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

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

CENTER HIGHLIGHTS

Oct - Nov - Dec 1950

ADMINISTRATIVE SERVICES

NEW CDC QUARTERS

The moving of the Executive Office and the headquarters of five Services of CDC to the new building at 50 Seventh Street, N. E., Atlanta, Ga., was begun in December. The move was to be completed in January 1951 for the following Services: Administrative, Engineering, Entomologic, Epidemiologic, and Veterinary Public Health. Audio-Visual Production and Laboratory Services will remain at the Veterans' Administration Hospital Facility, Chamblee; Training Services, at 165 Luckie Street, N. E., Atlanta; and Technical Development Services, at Savannah, Ga.

DECENTRALIZATION OF ACCOUNTING

Further decentralization of fiscal accounting was made in order that records could be maintained and vouchers paid in the geographical location where the personnel is assigned. Effective January 1, 1951, four additional allocations were decentralized to the San Francisco, Calif., office; and two to the Austin, Tex., office.

NONCOMPETITIVE ACTIONS

Authority was delegated to the CDC Board of Examiners to act for the Civil Service Commission on noncompetitive actions requiring prior approval for positions under jurisdiction of the Board.

SPECIAL CONSULTANTS

On December 12, 1950, authority was delegated to the Center to appoint Special Consultants under Public Law 410 Section 208(e), and new per diem rates were established by the Public Health Service.

PERSONNEL NOTES

Three issues of "Notes from the CDC Personnel Office," used for quick dissemination of informa-

tion pertaining to changes in Civil Service rules and regulations, were distributed to supervisory personnel.

MANUSCRIPTS EDITED, CLEARED

Forty-five manuscripts as follows were edited and cleared for presentation and/or publication:

- Ajello, Libero: The collecting of specimens for the laboratory demonstration and isolation of fungi.
- Andrews, J. M.: Nation-wide eradication projects in the Americas.
- Andrews, J. M., Quinby, G. E., and Langmuir, A. D.: Malaria eradication in the United States.
- Atchley, F. O.: The occurrence of *Leucocytozoon* in domestic chickens in South Carolina.
- Badger, L. F.: History of leprosy in the United States.
- Brooke, M. M.: The laboratory diagnosis of intestinal amebiasis.
- Carroll, L. D.: The nursing research laboratory at the Communicable Disease Center. A progress report.
- Carroll, L. D.: Orientation of public health nurses who are to participate in epidemiological field investigations.
- Cockburn, T. A., Rowe, J. A., and Price, E. R.: Encephalitis in the Missouri River Basin States.
- Crowell, R. L., and Fay, R. W.: Preliminary experiments in the use of hot DDT and other halogenated hydrocarbons for residual applications.
- Edwards, P. R., and Ewing, W. H.: Salmonellosis transmission of infection from animals to man.
- Ewing, W. H., Taylor, M. W., and Hucks, M. C.: The alkalescens-dispar group.
- Fish, C. H., and Kalish, Catherine: Evaluation of the leyva nucleic acid reaction in tuberculosis.

- Frobisher, Martin, Jr., King, E. O., and Parsons, E. I.: A test for virulence of *C. diphtheriae* *in vitro*.
- Furcolow, M. L., and Bozym, A. A.: Development of complement fixing antibodies and chest lesions among histoplasmin converters.
- Good, N. E., and Mohr, C. O.: Distribution of murine typhus infection among domestic rats in the United States.
- Goodwin, M. H., and Crenshaw, J. W.: Observations on natural occurrence of *Plasmodium floridense*, a saurian malaria parasite in *Sceloporus undulatus undulatus*.
- Hansen, C. A., and Bright, J. H.: The national malaria eradication program transition from operations to surveillance.
- Hayes, W. F., Ferguson, F. F., and Cass, J. S.: The toxicology of dieldrin and its bearing on field use of the compound.
- Hendricks, E. L., and Goodwin, N. H.: Observations on surface-water temperatures in limesink ponds and evaporation pans in southwestern Georgia.
- Hill, E. L., Morlan, H. B., Utterback, B. C., and Schubert, J. H.: Evaluation of county-wide DDT dusting operations in murine typhus control 1946 through 1949.
- Jensen, J. A., and Fay, R. W.: Tagging of adult house flies and flesh flies with radioactive phosphorus.
- Lindsay, D. R., and Haines T. W.: A method of testing the resistance of house flies to residual-type insecticides.
- Link, V. B.: Plague.
- Mathis, Willis, Kilpatrick, J. W., and Quarterman, K. D.: Residual spraying of rural premises with dieldrin for the control of mosquitoes and flies.
- Mohr, C. O.: Public Health Service rodent-borne disease control program.
- Morlan, H. B.: Host relationships and seasonal abundance of some southwest Georgia ectoparasites.
- Morlan, H. B.: Notes on the genus *Gigantolaelaps* and description of a new species, *Gigantolaelaps cricetidarium* (Acarina: Laelaptidae).
- Quarterman, K. D., Jensen, J. A., and Bogue, M. D.: The comparative effectiveness of several insecticides as outdoor space sprays against flies.
- Quinby, G. E., and Welch, S. F.: Progress report of epidemiological appraisal of reported malaria in the United States during 1949 and 1950.
- Resnick, S. L., and Crowell, R. L.: Comparative evaluation of certain high pressure insecticidal aerosols against *Musca domestica*.
- Schoof, H. F., Siverly, R. E., and Coffey, J. H.: Dieldrin as a chemical control measure in community fly control program.
- Simmons, S. W.: Health hazards of economic poisons and related substances.
- Stark, H. E.: A specimen of *Hoplopsyllus anomalus*.
- Stark, H. E.: The unusual occurrence of three spermathecae in a specimen of *Hystrihopsylla gigas dippiei* Roths. (Siphonaptera).
- Steele, J. H.: Veterinary public health activities of the Public Health Service.
- Stenburg, S. A., and Hall, L. B.: A continuous recording particle sampler.
- Sumerford, W. T., Goette, M. B., Quarterman, K. D., and Schenk, S. L.: The potentiation of DDT against resistant house flies by several structurally-related compounds.
- Sumner, Ruth: Field training for health education.
- Sunderman, F. W.: Studies in serum electrolytes XVII. Some clinical aspects.
- Thurman, D. C., Jr., and Nortenson, E. W.: A method of obtaining an index to *Aedes* densities in irrigated pastures.
- Upholt, W. M.: Significance to the insecticide industry of fly resistance.
- Upholt, W. M.: Insecticides as health hazards.
- Vonderlehr, R. A.: The public health laboratory of the future.
- Wilson, F. J., Kalish, Catherine, and Fish, C. H.: Use of oxidation-reduction dyes in the determination of virulence of mycobacteria *in vitro*.

