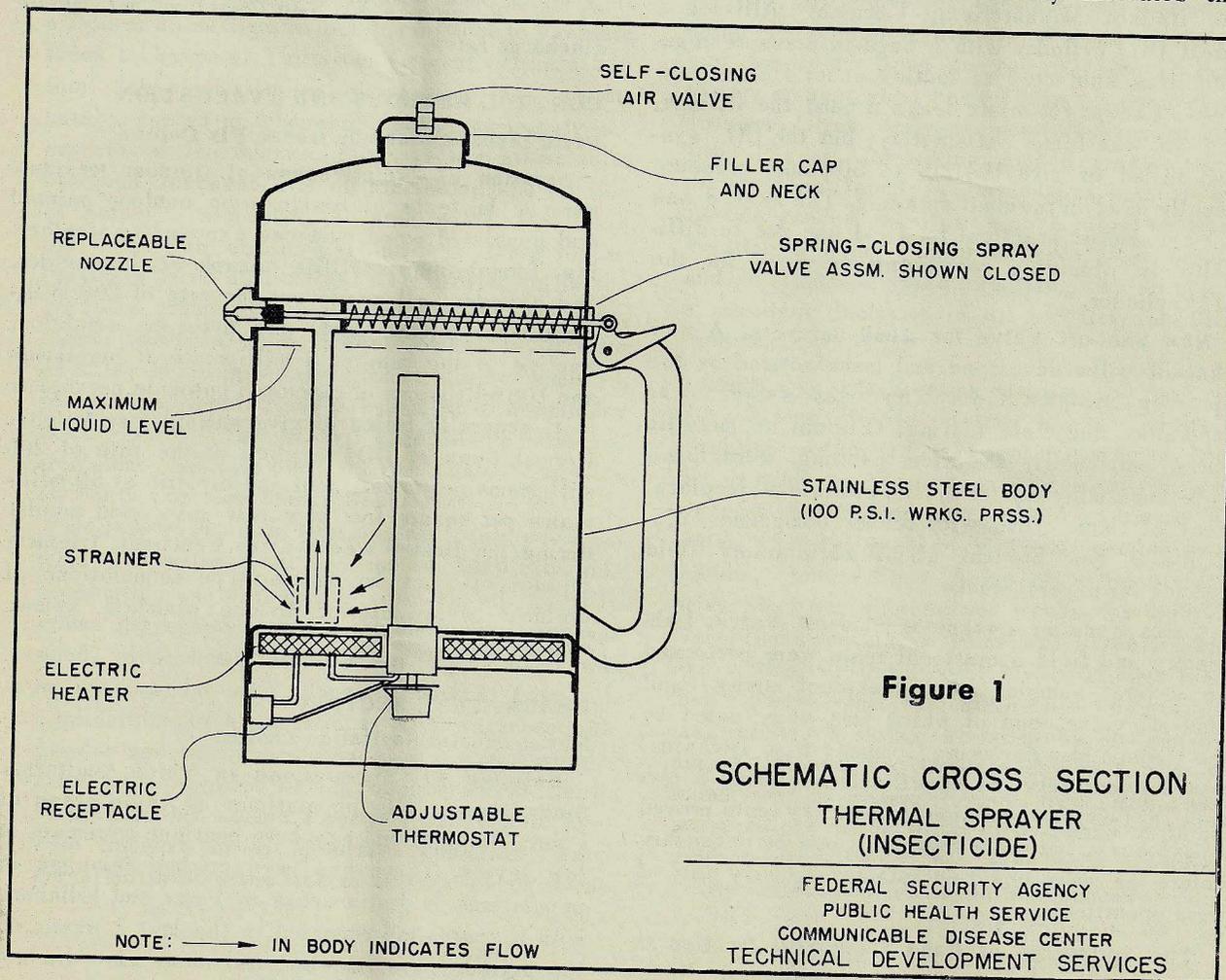
Low Melting Mixtures of DDT. Because of the possibility that some decomposition may result in technical DDT heated (especially if for prolonged periods) to a molten state of desired viscosity, low-melting mixtures of DDT with other chemicals were investigated. Sixty-two mixtures of DDT with various proportions of other chemicals have been made. Some mixtures showed satisfactory, low-melting points but had objectionable odors, high cost, high viscosity, or slow recrystallization times. Mixtures of DDT with BHC, DDD, diphenyl, *p*-dibromobenzene, or methoxychlor appear to be the most promising.

Comparative Insecticidal Effectiveness of Various Aerosol Formulations. Aerosol formulations containing Lethane 384 and allethrin were investigated. In comparison with standard formulation G-382, a 4 percent Lethane-384 and 2 percent pyrethrum formulation gave an index of 0.04. Addition of 3 percent DDT raised the index to 1.43, and further addition of 1 percent piperonyl

butoxide showed an index of 1.70. Substitution of allethrin for the pyrethrum in formula G-382 gave an index of 1.11. The addition of the pyrethrum synergists VanDyk 264 and piperonyl butoxide to formulas with allethrin gave inferior indices of 0.95 and 0.93 respectively.

RADIOISOTOPE STUDIES WITH INSECTS

Studies on the Tagging of Various Flies with P^{32} . Preliminary tests have been made of methods for tagging adult *M. domestica*, *Callitroga macellaria*, and *Phaenicia pallescens* with sufficient radioactivity for field studies. Two concentrations of P^{32} in various larval rearing mediums were tried. The uptake of P^{32} was low and adult flies showed unsatisfactory levels of radioactivity. P^{32} was incorporated in milk and fed to newly emerged adults for periods of 1, 2, and 3 days. Determinations of the radioactivity of individual flies of each sex and species and for each feeding schedule were made. The study indicates that



mass production of radioactively tagged flies by incorporating P^{32} in the adult food is practical.