SOME CURRENT BOOKS RECENTLY ADDED TO THE LIBRARY

With the following books and other additions, the library's collection now totals approximately 9,200 volumes:

- Academy - International of Medicine and Dentistry: Cumulative index of professional motion picture films, 1950.
- Advances in Chemistry: Series 1, Agricultural control chemicals, 1950.
- American men in government, 1950.
- Bates, Marston: The nature of natural history, 1950.
- Berens, Conrad: The eye and its diseases, 1949.
- Burger, Martin: Bacterial polysaccharides, 1950.
- Burrows, Harold: Biological actions of sex hormones, 1949.

- Conference on the Similarities and Dissimilarities between viruses 1950.
- Curran, S. C.: Counting tubes; theory and applications, 1949.
- Current therapy, 1949 and 1950.
- De Grazia, Alfred: Human relations in public administration, 1949.
- De Jong, R. N.: The neurologic examination, 1950.
- Ehlers, V. M.: Municipal and rural sanitation, 1950.
- Epstein, E. H.: Regional dermatologic diagnosis, 1950.
- Farris, E. J.: Care and breeding of laboratory animals, 1950.
- Fisher, R. A.: Contributions to mathematical statistics, 1950.
- Florey, H. W. *et al.*: Antibiotics, 1949.
- Friedman, S. M.: Visual anatomy: head and neck, 1950.
- Friedmann, H. L.: Distributional checklist of the birds of Mexico, Part I (Pacific Coast avifauna No. 29), 1950.
- Gohar, N.: Mycoses and practical mycology, 1948.
- Green, D. E.: Research in medical science, 1950.
- Harrison, T. R.: Principles of internal medicine, 1950.
- Herns, W. B.: Medical entomology, 1950.
- Himsworth, H. P.: Lectures on the liver and its diseases, 1948.
- Israelsen, O. W.: Irrigation principles and practices, 1950.
- Kahn, R. L.: Serology with lipid antigen, 1950.
- Kampmeier, R. H.: Physical examination in health and disease, 1950.
- Kelly, G. L.: Sex manual for those married, 1950.
- King, Frances: Office management for health workers, 1949.
- Lederle Laboratories, New York: Aureomycin, 1950.
- Lederle Laboratories, New York: The nutritional and clinical significance of folic acid, 1950.
- Leitner, S. I.: Bone marrow biopsy, 1949.
- McClung, C. E.: Handbook of microscopical technic, 1950.
- McDougall, John B.: Tuberculosis: a global study in social pathology, 1949.
- Maegraith, B. G.: Pathological processes in malaria and blackwater fever, 1948.
- Marple, C. D.: Thromboembolic conditions and their treatment with anticoagulants, 1950.
- Meakins, J. C.: Practice of medicine, 1950.
- Mitchell-Heggs, G. B.: Modern practice in dermatology, 1950.
- Morrison, G. A.: In the dentist's office, 1948.
- Murray, Sir James Augustus Henry: Oxford English dictionary on historical principles, 13 volumes, 1933.
- Murray, Sir James Augustus Henry: Shorter Oxford English dictionary, 2 volumes, 1947.
- Offenhauser, W. H., Jr.: 16 mm sound motion pictures; manual for the professional and the amateur, 1949.
- Parten, M. B.: Surveys, polls, and samples, 1950.
- Pullen, R. L.: Communicable diseases, 1950.
- Rose, J. J.: American cinematographer handbook and reference guide, 1950.
- Sawitz, W. G.: Medical parasitology for medical students and practicing physicians, 1950.
- Skinner, H. A. L.: Origin of medical terms, 1949.
- Soskin, Samuel: The endocrines in diabetes, 1948.
- Stuntz, A. E.: To make the people strong, 1948.
- Tennessee Valley Authority: Hiwassee Valley Projects, volumes 1,2, 1946-48.
- Thomas, E. W.: Syphilis, its course and management, 1949.
- U. S. Army Medical Library: Catalogue of incunabula and manuscripts in the Army Medical Library, by Dorothy M. Schullian and Francis E. Sommer, 1948.
- U. S. Atomic Energy Commission: Radiation instruments catalog, 1949.
- U. S. Dept. of Agriculture: Workers in subjects pertaining to agriculture in land-grant colleges and experiment stations, 1949 and 1950.
- U. S. National Bureau of Standards: Tables of the binomial probability distribution, 1950.
- U. S. National Security Resources Board: United States civil defense, 1950.
- Wilkins, Lawson: Diagnosis and treatment of endocrine disorders in childhood and adolescence, 1950.
- Williams, R. E. O.: Infection and sepsis in industrial wounds of the hand (Medical Research Council. Great Britain. Special report series, No. 266), 1949.
- Williams, R. H.: Textbook of endocrinology, 1950.
- Yater, W. M.: Fundamentals of internal medicine, 1949.
- Yates, Frank: Sampling methods for census and surveys, 1949.
- Yearbook of dermatology and syphilology, 1949.
- Yearbook of drug therapy, 1949.

AUDIO-VISUAL PRODUCTION SERVICES

MAJOR PRODUCTIONS RELEASED DURING THE QUARTER

Motion Pictures

- 4-091.0 Community Fly Control Series -- Spraying Equipment and Procedures, Part I -- Residual Spraying. 16 mm, sound, color, 9 min., 333 ft.
- 4-100.0 Epidemiology of Influenza. 16 mm, sound, black and white, 12½ min., 450 ft.
- 4-101.0 Laboratory Diagnosis of Influenza. 16 mm, sound, black and white, 13 min., 479 ft.
- M37a Rat Control Series: The Rat Problem (Army -- CDC Cooperative Project). 16 mm, sound, black and white, 25 min., 900 ft.*
- M37g Rat Control Series: Rat Ectoparasite Control (Army -- CDC Cooperative Project). 16 mm, sound, black and white.*

Filmstrips

- 5-140.0 Sampling and Testing Drinking Water. 35 mm, sound, color, 7½ min., 74 frames.
- 5-156.0 Q Fever. 35 mm, sound, color, 9 min., 90 frames
- 5-174.0 An Introduction to Bacteriology, Part I -- Basic Biology. 35 mm, sound, color, 7 min., 56 frames.
- 5-175.0 An Introduction to Bacteriology. Part II -- Identifying Pathogens. 35 mm, sound, color, 9 min., 64 frames.*
- F33 Medical Certification of Causes of Death (for Bureau of State Services, National Office of Vital Statistics). 35 mm, sound, 15 min., 59 frames. To be distributed by the National Office of Vital Statistics.
- F35 How to Make a Filmstrip -- Spanish Version. 35 mm, sound, black and white, 8 min., 50 frames. Spanish version released but not available for distribution by CDC. English version to be released during the third quarter, fiscal year 1951.

2 by 2-inch Slide Series

- S32 Effectiveness of Various Materials for Rat-proofing. Black and white, 200 slides. At present, not for distribution by CDC.

*Prints not available for distribution as of December 31, 1950.

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

Motion Pictures

- M39 Visual Report on Social Security in Brazil
- 4-116.0 Rural Rat Control
- M37d Practical Rat Control I
- M37e Practical Rat Control II
- M37f Practical Rat Control III
- M6 Sewage Treatment Processes

Filmstrips

- 5-137 The Electrokymograph
- F21a Food Handling Series, Part I -- Basic Principles of Refrigeration
- F21b Food Handling Series, Part II -- Refrigerated Food and Storage Principles

KITTY WALK FOR SUSPENSION OF LIGHTS

A new piece of equipment called the Kitty Walk was developed. This is a Catwalk substitute, consisting of two parallel 10-ft. steel tubes spaced



Hanging lights on new Kitty Walk, developed to allow more freedom of movement for cameras and personnel on movie set.

8 in. apart and joined by cross member tubes; in appearance it resembles a narrow ladder with widely spaced steps. Four of these Kitty Walks were constructed, and hung by chains from the ceiling of the motion picture studio. Various types of lights used for motion picture photography may be clamped onto a Kitty Walk at any point. The clamping device is also a special development, constructed by welding a short steel sleeve to a standard "C" clamp, to accept the yoke of the light. The "C" clamp is changed to a pipe clamp by welding a small "V" of metal into the "C" position so that the clamp does not slip off the steel tube of the Kitty Walk.

The primary function of this new equipment is to eliminate most, and in some cases all, floor stands and cables from the studio floor, allowing freedom of movement of cameras and personnel.

FILM SERIES STRESSING SIGNIFICANCE OF INFECTIVE AEROSOLS

Among several projects initiated, the program of greatest importance, from the standpoint of defense, is a series of films on infectious hazards in the laboratory to be made in cooperation with the Army at Camp Detrick, Md. The films are to stress the significance of infective aerosols created by commonly used laboratory techniques and should be of considerable value to laboratory workers in general. Ten films with titles have been proposed.

PROJECT FOR DIVISION OF TUBERCULOSIS

Another project of interest is the three-reel color film being produced for the Division of Tuberculosis on the "Operation of a BCG Clinic." This film is in two parts, the first of which covers the administration of tuberculin, and the second of which covers BCG vaccination. It utilizes extreme close-ups throughout to demonstrate correct procedures in all phases of the problem.

SERIES OF PUBLIC HEALTH FILMS

Plans were made for a series of public health films to be produced under the auspices of the Division of International Health. These films fall under the President's Point Four Program and will be adapted for use in various countries where public health need for visual material is great.

"RH AND OTHER BLOOD GROUPS" FILM

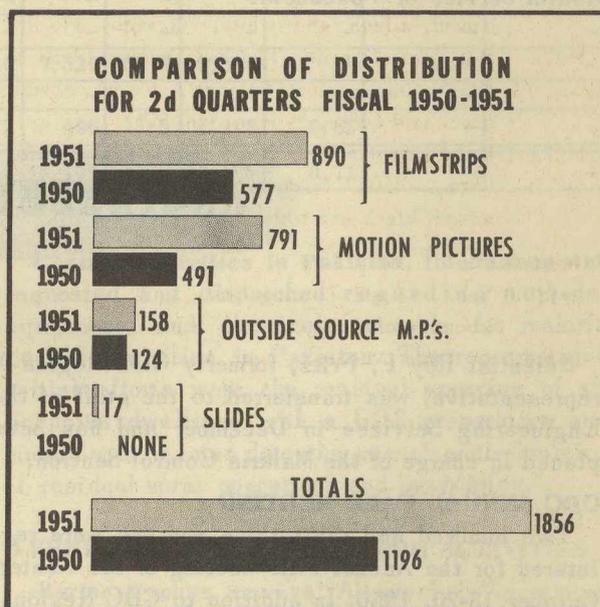
Another film which has very definite value from a defense standpoint is one entitled "Rh and Other Blood Groups." The script for this film was developed in cooperation with Duke

University and provides basic information to all professional personnel who may be held responsible for giving blood transfusions or for typing blood. This film is to be entirely in animation.

UTILIZATION PROGRAM

Chart 1 compares distribution by the film library for the second quarter of fiscal year 1951 with that for the corresponding period of fiscal year 1950. The total distribution of 1,856 films and slide series is 155 percent of that for the same quarter of the preceding fiscal year, and exceeds that for any other quarter in the history of the library.

Chart 1



A new alphabetical descriptive list of CDC productions was compiled to bring both of the CDC film catalogs up to date.

CDC FILM PRINTS FOR SALE

Prints of 30 CDC motion pictures may now be purchased through United World Films Incorporated. Descriptions of the films have been sent to this firm. Special Notice No. 13 listing titles, foot-ages, and prices of 17 black and white and 13 color 16 mm. films for sale has been distributed to approximately 2,000 holders of CDC film catalogs. Prices represent the cost of the prints and do not include production costs.

SANITATION FLIP-CHART

With the cooperation of Training Services, pro-

duction was begun on a flip-chart designed to aid in teaching block sanitation to insect and rodent control classes. This flip-chart, to consist of about 20 large graphics which can be used in a fully lighted room and in any sequence and order or repetition, is the first of this type of training aid to be made by Audio-Visual Production Services.

ORIENTATION FOR FOREIGN VISITORS

Among foreign visitors given orientation were a group of 5 French and 13 Turkish veterinarians, under the auspices of the Economic Cooperation Administration, and a representative of the Public Health Service of Venezuela.

EVALUATION

A special evaluation of the motion picture "The Fight Against the Communicable Diseases" was completed. In this evaluation, the director of the Virus Laboratory of the State of Washington Department of Health used the film with audiences totaling 3,745 and, on forms printed for the purpose, collected critiques of the film from 1,000 of the people viewing it. Analyses of these reports were made, and the results are available in graphic form to aid in a possible revision of the film.

AUTOMATIC PROJECTOR

An automatic motion picture projector was set up in a downtown building in Atlanta, Ga., during the first week of November, to assist in the City of Atlanta Health Department fly control program.

ENGINEERING SERVICES

Scientist Roy F. Fritz, formerly CDC Region X representative, was transferred to the staff of the Engineering Services in December and has been placed in charge of the Malaria Control Section.

CDC ANNUAL FALL MEETING

Two hundred and thirty-three persons were registered for the Annual Fall Meeting of the Center, October 18-20, 1950. In addition to CDC Regional and State personnel, Regional engineer officers and representatives from other Federal agencies, the Headquarters Third Army Medical Section, and the State and local health departments were present. In all, 7 Public Health Service Regions, 26 States, and 1 foreign country were represented. Engineering Services personnel served as moderators for the panel discussions on Malaria Eradication, Typhus and Rodent Control, and Fly Control, as well as for the specialty panel discussions on these subjects.

IRRIGATION-ENCEPHALITIS STUDIES

Professor John M. Henderson, on sabbatical leave from Columbia University, was called to active duty in the Public Health Service Reserve Corps, assigned to the Engineering Services, and stationed in Kansas City, Mo. As consultant and

adviser, his first responsibility will be the study of the irrigation-encephalitis problem in the United States and the development of program plans of the Engineering Services in the field.