EQUIPMENT DEVELOPMENT

Atmospheric Pollen and Dust Sampler (Continuous Recording Type). Pollen recovery studies made with the Technical Development Services-constructed pollen sampler have established the ability of the sampler to record differences in atmospheric pollen concentrations. The unit has been completely redesigned to reduce it to one-half its original size and to eliminate 44 of the previous 68 parts required. Orifice size has been reduced to $5/16$ -inch diameter, tape width from 1 inch to $1/2$ inch, and rate of tape movement from $1/2$ inch to $1/8$ inch per minute. These factors combine to simplify the counting of pollen grains on the scotch cellulose tape. The unit still requires a source of 110-volt electricity.

Field Test of 4-Gallon Hudson Spray Can (Constant-Pressure Type). A spray can produced by the Hudson Manufacturing Company utilizing a small CO_2 cylinder with a built-in pressure regulator was subjected to testing under field conditions. Except for minor leaks around the fittings, the can was found satisfactory; but the CO_2 system failed to give the 30- to 50-pound pressure usually used in residual spraying. The method was not considered practical for field use due to difficulty in obtaining recharging services for the CO_2 cylinder.

New Shut-off Valve for Hand Sprayers. A new shut-off valve developed and manufactured by the Spraying Systems Company was subjected to laboratory and field testing. Original nonmetallic parts, particularly the stem packing, were found to be unsatisfactory for xylene emulsions. Replacement of these parts with rubber compound 1275-HCR-138 has brought about satisfactory field service for several weeks.

Tests Made on Leakproof Shut-off Valve. Laboratory and field operational tests were performed on several samples of a leakproof spray wand shut-off valve, one of which was constructed by the Hudson Manufacturing Company from Technical Development Services specifications, using 5 percent DDT-xylene emulsion. Laboratory tests proved satisfactory, but some changes would be necessary before the valve could withstand the heavy duty of field operations.

The Suitability of Hand Equipment for Use in Spraying Water-wettable DDT Powders. Hand-

pumped spray cans of 3- and 4-gallon capacity were found suitable for dispersing $2\frac{1}{2}$ percent and 5 percent DDT suspensions when equipped with suitable strainers.

The most satisfactory placement of the strainers was on the end of the dip tube. External strainers of 30- to 100-mesh screen worked satisfactorily, but most nozzle strainers were unsatisfactory, mainly due to their restricted size. Other accessory equipment on the sprayers was suitable for use with water-wettable suspensions. Nozzle tips were found to wear quite rapidly and should be checked frequently to avoid excessive discharge rates.

Double-Throat Venturi Tube Airplane Spray Unit. A gravity-fed spray unit has been developed for use in light and medium aircraft employing double-throat venturi tubes with annular orifices to accomplish the spray solution break-up. Flight tests with PT-17 airplane using a 22 percent DDT-Velsicol NR-70 solution gave a particle size range of 10 to 50 microns with a mass median diameter of 24 to 28 microns at $1/4$ -to $1/2$ -gallon per minute discharge rates.

CONTROL METHODS AND EVALUATION

Field Investigations on House Fly Control

Duration of Effectiveness of Outdoor Residual Sprays. In tests of residues on outdoor painted and unpainted wood surfaces exposed to weathering, formulations of DDD, toxaphene, heptachlor, and chlordan, all applied at the rate of 200 milligrams per square foot, and pyrenone emulsion, applied at the rate of 5 milligrams of pyrethrins and 100 milligrams of piperonyl butoxide per square foot, generally failed to give satisfactory results. Formulations of DDT applied at the rate of 200 milligrams per square foot and dieldrin at 50 milligrams per square foot generally gave good results during the first 9 weeks after treatment. Dieldrin in fuel oil and mayonnaise-type formulations of dieldrin were inferior to the standard xylene emulsions.

PHARR, TEX., SECTION

Environmental Sanitation Studies

Relative Fly Populations in Three Sanitation Study Towns. Fly populations in Anglo areas of Pharr, Mission, and Edinburg continue to remain at low levels. There has been gradual increase in populations in Latin areas in Pharr and Edinburg with a sharp rise recorded in the last 2 weeks of the period. This increase and sharp rise did not

occur in Mission. An increase of the intensity of fly breeding in garbage containers was noted in all three towns in early June. Heavy rains interrupted the routine twice-per-week garbage collections in Pharr and Edinburg but not in Mission. The differences in fly populations among the three towns are thought to be due to this difference in effectiveness of garbage collections.

Chemical Fly Control Investigations

Improved Techniques for Applying Outdoor Residual Sprays for Fly Control. An effort has been made to refine the techniques of applying outdoor residual sprays for adult fly control. It involves a pretreatment survey to classify city blocks according to the number of fly attractants found. The intensity of treatment then is modified to suit the "fly potential" of each block. Only selected types of preferred fly resting surfaces are treated. The nozzle-tip size has been increased from 5004 to 5008 to speed operations. Weslaco (estimated population 15,000) was treated with dieldrin at a rate of 25 milligrams per square foot to evaluate these techniques. Thirty-two percent of the city's total 249 blocks (those with two or less attractants) received no chemical treatment. Twenty-one percent of the blocks (three to six attractants) received treatment only on the inside and outside of garbage cans plus the area within 5 feet of the cans. The remaining 47 percent of the blocks (seven or more attractants) were treated as in the previous group plus a residual spray on weeds, shrubs, grasses, lower branches of trees, interior of utility buildings (if used for cooking or laundry), pit privies, fences, and a 4-foot strip around the back door of the house. This single low-cost treatment has maintained very good city-wide fly control for more than 8 weeks.