Prior to the assignment of Mr. Henderson, a review was made of Midwestern CDC irrigation-encephalitis studies. State health departments in that area were contacted regarding legislation on impoundment control and mosquito control districts.

ARKANSAS-WHITE-RED RIVER BASIN ACTIVITIES

The date for completion of the Arkansas-White-Red River Basin study has been extended to 1954, and plans for completion of the study and submission of the comprehensive report have been adapted to the new time schedule.

MALARIA CONTROL ACTIVITIES

PROGRAM ACCOMPLISHMENTS:

Operations. Residual spray activities conducted on continental United States programs are summarized in table 1. In Puerto Rico, joint Public Health Service-Army-Insular Health Department operations were inaugurated in the Camp Tortuguero area. The first residual spray cycle was completed

Table 1
SUMMARY OF DDT RESIDUAL SPRAY OPERATIONS
October 1 to December 31, 1950

State	Number of Counties	Number Spray Applic.	Lb. DDT Used	Lb. Chlordan Used	Man-hours				Lb. DDT Per Applic.	Man-hours Per Applic.	Man-hours Per Lb. DDT
					CDC	Local	% Local	Total			
Alabama	-	-	-	-	2,186	-	-	2,186	-	-	-
Arkansas	1	6	4	-	6,326	3,304	34.3	9,630	0.66	-	-
Florida	3	390	523	-	-	461	100.0	461	1.34	1.18	0.88
Georgia	35	2,064	1,073	193	40	1,522	97.4	1,562	0.52	0.76	1.45
Kentucky	-	-	-	-	-	96	100.0	96	-	-	-
Louisiana	-	-	-	-	1,440	-	-	1,440	-	-	-
Mississippi	5	41	108	-	3,014	48	1.6	3,062	2.63	-	-
Missouri	-	-	-	-	-	-	-	-	-	-	-
North Carolina	-	-	-	-	-	-	-	-	-	-	-
Oklahoma	-	-	-	-	-	-	-	-	-	-	-
South Carolina	-	-	-	-	1,440	7,520	83.9	8,960	-	-	-
Tennessee	-	-	-	-	-	-	-	-	-	-	-
Texas	1	584	479	-	2,712	496	15.5	3,208	0.82	-	-
Totals	45	3,085	2,187	193	17,158	13,447	43.9	30,605	0.71	-	-

in the extracantonment zone between November 17 and December 12. These operations included treatment of a total of 2,357 houses.

Surveillance. Surveillance activities for the residual spray program were developed and procedure to serve as a guide for proper functioning of the surveillance team activities promulgated.

Military and Strategic Area Activities. For use in connection with environmental sanitation activities in the vicinity of military and strategic areas, a survey form pertaining to insect vector sanitation was prepared. The survey form is adaptable for use in connection with general war area surveys or may be used for independent insect control surveys.

Demonstration Spray Equipment Truck. The Malaria Control Section demonstration spray equipment truck was exhibited at the National Malaria Society meeting at Savannah, Ga., on November 6-9. A large number of Society members observed the unit with interest. An article describing the demonstration spray equipment was prepared for publication in the *Journal of the National Malaria Society*.

Chemicals. The Technical Development Services submitted a formula for a new chlordan concentrate for field testing and arrangements were made to have the formula tested on the Alabama, Georgia, and Mississippi programs.

Control Activities in Pakistan. Information was requested and dispatched regarding methods, equipment, and chemicals suitable for malaria control activities in Pakistan. The recommended initial efforts were the residual spraying of all occupied dwellings with a DDT preparation and possibly at a later date the use of a combination of residual spray operations and larviciding.

TYPHUS AND RODENT CONTROL ACTIVITIES

Murine Typhus Surveys. A survey is in various stages of progress in the southeastern States to determine the present status of murine typhus among domestic rats: how much it has been reduced by dusting and antirat measures in places where it exists, and what the possibilities are of widening those areas where typhus may have been eradicated. During the 1945-46 period, 46 percent of the counties surveyed showed over one-fourth of the rats with murine typhus antibodies. During 1948-49, only 7 percent of the counties showed a similar high percentage of infection. Data from most of the surveyed counties showed that only about 10 percent of the rats bore evidence of present or former infection.

In Georgia, counties participated financially in obtaining rats for testing for presence of murine typhus antibodies, trappers being paid by county governments. Twenty-four counties furnished rats

from more than 50 premises in every quarter of the county, thus affording a comprehensive survey in each. Over 5,000 rats were bled and tested successfully. Only 10 percent of the total number of rats surveyed bore murine typhus fever antibodies, but the percentage varied from 0.7 in some counties to 32 in others.

Control operations were concentrated in areas within counties in which the greatest percentages of rats were found infected, for the purpose of reducing these foci of infection.

Alabama and Arkansas also began intensive surveys, and data are being analyzed from counties in which 50 or more premises were sampled.

In Oklahoma, in extensive surveys, murine typhus was found present among domestic rats in the southeastern section of the State but not elsewhere although it is likely that small foci are present since rats have been found infected north of Oklahoma. No rats were found infected in a small survey in Illinois, conducted in part to delineate the area of the problem.

Murine Typhus Control Operations. During the quarter ending December 9, 1950, 39,450 premises



Applying DDT dust to control typhus-bearing ectoparasites of domestic rats.

(Photo courtesy of Georgia Health Department)

were dusted with a total of 13,216 man-hours, an average of 0.3 man-hour per premises as compared to 37,342 premises dusted during the same quarter of the previous fiscal year. An average of 2.7 lb. of 10-percent DDT dust was used per premises.

Five hundred and seventy-two premises were rat-proofed in eight typhus States with an expenditure of 22,020 man-hours or an average of 38.5 man-hours per premises. Antirat sanitation was put in effect in each of the 29 projects. In addition, 8,237 man-hours were spent on antirat sanitation in other communities in the typhus States compared to 5,443 man-hours during the same period of fiscal year 1950.

Total CDC and local man-hours on activities in the typhus States for the quarter were 132,320. Of this figure, State and local services contributed 80 percent.

Rodent Control in Cities. The control activities in northern and western States included the training of 16 local sanitarians to recognize rat signs in order to make surveys for determining the rodent infestation, to advise on use of proper control procedures, and to aid in enforcement of antirat sanitation.

Four hundred and fifty-nine premises were ratproofed on 10 city projects with a total of 2,112 man-hours or an average of 4.6 man-hours per premises.

A total of 18,556 man-hours was spent on antirat sanitation in the rodent control States. Local governments contributed 15,235 man-hours or 82 percent of the above total.

Total CDC and local man-hours on activities in northern and western States were 48,758. Of this figure, State and local services contributed 38,239 man-hours or 78 percent of the total. Program operations are summarized in table 2.

FLY CONTROL ACTIVITIES

Activities were largely concentrated on direction of the remainder of the current season's operations to the projects of the dysentery and diarrhea and polio investigational programs; reorganization of the Phoenix, Ariz., project; and the compilation of educational materials which have been distributed or will be made available to the projects.