Further Tests with Dieldrin for Adult Fly Control. A repetition was made of the 1949 city-wide application of a dosage of dieldrin of 10 milligrams per square foot. No emulsifying agent was used. Reasonably satisfactory fly control was maintained for only about 7 weeks. City-wide applications of a suspension of a water-wettable powder and of an emulsion of a mayonnaise-type concentrate applied at the rate of 25 milligrams of dieldrin per square foot were difficult to evaluate because of the low fly populations which prevailed in both the treated and the check towns;

however, any effects which may have resulted had largely disappeared by the time of the seasonal increases in fly populations about 1 month later. A dieldrin-rosin mix without emulsifier applied to preferred daytime fly resting surfaces only, at a dosage of 25 milligrams per square foot and on a city-wide basis, gave good control for about 6 weeks. Because of the low application cost and speed of coverage, this method will receive further study. A dosage of 25 milligrams per square foot of a dieldrin-rosin mix without emulsifier applied to preferred nighttime fly resting surfaces only, gave city-wide fly control for about 3 weeks. All of the above tests were subjected to two or more heavy rains.

Fly Larviciding Tests on Vegetable Wastes. Additional studies have been made of fly larvae control in vegetable wastes using dieldrin and aldrin as emulsions and water-wettable powder suspensions. Dosages were applied at 50, 25, and 15 milligrams of toxicant per square foot using 40 to 120 milliliters of spray per square foot for each. Good control (90 percent kill or better) or near good control was obtained at most dosages. High daily temperatures (maximum 92°-100° F.) of late spring caused greater surface drying than found in the earlier season tests. Larvae tended to work deeper into the wastes, creating a wider barrier between their positions and the outer surface receiving the spray, with a resultant decrease in the effectiveness of the treatment.

Studies of Fly Resting Habits. Day and night observations of fly resting habits continue to establish certain preferred resting surfaces. During the daytime, *M. domestica* were found on ground surfaces (with food scraps and scattered wash water), fences, garbage in containers, trees and bushes, clothes lines, floors of utility buildings, privy pits, and grasses and weeds. At night they were found resting on trees and shrubs, grasses and weeds, ceilings of utility buildings, fences, and clothes lines. *Phaenicia* spp. were found on practically the same surfaces as *M. domestica* during the daytime. At night, however, they were found only on grasses, weeds, trees, and bushes. *Drosophila* spp. continue to be observed in large numbers in privies. They have been observed in utility buildings and trapped from homes.

Training Services

FIELD TRAINING

Amherst, Mass. The second 12-week course for sanitation personnel was begun at this station on April 10, with 15 employees of State and local health departments enrolled. The course was completed on June 30 with 13 trainees receiving certificates. Six trainees expressed a desire to obtain a Massachusetts Babcock testing license. As this station was not in a position to issue the license, arrangements were made with the Agricultural Experiment Station of the University of Massachusetts to give the necessary 14 hours of instruction. Classes were arranged for five evenings, and the six trainees obtained licenses on June 15.

Eighteen persons received individual training during the quarter. Their interests included swimming pool sanitation, slaughterhouse sanitation, food sanitation, and hospital inspections.

Buffalo, N. Y. This station was moved from Troy to Buffalo on April 14. New quarters of the station are at 40 Delaware Avenue.

The first 12-week sanitary inspectors' training course began on April 24 with 11 employees of the Erie County Health Department in attendance. Three inspectors and one engineer attended the milk portion of the course.

Additional equipment and training-aid materials are being received which will make it possible for more practical type field training courses to be conducted in the future.

Cincinnati, Ohio. During May, personnel of this center participated in a collaborative study of the comparison of two phosphatase methods for cheese. The study is being conducted by the Ohio State University, College of Agriculture.

The training officer attended a Radiological Health Orientation course in Atlanta, Ga., on April 13 and 14. Another member of the staff attended a 4-week training course in Radioisotopes Techniques of the Oak Ridge Institute of Nuclear Studies June 5-30.

Work was begun on the preparation of handbooks

or manuals of procedures for personnel in water pollution investigation programs.

Columbus, Ga. Sixteen trainees completed the sanitarians course which began February 9. The general sanitary engineering field training course began June 19 with 17 trainees in attendance. Thirteen of these trainees represent the following countries: Bolivia, 1; China, 1; Colombia, 2; Cuba, 1; Ecuador, 1; Guatemala, 1; Honduras, 1; India, 1; Lebanon, 1; Peru, 1; and Philippines, 2.

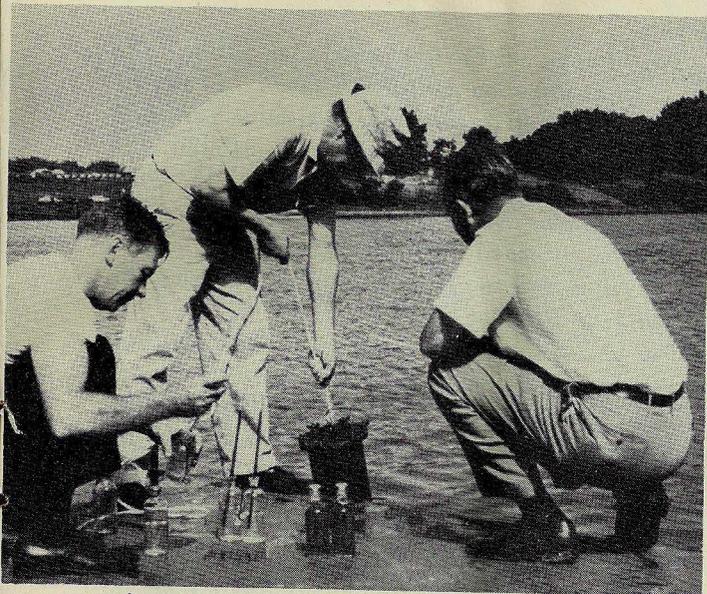
Three Muscogee County Health Department conferences were attended by staff members and trainees during the quarter. A representative of this station attended a field training conference at the University of North Carolina April 24-28. From April 30 to May 3, personnel attended the Georgia Public Health Association conference in Savannah, Ga. During the month of June, they assisted in the production of a film dealing with milk production.

The training officer returned from his assignment at Columbia University in New York. During his time there, he was able to become familiar with the CDC field training activities in New York State and the New England area.