A series of pamphlets on various phases of environmental sanitation, such as garbage storage, collection, and disposal, is being prepared. Eight films (three with Spanish sound tracks) pertaining to sanitation and transmission of disease have been procured for the use of the projects in pro-

moting sanitational and educational campaigns.

A talk outline and a set of 31 slides on the "Sanitary Landfill" have been prepared and distributed to the projects of the Dysentery and Diarrhea and Polio-Fly Control Programs.

Other materials sent to the projects include: (1) a set of 14 suggested news releases; (2) a copy of "Vegetable Cull Ordinance" from Monterey County, Calif.; (3) a copy of "Texas General Sanitation Law of 1945"; and (4) an outline for educational and sanitation programs on fly control activities.

Definite steps have been taken to compile the information obtained from current fly control activities for the purpose of outlining a standard procedure for conducting environmental sanitation programs in communities of various sizes. The ultimate aim is to prepare a practical guide book for operating local environmental sanitation programs.

A special committee composed of representatives of Epidemiologic, Laboratory, Entomologic, and Engineering Services, was formed for the purpose of integrating the work of these various Services as it applies to the Fly-Polio Investigations Projects.

Polio-Fly Control Projects. At the projects of the Polio-Fly Control Program satisfactory control was maintained throughout the remainder of the current season except in Phoenix, Ariz.; there, the development of "resistance" resulted in a continued lack of control in certain sections of the city. In view of this continued lack of fly control during the past season, the Phoenix fly control sanitation program is being revised to achieve closer coordination between fly control activities and the work of city, county, and State sanitation personnel.

An intensive campaign to rid Phoenix of inadequate garbage containers was conducted during September and October. These efforts resulted in raising the percentage of adequate garbage cans from an initial 30 percent to 95 percent.

Tempe (check town for Phoenix project) purchased a fog-type machine and started spraying operations late in the season; it has planned to continue operations next season.

The city of Charleston, W. Va., with the aid of polio-fly project personnel, is making an analytical study of its existing refuse collection system. This study is expected to lead to improvements whereby savings will be realized which would better enable the city to afford a twice-weekly collection service

in residential areas.

St. Albans (check town for Charleston project) has started a sanitary landfill. This new landfill is developing satisfactorily under the guidance of the CDC representative, Region III, and the chief sanitarian of the city-county health department.

Dysentery and Diarrhea-Fly Control Program. Most projects of the Dysentery and Diarrhea-Fly Control Program in Arizona, New Mexico, Texas, and Kentucky attained satisfactory fly control during the current season. Sanitation activities such as improving garbage and refuse storage, collection, and disposal, and eliminating animal pens and unsanitary privies, have progressed; however, much more work is needed to effect satisfactory environmental sanitation.

Good control was maintained at the Coolidge-Casa Grande, Ariz., projects, except for one section in Coolidge in which migratory laborers added to the sanitation problem. In Yuma, Ariz., fly counts were much lower than counts in the check town; however, fly populations increased at both cities toward the end of the season. This increased fly activity made more apparent the need for early development of a complete environmental sanitation program.

The program has been instrumental in introducing fly control sanitation measures in a number of Arizona cities. Some improvements noted are: (1) Coolidge and Miami—buying new packer-type garbage trucks, (2) Florence—modeling fly control activities after the Coolidge-Casa Grande project, purchased Hudson sprayer, (3) Eloy (check town) and Winslow—using red tags for garbage can drive, (4) Holbrook—buying Bean residual-type sprayer, and (5) Douglas—using red tags for garbage can drive, removing animal pens, buying Hudson residual-type sprayer.

The city of Carlsbad, N. Mex., has purchased a new garbage collection truck, has nearly doubled its garbage collection personnel, and is drafting an ordinance to require that garbage be wrapped and placed in approved containers. The Junior Chamber of Commerce has aided the educational activities of the fly control program through newspaper releases and talks to schools, on the radio, and to other civic clubs.

At Las Cruces, N. Mex., the film, "Insects as Carriers of Disease," was shown to 25 school groups. The local sanitarian has been very cooperative in solving individual sanitation problems. The clean-up program in the business district has resulted in marked sanitation improvement by indi-

Table 2(a)

STATE	SUPERVISION				TRAINING AND EDUCATIONAL ACTIVITIES				LAY INVESTIGATIONS Premises	ECTOPARASITE CONTROL						EVALUATION ACTIVITIES				
	P.H.S. Man-hours				Meetings	No. Attend- ing	Man- hours	No. Train- ing		Man- hours	Residual Dusting						Rats Trapped	Blood Taken	P.H.S. M.H. & L&LF*	Others M.H. & L&LF*
	State Super. & Adm.	Reg. Super. & Entom.	Ware- house & Shop	Other Man- hours							Cos. Rep.	Premises Dusted	Lb. DDT & lb./ Prem.	Man-hours		M.H. & M.H./ Prem. L&LF*				
														P.H.S.	Others					
Alabama	420	176	80	400					18	23,071	2.9	67,765	799	5,489	0.3	6,288	255	712	184	
Arkansas	361				5	123	1,394					1,134				221	150	4	20	
Florida	644	282	230	2,034				8	36	8	187	6.0	2	219	1.2	3,761	255	300	908	
Georgia	3,933	1,459		840	17	357	389			395	198	45	8,953	539	3,222	0.4	881	551	1,922	
Louisiana	672		556	960						7	2,272	1.6	43	838	0.4	198		32	128	
Mississippi	1,076	360		960	21	170	210			2	110	1.8		32	0.3	32		52		
North Carolina	610			423						4	340	1.9	10	230	0.7	632	17	280	106	
South Carolina	560	160		1,464						2	76	1.7		34	0.4	130	2		371	
Tennessee										2	2,561	0.3		250	.09	650			158	
Texas	2,220	1,180		320						12	1,880	2.3		291	1,218	4,274		13	16	
Virginia**	1,013			495	2	181	4,296	196	1,979							1,509			642	
Total	11,509	3,617	866	7,896	45	831	6,289	204	2,015	395	198	100	39,450	1,684	11,532	105,422	13,216	679	1,944	4,455

Table 2(b)