Denver, Colo. Certificates were given to 10 trainees who completed the 12-week course in environmental sanitation May 27. Three of these trainees were from Canada, and one was from Alaska.

Plans are being made with officials of the Colorado State Health Department for a week's course designed to qualify sanitarians in the field of plumbing inspection. The State of Colorado does not have an adequate number of personnel assigned to enforce the plumbing code, and sanitarians could materially assist the State inspectors with this work. This course probably cannot be held before September.

During the last week in May and the first week in June, the high-temperature short-time equipment was demonstrated to students enrolled in Sanitary Science at Denver University.



Obtaining water samples for determination of Biochemical Oxygen Demand in the stream sanitation training program.

On May 25, a representative of this center participated in a milk seminar sponsored by Utah public health officials. The health officials in Utah and Idaho have expressed a request for participation in as many meetings as they are able to promote. In fact, some feel that the 12-week courses should be brought into their States.

Pittsburgh, Pa. On May 20, the first group of trainees from the Pittsburgh Department of Health received their certificates for satisfactory completion of the 3-month course in environmental sanitation. These sanitarians now are developing a generalized sanitation program in five districts set aside for this purpose by the Pittsburgh Department of Health. Since this area is situated near the field training center, it has been possible to keep in close contact with the former trainees for the purpose of evaluating the content and presentation of the initial course.

In cooperation with the Pennsylvania Department of Health, the training center is now in the process of developing a long-range program for the training of public health personnel in that State. Preliminary meetings with representatives of the State Health Department have indicated that the Department is anxious to establish such a program, especially for sanitation and health education personnel, that it is willing to develop a limited number of decentralized field training areas throughout the State, and that it will contribute its part of the operational cost of the training

program.

In order to coordinate the activities of the training center with educational institutions, this station has made preliminary arrangements with the Institute of Local Government, University of Pittsburgh, to cooperate in the academic phases of the station's training programs. This association may expand later into an affiliation with the University of Pennsylvania and the Pennsylvania State College through their respective Institutes of Local Government.

Topeka, Kans. A 1-week course for milk sanitarians was held at Madison, Wis., during the period April 10-13. The University of Wisconsin and the Wisconsin State Departments of Health and Agriculture cooperated with the Public Health Service Region V Office and the Topeka Field Training Center in presenting this school.

Cooperation was extended to the City of Minneapolis Health Department in conducting a 4-day seminar and field demonstration for "Regulatory and Industry Dairy Farm Fieldmen" April 18-21. Some 42 persons attended this seminar. They represented all milk sanitarians of the St. Paul and Minneapolis Health Departments, representatives of State departments of health and agriculture, as well as fieldmen of the milk industry supplying milk to the Twin City area and for interstate milk shipments.

The regularly scheduled 2-week field training course in milk sanitation was conducted at Topeka during the period May 15-27 with 19 persons enrolled. During the week of June 5, a milk sanitation program was presented at St. Louis, Mo. Two days were devoted to an in-service training program for 65 milk plant personnel. An in-service training program for 47 milk sanitarians employed by health departments in the St. Louis area was conducted during the last three days of the week.

On June 12, 13, and 14, a short in-service training course on short-time high-temperature pasteurization of milk was held at Columbus, Ohio. Eight trainees were enrolled in the course. The cooperating agencies were the Ohio State Board of Health, Public Health Service Region VII, the Pittsburgh Field Training Center, and the Topeka Field Training Center.

A fly control course was conducted during the first week of May for 13 trainees. The course emphasized the sanitation aspects of fly control measures as practiced by the fly control project which operates in conjunction with the Topeka

City-Shawnee County Health Department and the Communicable Disease Center.

In cooperation with the Public Health Service Region VII Office, the Wyandotte County Health Department, the Engineering Section of the Kansas State Board of Health, and the Housing Sanitation Unit of Training Services, a housing seminar was held at Kansas City, Kans., May 8-12.

Personnel of this center attended the joint meeting of the Kansas and Missouri Public Health Association held in Kansas City, Mo., April 24-26, the meeting of the Mid-Continental Association of Food and Drug officials in Pittsburg, Kans., May 15 and 16, and the National Conference of Interstate Milk Shipments held at St. Louis, Mo., June 1-3.

STATE FIELD TRAINING (COOPERATIVE ENTERPRISES)

Maryland. The first Maryland field training school for sanitarians ended May 12. Four State employees certified by the State Employment Commission, and two county employees who passed a similar qualifying examination attended the course. Approximately 55 percent of the time was spent in the field, where the trainees actually engaged in the regular activities of an operating health department, and received training in almost all phases of environmental sanitation. The program was designed for sanitarians who will do general sanitation work in a county health department.

The second school for sanitarians started June 19 with five persons in attendance. A few minor changes were made in the course schedule so that more time will be spent on rural water and sewage.

New York. The chief of the Training Unit, Office of Public Health Education, made arrangements for the assignment of three new apprentice public health educators and one graduate field training student who arrived in the Training Unit during the month of June. One trainee was assigned to the Migrant Labor program for the summer, two to the Ulster County Department of Health, and one to the Rochester City Health Bureau. In addition, 17 inquiries regarding the apprentice training positions have been processed.

Sixteen water-treatment plant operators completed a 2-week course at Cornell University for Grade II operators during the period June 5-17.

A Grade II course for sewage treatment plant operators began at New York University on June 19. Thirteen trainees are attending the

school.

The Bureau of Environmental Sanitation plans to hold courses on civilian defense and atomic explosions for all professional sanitation personnel in the State. In order to become acquainted with the content and conduct of such courses, the chief of the Training Section, Bureau of Environmental Sanitation, attended a course on atomic explosions and civilian defense for health officers during the period June 19-21 at Cooperstown, N. Y.

The bulletin on Food Handlers Course was prepared during the quarter, and typewritten copies of this proposed bulletin were sent to several people in the State requesting their recommendations. Work was also completed on the preparation of four pamphlets to be used in connection with flip charts at food handlers courses.