STATE	SUPERVISION				TRAINING AND EDUCATIONAL ACTIVITIES				LAY INVESTIGATIONS Premises	ECTOPARASITE CONTROL						EVALUATION ACTIVITIES					
	P.H.S. Man-hours				Meetings	No. Attend- ing	Man- hours	No. Train- ing		Man- hours	Residual Dusting						DOT Spray		P.H.S. M.H. & L&LF*	Others M.H. & L&LF*	
	State Super. & Adm.	Reg. Super. & Entom.	Ware- house & Shop	Other Man- hours							Cos. Rep.	Premises Dusted	Lb. DDT & lb./ Prem.	Man-hours		M.H. & M.H./ Prem. L&LF*	Premises Treated	Gal. & Prem.			M.H. & M.H./ Prem. L&LF*
														P.H.S.	Others						
California																					
Colorado	80			84																	
District of Columbia	480							4	32												
Hawaii**																807	1,455	620	474	11,528	
Idaho	60			7	4	69	155		117												
Illinois	304			20															80	201	
Indiana**																					
Kentucky	171				11	219	25													200	
Michigan	33			41																	
Midwest	480	44		84	3	150	390	1	144												
Minnesota																					
Montana**																					
New Jersey					3	400	44														
New Mexico	24																		480	480	
New York	144			136	3	18	88														
Ohio†																					
Oklahoma	239			88	2	29	21												110	176	
Oregon	340			252	2	75	28														
Rhode Island	93			81																	
Utah	417			263	3	2	74	3	158										40	16	
Washington††					3	49	175	7	140												
Wyoming					1	55	48	1	16												
West Virginia	165	54		135	2		144														
Total	3,030	98		1,191	37	766	1,192	16	607							807	1,455	620	1,184	12,601	
GRAND TOTAL	14,539	3,715	866	9,087	82	1,597	7,481	220	2,622	395	198	100	39,450	1,684	11,532	105,422	13,216		3,128	17,056	

*Labor and labor foreman.
 **Includes totals from pay roll period No. 19.
 ***Alabama uses arsenic water.
 †Includes totals of pay roll periods Nos. 17, 18, and 19.
 ††Totals from August through September 1950 monthly report.

vidual store and restaurant owners.

The Seguin, Tex., project has purchased equipment and instituted a sanitary landfill for garbage disposal. Twenty-seven hog pens were eliminated from populous areas adjacent to the city limits. The city continued the extension of its sewerage system and expects to have the system completed in the spring. At the Taft, Tex., project several extensions of sewers have been completed. The San Patricio County attorney and the county health unit personnel were active in getting hog pens removed from the control cities.

The Texas State Department of Health has requested that consideration be given to starting a third fly control project in the State.

The sanitary survey of the Harlan, Ky., project has been completed and plans are in progress for the development of a comprehensive environmental sanitation program.

IMPOUNDED WATER STUDIES

Corps of Engineer Impoundments. A reconnaissance malaria control survey report on four reservoirs on the North Branch of the Susquehanna River and tributaries in New York and Pennsylvania was submitted to the Corps of Engineers. A request was received from the Seattle District for a report on the Albeni Falls project in Idaho. A field investigation of this project was made by the Regional CDC representative at Denver, Colo.

A field trip was made to Raleigh, N. C., to make plans for mosquito control on two proposed sub-impoundments on the Buggs Island Reservoir in North Carolina and Virginia sponsored by the U. S. Fish and Wildlife Service.

Water Resources. A statement of principles relative to disease-transmitting mosquito problems associated with water development projects in the Weber River Basin of Utah was prepared and submitted to the California and Great Basin Drainage Basins office in San Francisco.

Supplement to Impounded Water Manual. In view of recent developments relating to mosquito control on impounded waters, a supplement to "Malaria Control on Impounded Waters" is being prepared by the Communicable Disease Center. Assistant Sanitary Engineer Charles E. Sponagle, who was

transferred from the Environmental Health Center at Cincinnati to the Impounded Water Section on December 11, has been designated to head the project.

Much of the data in the supplement will be obtained from the experiences of the Tennessee Valley Authority, the Corps of Engineers, and State health departments. It is planned to bring information up-to-date concerning the following phases of mosquito control: (1) reservoir clearing, (2) shoreline maintenance, (3) relationship between reservoir operation and aquatic plant production, and (4) improved insecticidal, herbicidal, and arboricidal techniques. In addition, detailed cost data for the various operations will be given.

SPECIAL SERVICES

The fifth and last of the 100 GPM truck-mounted water purification units reconditioned was placed in operation by a test run at the Atlanta water purification plant. As a result of this test, certain delicate parts were reconditioned and final assembly of the chlorinator accomplished.

Proposed Building for the Communicable Disease Center. The Graphic Analysis Charts, the first phase of design for the proposed CDC building at Emory University, Atlanta, were approved by Public Buildings Service in Washington, October 13. The Diagrammatic Sketches were approved by the Chairman of the CDC Building Committee November 6, and by Public Buildings Service November 28.

The architect in charge of CDC plan development, a representative of Laboratory Services, and the Secretary of the Building Committee held a conference in Washington, D. C., with the secretary of the Public Health Service Building Committee and service officers of the Research Facilities Planning Branch of the National Institutes of Health relative to the CDC building plans. While in Washington developments of NIH regarding glassware and animal cage washing and sterilizing were reviewed, and a conference was held with PBS relative to the CDC plans.

During the last month of the quarter, the development of the tentative plans, the third phase, were facilitated by arranging for the development of the 1/4-in. scale drawings of each floor.

ENTOMOLOGIC SERVICES

MALARIA ERADICATION PROGRAM

Summaries of entomological evaluation data for 1950 on the operational efficiency of the Residual Spray Program for malaria eradication have been completed. The results of some 12,000 house inspections made during the year indicate that DDT is continuing to effectively prevent any malaria transmission hazard, since 99.4 percent of the sprayed houses were free of mosquitoes. It would appear also that there is no indication as yet that *Anopheles quadrimaculatus* is developing any resistance to DDT. The 1950 records combined with those collected over the preceding 5 years total 77,600 inspections of sprayed and unsprayed houses. During these 6 years only 1.5 percent of sprayed houses has been found to harbor malaria mosquitoes in contrast to an average house infestation rate of 13.5 percent for unsprayed houses.

In several States, chlordan was used to supplement DDT in an effort to obtain more effective fly control. In each instance, however, no apparent advantage resulted over the use of DDT alone. In general, the records indicate that the use of DDT residuals greatly reduced fly abundance, the percentage (59 percent) of sprayed houses having low fly indices (0-10 flies per grill count) being twice as great as that for unsprayed houses, of which only 31 percent were in the low density group. Results with dieldrin, another of the chlorinated hydrocarbons, which was used for the first time as a chemical control measure for community fly control in 1950, are reported in the Polio Investigations-Fly Control Section.

RIVER BASIN DEVELOPMENT STUDIES

Surveys of mosquitoes and other insects of public health importance in connection with River Basin Development Studies carried on by the Federal Inter-Agency River Basin Committees have been assigned to the Communicable Disease Center. The work is to be the

joint responsibility of the Engineering and Entomologic Services. Two entomologists, Mr. T. E. McNeel and Dr. M. E. Griffiths, have been assigned to the Arkansas-White-Red River Basin Project, and are assembling and analyzing records of health departments and other agencies in the various States of that drainage area. Later, this existing information will be supplemented by field investigations to fill lacunae in selected areas. Work on preliminary plans in connection with the New England-New York River Basin Program was under way late in December. These plans will be discussed in the next quarterly report to appear in the June 1951 CDC Bulletin.

The purpose of these survey activities is to properly evaluate and report on the existing problems related to pests of public health importance, to indicate the probable effects on them of water resources developments, and to recommend basic procedures designed to prevent the creation of public health insect control problems.