A meeting was held on April 28 with representatives of the Office of Professional Training in which it was proposed that a committee be selected to draft policies and future programs for the training of all sanitation personnel in the State. Ten men were selected for this committee. They represent a cross section of sanitation activities in the State (county, city, district, regional, and headquarters engineers, headquarters and district milk sanitarians, county and district health officers).

HEADQUARTERS TRAINING

INSECT AND RODENT CONTROL:

Courses at Headquarters. During the week of April 3, an insect control course was given for four trainees who completed the rat control course in the spring. Special emphasis was given to fly control due to the similarity of control methods between rat and fly control.

Two 1-week comprehensive fly control courses were presented during the spring. The one given the week of April 24 was attended by nine trainees, and the one conducted the week of May 15 was attended by three trainees. These courses were designed to give persons already trained in public health sanitation enough information to conduct a complete community fly control program.

The first course in insect and rodent control especially designed for foreign public health workers was held during the period June 5-16. The 11 trainees in attendance represented Pakistan, India, China, Turkey, Iran, Venezuela, and the Canal Zone. In addition, four foreign trainees attended parts of the course.

Four public health workers from Venezuela received special training in fly control during the

The officer who was assigned to this work then made a trip to Washington, D. C., to discuss the courses and decide on the changes that should be made before other courses are conducted throughout the country. As a result, the Audio-Visual Production Services were requested to produce a set of slides in radiological health. These slides have been completed and they will greatly improve the presentation of future courses in radiological health given throughout the country.

During the quarter, a seminar on radiant energy was developed by one of Training Services' consultants for the purpose of acquainting CDC personnel with many aspects of radiological health problems. About 20 persons participated in the work.

OTHER HEADQUARTERS ACTIVITIES

CONFERENCES:

On April 12, the chief of Training Services made a trip to Washington, D. C., to present the subject, "Field Training," to 10 Regional Medical Directors of the Public Health Service. On April 18 and 19, he attended a committee meeting of the American Public Health Association in Ann Arbor, Mich., to assist in developing criteria for accreditation of field training areas.

The chief of Training Services participated in the Georgia Public Health Association meeting in Savannah on May 2. A panel discussion on the work of the Communicable Disease Center was presented to approximately 750 persons attending this meeting.

TRAINING MATERIALS:

At the request of the Division of Sanitation,

Training Services prepared and submitted to Washington a chapter on Insect Vector Control for a publication to be entitled "Environment and Health" and to be published by the Public Health Service. The publication will be set up on the basis of the "problem" and the "program" and will be largely pictorial.

Editorial and lay-out work was completed on an Engineering Recruitment Pamphlet, developed at the request of the Division of Commissioned Officers. The pamphlet provides information regarding an engineering career in that Division of the Public Health Service.

Photography was completed for the Army-CDC series of training films on rats - with shooting occurring at Savannah, Ga.; Atlanta, Ga.; and New York, N. Y. Also completed was the footage involving rat action for a CDC film on rural aspects of rat control.

Three of the films were brought to a preliminary roughcut stage in June, and were reviewed by personnel of the Insect and Rodent Control Section.

EVALUATION:

Arrangements were completed with the APHA State Merit System Service to assist CDC in the preparation of two comparable achievement tests for the environmental sanitation field training program. The purpose of these tests is (1) to measure the growth of trainees' factual knowledge (2) to determine strengths and weaknesses of trainees in major areas of knowledge, (3) to compare the effectiveness of training methods employed in regional and State training centers, and (4) to assist the States in maintaining the level of instruction in their State field training centers.

Veterinary Public Health Services

RABIES

During this quarter, epidemic aid was provided through State and Insular health departments to three widely divergent areas where epizootics of

rabies occurred. These areas were east Texas, West Virginia, and Puerto Rico. In Charleston, W. Va., 19,000 dogs, or 75 percent of the animal population, were immunized during the latter part

of March and early April. Nearly all of these animals were immunized by the five veterinarians in Kanawha County at no cost to the owners. The cost of operations was borne by the State Health Department and the Communicable Disease Center.

The Puerto Rico outbreak was the first that had been experienced in that country in many years. There were four cases reported in dogs, one in the municipality of Rio Piedras, one in Trujillo Alto, one in Toa Alta, and one in Ciales. In addition there have been two cases in cattle, one in a pig, and one in a cat. Since the clinical symptoms in most of these cases did not follow the usual pattern, they all required laboratory testing to establish the diagnosis. It is not definitely understood how the disease was introduced in the island or if it has been present during recent years without being diagnosed. In the areas where rabies occurred, control measures requiring immunizing of all resident dogs and impoundment of all stray animals has stamped out the disease. The quarantine facilities of the island were investigated and found to be satisfactory. In searching for a possible reservoir of the disease in the island, it was found that there are no suspicious wild animals, except rodents and mongooses. During June 1950 a number of mongooses were trapped and examined, but no evidence of the disease was found. The mongoose previously has been reported to be infected with rabies in Cuba, South Africa, and India.

Upon request of the Public Health Service, a conference of Caribbean countries which are interested in the control of rabies in that area will be called by the Pan American Sanitary Bureau in the near future. At this conference standard control and quarantine procedures for all the countries in the West Indies will be discussed. There is an urgent need for stringent quarantine regulations because of the large amount of interisland shipping which carries native dogs back and forth between the many islands in that area.

The outbreak of rabies in Denver, Colo., had subsided by the end of the quarter, but cases continue to appear in rural areas of Colorado, extending as far north as Wyoming, with one or two cases occurring in Wyoming. In all these rural areas immunization clinics and stray-dog programs have been effectuated. Fortunately, no wild animals are known to be infected at this time. In Texas the program has been very effective in preventing epizootics in the larger cities, but in northeast Texas the disease is widespread in skunks and

foxes. In some counties all official agencies and many private groups have banded together to reduce the fox population which is threatening human and animal health.