MALARIA INVESTIGATIONS

HELENA, ARK., FIELD STATION:

Epidemiological Survey. Routine home visits were made in the intensive study area, but these were greatly handicapped by cotton picking and unsuccessful crops, which increased the number of persons doing day work away from home. Additional blood films on a previously reported case of malaria were obtained, initial blood films were secured from 33 local residents, and 7 films were submitted by doctors. All slides examined were negative. Interviews with local medical practitioners suggest the widespread belief that malaria has vanished from this area due to use of residual DDT and chemotherapeutics.

Anopheline Abundance and Activity. Both adult counts and larval indices showed that the onset of freezing weather early in November was the primary cause of a precipitous decline in the anopheline population.

Of all adult resting stations visited, privies gave the highest counts after the beginning of cold weather. Routine evening checks in homes were initiated and resulted in the finding of two *A. quadrimaculatus* females during October. No anophelines were found in homes during November or December. Thus it is suggested that few or no human blood meals were obtained by anophelines. This is further borne out by the fact that of 178 blooded "quads" collected in October, none had fed on humans, as shown by the precipitin reaction. Also, previously unreported results of precipitin tests for the first quarter showed that only 2 of 1,183 (0.001 percent) *A. quadrimaculatus* had fed on human blood.

Biological Studies. The NIH strain of *A. quadrimaculatus*, recently transferred from the Newton, Ga., Station, is being maintained satisfactorily, as is also a colony of *Culex quinquefasciatus*. Attempts to colonize local wild-caught anophelines were handicapped by the onset of cold weather with resultant depletion of the available population. A comparative study of the biotic potential of NIH, rice field, and delta *quadrimaculatus* was initiated, with preliminary studies of the last named strain to set up techniques and procedure.

Demonstrations to station personnel of sporozoites in fresh salivary gland preparations were facilitated by feeding female *C. quinquefasciatus* on canaries infected with *Plasmodium relictum*. Of 66 female *quinquefasciatus* fed, 35 were dissected 14 days after the infective meal and 11 percent proved positive for sporozoites.

Of a total of 127 wild-caught anopheline females (mainly "quads" and *crucians*) dissected during the quarter, none was found positive for either oocysts or sporozoites. One *Anopheles crucians* contained several larval filariae which resembled larval stages of *Dirofilaria immitis* in morphology but were not thought to be the dog filaria by virtue of their developmental site in the mosquito's thorax.

MANNING, S. C., FIELD STATION:

Epidemiological Survey. Blood films were collected from approximately 83 percent of the population of 2,000 in the intensive study area. Reports of laboratory findings

on films taken have not been received. Examinations of previously collected films continue to be negative. Known positive slides inserted among the survey slides to serve as checks on laboratory accuracy were satisfactorily diagnosed.

Anopheline Abundance. Counts of adult anophelines are being continued throughout the winter using 10 selected stations. As expected, late fall counts have been low: no *A. quadrimaculatus* were observed after the last week in November; *Anopheles punctipennis*, never abundant in the area, was not seen following December 8; *A. crucians* was last observed during the week ending December 15. The weather was unusually cold the final week of November; temperatures as low as 16° F. were reached, and night temperatures did not exceed freezing for a period of 5 days.

Results of weekly larval surveys indicate that low temperature is not decisive in eliminating *A. crucians* larvae from breeding areas unless the population is very small. Previous records and those so far this winter demonstrate that *A. crucians* larvae are very resistant to cold. On December 19, in a pond with ice about ¼-inch thick, the larvae were recovered from beneath the broken ice. Although these particular larvae were sluggish, it has been observed that *A. crucians* larvae are active at water temperatures of 40° F., which is just 5 degrees higher than that beneath the ice.

The significance of hollow trees in the winter hibernation of mosquitoes in this area is being investigated. By means of smoke, the following mosquitoes have been recovered from the 10 hollow trees thus far examined: 2 *A. quadrimaculatus*, 1 *A. punctipennis*, 10 *Uranotaenia sapphirina*, and 1 *Culex restuans*. These trees are located along a water course.

Parasitological Work. Only small numbers of *A. quadrimaculatus* and *A. crucians* were dissected due to the usual seasonal decline in mosquito population. Sporozoites detected in a single gland-positive *A. crucians* subsequently yielded negative results when injected into a parietic at the NIH laboratory at Columbia, S. C.; a medium of citrated human blood was used for the sporozoites. Less than 10,000 wild-caught

anophelines were dissected during the calendar year 1950. More than twice as many dissections were made in 1949, chiefly because of the greater numbers of mosquitoes available then. The percentage of positives in 1950 was approximately 1/3 below that in 1949.

Investigations utilizing mosquitoes as possible vectors in the transmission of the blood parasite (*Leucocytozoon andrewsi*) of domestic chickens have given negative results to date. The mosquitoes were *A. quadrimaculatus* (Q-1 laboratory strain), *Aedes aegypti*, and *C. quinquefasciatus*. These studies will be continued with variations in the procedure.

Another attempt recently to inoculate young chicks with *L. andrewsi* using comminuted tissue from a naturally-infected chicken failed to produce successful transfers. It must be pointed out that the inoculum was derived from a low grade natural infection. Of the 25 chicks inoculated, there was 1 which died 23 days after inoculation; microscopic examinations of the internal organs revealed large numbers of parasites of the genus *Toxoplasma*. Presumably, this organism had been present in the inoculum, although unobserved.

Several chickens naturally infected with *L. andrewsi* have been under observation for many months to ascertain whether any changes in the appearance of the parasite will occur. Round gametocytes have been the only forms noted, with some variations in their numbers.

Twenty-eight wild animals of different species were examined for blood parasites. One gray squirrel of 13 observed was found to harbor microfilariae. A single black vulture which was sampled was carrying microfilariae also. No other parasites were recorded.

NEWTON, GA., FIELD STATION:

Epidemiological Survey. Ten persons of 205 families visited by the station nurse during the quarter had some of the symptoms of malaria; blood films were prepared in each case and returns on eight have been received from the laboratory, all negative. A total of 691 blood films was prepared in a malaria survey of a portion of the experimental area; 673 were negative, and

returns on the remaining 18 have not been received from the laboratory.

Studies of Anopheline Abundance. Drought conditions, already extreme, became even more severe. An already reduced population of *A. quadrimaculatus* was almost eliminated during the last week of November, a period in which freezing temperatures occurred every night. Only one adult *crucians* was observed after the end of October. *A. punctipennis* is a cold weather species at this latitude, and adults of this mosquito were encountered in more than normal frequency.

Biological Work. Until the advent of an extended period of severe cold in late November, work on the colonization of a local strain of *A. quadrimaculatus* in an unheated 15-foot high screened building was continued. In an attempt to encourage mating activities, the lighting effects were variously modified in this tall screened cage. Low candle-power white, red, and blue lights were utilized, but these and other modifications were fruitless since all ova deposited in a concrete water tank were infertile. After the onset of cold weather, attempts were made to colonize *quadrimaculatus* and *punctipennis* in small cages



Outdoor insectary used in rearing *Anopheles* mosquitoes.

in an insectary room where humidity and temperature are controlled, but these attempts have also been unsuccessful.