In recent years Indiana has had one of the highest incidences of rabies in the country, and it continues to have a serious problem even though the incidence of the disease has declined about one-third. During the first 6 months of 1950 there were 354 cases as compared with 538 during the same period of 1949. Public interest and the suppression of rabies by the control of stray dogs have increased during the past 6 months. Numerous newspaper articles and the activities of various local groups emphasize the public sentiment in coping with this problem. Figure 1 (page 40) shows the distribution of rabies in Indiana during the first 4 months of 1950. In several of the small counties, educational programs have shown good results, and several cities in the northern part of Lake County, which is adjacent to Chicago, are operating part-time vaccination clinics. Such clinics, plus intensified control measures, have resulted in a marked decrease of rabies in that area.

The State of New Jersey became free of rabies during the quarter, for the first time in the past two decades. New Jersey has an excellent stray-dog program, public education and immunization programs.

BRUCELLOSIS

The Indiana Brucellosis Study Project closed its field work during the quarter. A final report of these investigations will be made by the cooperating agencies at a later date. The comparative studies between animal inoculation and artificial mediums are continuing between the Indiana State Board of Health and Purdue University. Upon the completion of this phase of the work, the original study as planned in 1946 will be completed.

The Wisconsin Brucellosis Studies tested two different skin test antigens, purified *Brucella* protein and brucellergen, on two key case families and two check families. Seventeen persons were skin tested with brucellergen on the right forearm and with purified *Brucella* protein on the left forearm. Blood samples were taken prior to the skin work, and the blood tests paralleled the skin reactions. Fifty percent of the key case persons were positive, while none of the seven persons of check families showed positive reactions. In all cases purified *Brucella* protein elicited a lesser reaction than did brucellergen. This work has gone

area during the winter. The incidence of the infection in the Jacksonville area was about 22 percent between April and June. According to dog attendants there is a high rate of kennel sickness during the winter season. A study of impounded dogs in the Jacksonville area revealed a lower rate of infection that varied between 2.6 percent and 3.9 percent. In contrast to this, dogs cultured in the Leon County Pound revealed that more than half the dogs were infected with *Salmonella*. In recent months all dogs brought to rabies clinics throughout the State also were tested. This is a new group of dogs that have not been sampled previously. To date, cultures from 392 such dogs revealed that 58, or 14.5 percent, were positive. At the same time 357 hospitalized dogs were cultured, of which 115, or 32.2 percent, were positive.

An abstract of a report entitled, "Preliminary Study of Tetrathionate Brilliant Green Bile Broth with Added Sulfathiazole for the Isolation of *Salmonella* from Dogs," by Galton, Stucker, McElrath, and Hardy was published in *Bacteriological Proceedings*, May 1950.

Salmonella studies in chickens revealed that nearly all isolations were of the *S. pullorum* variety. *S. bredeney* was isolated from the intestinal contents of two chickens. Some laboratory chicks that were to be used for diphtheria virulence tests were found to be infected with *S. give*.

In studies made on sausages collected from markets, it was found that from one of six samples of sausage, *S. cholerae-suis* var. *kunzendorf* was isolated.

An autopsy of a spider monkey that died in a local pet shop revealed *Shigella paradysenteriae* (Flexner) and a *Salmonella* of an undetermined type.

Q FEVER

Experimental studies inaugurated earlier in the year were continued. In one of these experiments five cows were exposed by dipping their teats in infectious milk during the milking process. After 38 weeks of such exposure to milk containing from 5 to 1,000 guinea pig-infectious doses, none became infected. These cows are currently being exposed to milk containing both *Coxiella burnetii* and *Streptococcus agalactiae*. To date, two of four cows (fifth cow dry) have become infected with *Str. agalactiae*, whereas none have become infected with *C. burnetii*. This experiment is being continued.

In another experiment, two yearling heifers

(unbred) were exposed to *C. burnetii* by inhalation of an infectious aerosol spray. One was exposed to a spray produced from a 1:100 dilution of yolk-sac suspension, and the other to a spray produced from a 100,000 dilution of yolk-sac suspension. Results of isolation studies are not complete; however, complement-fixing antibodies appeared in the serum of both heifers. The results confirm earlier experiments on lactating cows but suggest the use of smaller exposures for further studies.

In previous experiments, it has been demonstrated that 1 milliliter of a 10 percent infectious yolk-sac suspension, inoculated intradermally in normal cows and calves, will produce regularly a local skin lesion, a rickettsemia of 5 to 7 days' duration, a brief febrile reaction, and the development of specific CF antibodies. When cattle which previously had been infected with *C. burnetii* but whose CF antibody level had returned to a negative status, were challenged by an intradermal inoculation of 1 milliliter of a yolk-sac culture, a local skin lesion was produced, and specific CF antibodies appeared in their sera; however, *C. burnetii* could not be recovered from their blood stream and the febrile reaction was markedly reduced. These preliminary observations suggest that recovered cattle possess a degree of immunity to reinfection.

Q FEVER PASTEURIZATION

Systematic collection of raw and pasteurized samples of milk from dairies in the vicinity has been started. One local dairy has been found to be receiving milk containing *C. burnetii*. Tests will be made to determine the resistance to heat treatment. It has been pointed out recently by Dr. Heubner that *C. burnetii*, when killed by heat, remains immunogenic to a marked degree. It therefore becomes imperative that in all experiments every attempt be made to recover the live rickettsia. This prolongs the experimental procedure to a minimum of 3 months before an individual test may be evaluated. The best methods for determining the viability of the organisms are three blind passages through embryonated eggs and subpassage to guinea pigs before it can be assumed that the rickettsia are not alive.

Reports received from Germany and Italy indicate that Q fever is being found with increasing frequency in cattle and sheep.

COLUMBIA RIVER BASIN STUDY

The cooperative study of diseases of nature in Washington was begun, with Washington State College and the University of Washington partici-



Photo courtesy Bureau of Reclamation.

Mixed growth of clover used as pasture for milch cows in the Columbia River Basin area. Preventing introduction of communicable diseases of cattle which are transmissible to man will be a major objective of the Columbia River Basin project.

pating with CDC and other health agencies. Erst-while uninhabited desert land of central Washington State will be an 85,000-acre laboratory to determine the effects of civilization on a previously uninhabited area.

First phase of the unusual project is to determine what diseases of potential danger to humans now exist in one portion of the barren area. This is being done by collecting and studying wild rodents, insects, and birds. Later, the changes that water, domestic animals, and humans bring to the area will be investigated.

Initial rodent surveys showed little small-rodent population in the immediate semiarid sagebrush areas around Ephrata, Wash. (field base), and that plague-infected fleas had been found on chipmunks 3 miles northwest from the area of the Basin Study.

Ephrata, the county seat of Grant County, which covers most of the reclamation area, was made field headquarters. The Bureau of Reclamation provided space for use as a field laboratory. Here are processed specimens for shipment to the college laboratories and for future information and investigations.

Unfortunately, from a research standpoint, winter poisoning of predatory animals and birds killed many valuable specimens. Nothing could be obtained from their carcasses or their lairs.

Emphasis has been placed on obtaining specimens from domestic animals during the latter part of May and June because many of these animals, particularly sheep, are shipped out of the region to summer grazing areas.

At present, a generalized system of sampling is considered best, with the possibility of later study in specific areas and locations where posi-

tive samplings are found. Samples of blood were taken from domestic animals, from mosquitoes in the vicinity of these same farms, and from wild rodents and birds near present irrigated areas and habitations. Few samples have been taken from wild game birds, since most of them are nesting during the spring. Greater samplings from these birds will be taken in July and August. When a portable boat becomes available more shore birds, ducks, and geese will be sampled. A follow-up study of the nesting areas should bring in mites and other ectoparasites from abandoned nests.

The sampling of rodents from the Quincy basin area (that portion of the project to have the heaviest irrigation) has been disappointing. This area is largely semiarid sagebrush, rolling or flat, with only a few inhabitants in the whole area. Speculation as to the reasons for the low rodent population brought to light the following information:

1. Past sagebrush fires. Within the last two to three years, this area has been burned over several times by severe fires. This not only destroyed the rodent population in the areas, but destroyed the native grasses, slowing or preventing a return of these animals from nearby unburned areas.

2. New grass types are not preferred by these animals. Instead of the native grasses, introduction of cheat and hard types of grass replaced the older blade grass.

3. Two severe winters in succession succeeded in killing the burrowing animals, even those in the deeper burrows. Winters with 2 to 4 weeks of persistent 30-degrees-below-zero weather drove the frost line 6 to 12 inches deep, killing those animals in their burrows or preventing normal family life of the animals.

4. Rabbit population was decimated approximately 7 years ago by an unknown malady. Rabbits had been present in such a great number that one could not drive any distance over the highways or roads without hitting and killing a number of them. At the present few rabbits are seen, and what spoor is found is very old. No official investigations were made of the rabbits' deaths, since it was wartime; hence, no recorded information is available as to the reasons for their deaths.

The gradual increase of summertime temperature has made it necessary to conduct surveys only during the very early morning hours or late in the evenings. Temperatures recorded by the thermometer of the laboratory field truck have been as high as 120° F. in the open and 96° in the shade.

Tick collection has been slow. Although ticks of the *Dermacentor* genus are found in the sagebrush of the higher "benches" or elevations, none have been found in the lower or basin areas. Natives of the areas support the idea that there are few ticks found in the basin areas, and that those found are usually brought back by animals pastured on the higher benches.

Fortunately, station personnel were able to make a good contact with a local slaughterhouse owner in the Moses Lake area. From this source they are able to get blood samples from a variety of animals, as well as to observe any lesions

they may have and to obtain any pathological specimens. This place slaughters only once a week, and usually only animals from the basin area.

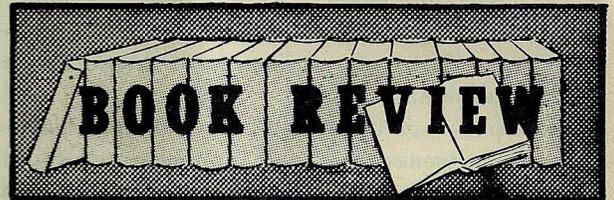
NEW PROGRAMS

The Missouri State Department of Health took steps to inaugurate a veterinary public health program, with Dr. E. R. Price to be assigned to this project beginning August 1.

The General Assembly of South Carolina enacted a law providing for the control of rabies and the establishment of a veterinary public health program in that State.

Malariology

edited by mark f. boyd



A Comprehensive Survey of all Aspects of this Group of Diseases from a Global Standpoint — By sixty-five contributors. Philadelphia: Saunders, 1949. Volumes I and II. 1643 pp. Price \$35.00 per set.

This almost encyclopedic compilation of knowledge about malaria consists of 70 chapters divided into 5 sections as follows: Introduction (1), Parasitology (8), Definitive Hosts (15), Intermediate Host (25), Control and Eradication (21). There are two appendices, the first a list of field and laboratory investigation equipment and purveyors; the second a directory of makers and distributors of mosquito control supplies. The book is comprehensively indexed. Bibliographies are placed at the end of each chapter.

These volumes are the embodiment of a long-time objective of the Editor. He is to be congratulated warmly on his prodigious labor and enduring patience in overcoming the numerous obstacles and difficulties which presented themselves in the course of its fulfillment.

The content has been carefully planned, arranged, and presented. Obviously not every malaria authority in the world could be invited to collaborate in such a work — and probably no two editors would have a) selected the same combination of contributors nor b) assigned, in all instances,

the same subject to each of them. Nevertheless, there are some almost unaccountable omissions of outstanding malariologists from the list of authors — and certain of the subject assignments seem to have been made on some basis other than the contributor's best known competence. In spite of the varied authorship, duplication more than is necessary to make each chapter reasonably complete is minimized. However, there is much individuality in style and expression, some chapters being easy to read, others very difficult because of their pedantic and prolix language, and complicated tables. The book is well finished and bountifully illustrated. The Editor's "Photographic Atlas of Human Plasmodia" is especially notable; its value would have been greatly enhanced if the photomicrographs had been taken and reproduced in color.

However, these shortcomings are dwarfed into insignificance by the international scope of the book and its tremendous content of information regarding the various aspects of malaria and its control. As a reference text on these subjects it is not and probably will not be equaled for years to come.

Justin M. Andrews,
Scientist Director

CDC ANNUAL REPORT ISSUED

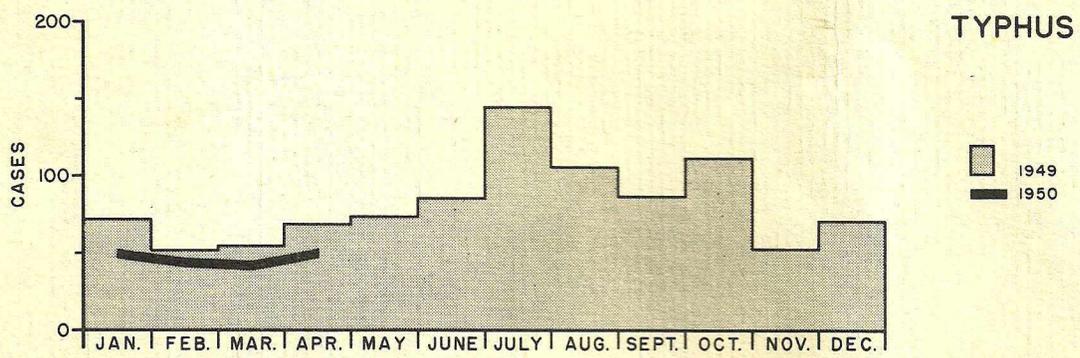
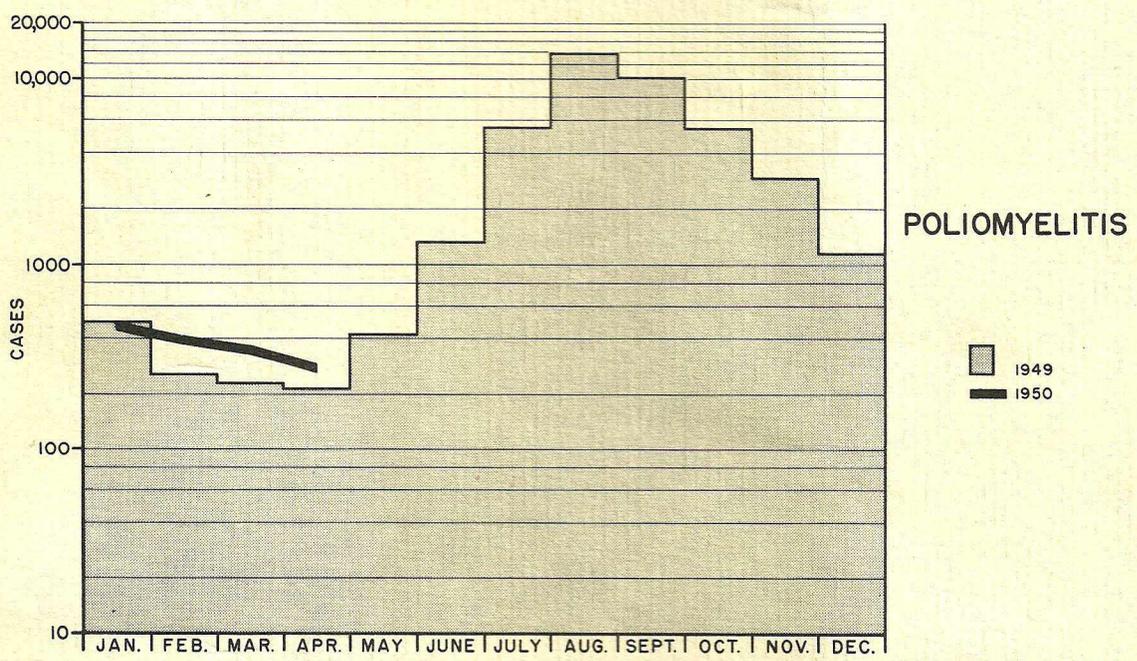
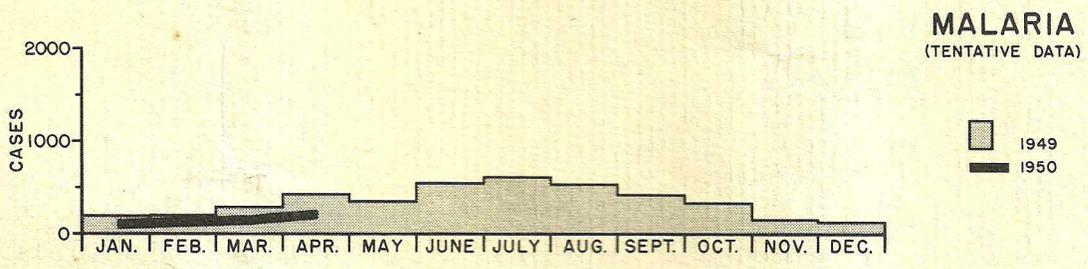
Communicable Disease Center Activities, 1948-1949, has been issued,
and copies are now available. To obtain a copy of this report, write to:

Medical Director in Charge
Attn. Technical Reports and Library Section
Communicable Disease Center
605 Volunteer Building
Atlanta, Georgia

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



FSA-PHS-CDC ATLANTA, GA.

* SOURCE OF DATA: NATIONAL OFFICE OF VITAL STATISTICS