A study designed to determine the fertility rates of overwintering female anophelines was inaugurated near the close of the quarter. Techniques for dissection of the spermatheca and for the recognition and staining of spermatozoa were formulated.

Keys and techniques for the identification of the common local anophelines in all instars have been worked out.

Parasitology. Dissections were performed on nine specimens of *A. crucians* and one of *punctipennis* which had taken blood from an English sparrow infected with *P. relictum*. All 10 were negative.

Two strains of *P. relictum* are being maintained simultaneously in English sparrows, one by mosquito transmission and the other by blood inoculation. The former has been passed through three hosts, the latter through two. Ninety percent (118) of 132 *C. quinquefasciatus* which had fed on these sparrows were found positive when dissected. The infection rate was only 2½ percent in previous experiments when this mosquito was fed on canaries infected with *P. relictum*. Using *C. quinquefasciatus* as a vector, three successful transmissions of *P. relictum* were made, and one transmission was made by inoculation of dissected sporozoites. There were no failures. Thus far mosquitoes have not become infected when fed on birds with *Plasmodium circumflexum* infections. Attempts to infect ground doves with *P. relictum* and *P. circumflexum* were not successful.

In a continuation of the survey of blood parasites of the avifauna of the area, 88 additional birds representing 26 species were taken. Three specimens were positive for *Plasmodium*, four for *Haemogregarina*, one for filaria, and one infection was not identified.

Eight natural *Plasmodium* infections in the lizard, *Sceloporus undulatus undulatus*, were followed by weekly preparation and exami-

nation of blood films. One *Plasmodium* infection and three *Haemogregarina* infections were found in a shipment of lizards from Kansas.

ECTOPARASITE INVESTIGATIONS

Murine Typhus Activities. Tabulations and analyses have now been completed on records of 7,236 rodent examinations made during the nine preceding months (January through September 1950). The rodents were obtained from the several States as follows: Georgia, 2,768; Alabama, 1,176; North Carolina, 861; Virginia, 483; Texas, 445; Louisiana, 399; Mississippi, 384; Florida, 354; Oklahoma, 196; Tennessee, 138; and South Carolina, 43.

The results of complement fixation tests on these specimens, to determine the presence of murine typhus antibodies (analyzed by type of project, and elapsed time since dusting at premises where the rodents were trapped) are shown in table 1.

These results, which show no significant change from those obtained in 1949, indicate that the percentages of rats with typhus antibodies appear to decrease with the length of the period since dusting, and that 5 percent DDT dust applications give results at least comparable to those with 10 percent DDT dust. The incidence of typhus-positive rat serums from undusted premises fluctuates considerably during the season with higher percentages of positives being grouped in the months of July, August, and September.

The data show considerable variation among the several States, both in the percentage of typhus positive rats from undusted premises, and in the apparent reduction in this

Table 1
RESULTS OF COMPLEMENT FIXATION TESTS
FOR MURINE TYPHUS ANTIBODIES

Elapsed Time after Dusting	Percentage of Rat Serums Positive for Typhus			Percentage of Reduction (Compared to Undusted)	
	10% DDT	5% DDT	Survey	10% DDT	5% DDT
Undusted	11.5	21.8*	13.5	-	-
1-30 days	3.9	24.0*	-	-	-
31-180 days	6.0	10.9*	-	48	50
181-365 days	6.1	7.7	-	47	65
1+ years	3.6	2.2	-	69	90

*Less than 100 rat serums tested

condition due to DDT dusting operations. The percentages of rats having typhus positive serums from undusted premises varied from a high of 27 percent in Louisiana, to a low of 0.9 percent in Virginia. As shown in table 2, dusting apparently caused a reduction in these infection rates ranging from 95 percent in Florida to 0 percent in both North Carolina and Tennessee.

Data collected on the effectiveness of DDT dusting operations in the control of the oriental rat flea, *Xenopsylla cheopis*, show during the period January through September 1950 that 10 percent DDT operations maintained both the percentage of rats infested and the average number of *X. cheopis* per rat at satisfactory low levels during the entire period; also, that some reduction was obtained for more than 1 year. When 5 percent DDT dust was used, the results were also satisfactory but were less consistent, and showed somewhat smaller over-all reductions.

A summary of the control of *X. cheopis* by months, with records for both 10 percent and 5 percent DDT dusted areas included, and for all States combined, has been prepared. This summary shows that for rats collected within 6 months after DDT dusting the percentage of infestation was reduced to 10 percent or less, except on those rats examined during July, when 14 percent were infested. The average number of *X. cheopis* per rat examined did not exceed 0.5 per rat, except during June, when it was 0.6. Rats collected from premises 6 to 12 months after dusting showed an infestation rate of less

than 20 percent during each month, and the average number of *X. cheopis* per rat was satisfactory in all months except July.

During the quarter ending December 1950, records of 1,987 rodent examinations were received for rats examined in 37 counties of 9 Southern States and Illinois. These data will be integrated with those presented here and discussed in the near future.

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

Incidence of Human Encephalitis in Kern County, Calif. During 1950, laboratory diagnoses were made on 20 human cases of St. Louis and 8 human cases of Western equine encephalitis from Kern County. Two of the St. Louis, and two of the Western equine cases occurred in urban Bakersfield; the remainder were from semirural or rural areas of the county. Scattered cases of Western equine encephalitis occurred between June 21 and September 17. St. Louis cases occurred somewhat later, between July 21 and October 9, with the largest number for any 10-day period occurring between September 9 and 18. This phenomenon has led to more careful examination of the seasonal activities of the two most common species of *Culex* in the area, *Culex tarsalis* and *C. quinquefasciatus*, and, this year to the testing of larger numbers of *C. quinquefasciatus* for virus than in the past.

Entomological Studies. Attempts to isolate virus from adult mosquitoes obtained from shelters throughout the winter are being

Table 2
REDUCTION IN TYPHUS INFECTION RATES IN RATS

	DDT Dusting Data	Ala.	Fla.	Ga.	La.	Miss.	N. C.	Tenn.	Tex.
Percentage of serums positive	Undusted	21.4	13.0	20.7	27.2	8.0	3.1	9.5	18.6
	Dusted 31-365 days	4.6	0.6	7.3	6.1	2.4	5.7	*	15.2
	Dusted 1+ years	5.0	*	2.2	*	*	3.1	*	8.8
Percentage reduction from undusted	Dusted 31+ days	79	95	70	78	70	0	0	24

*Less than 25 rat serums tested

made. Earlier efforts to isolate virus from overwintering mosquitoes by the Hooper Foundation have failed but further tests appear to be indicated. So far, the present winter has been milder than usual, and as a consequence, some species of mosquitoes have been continuously active; this is particularly true of *C. quinquefasciatus*. On the other hand, *C. tarsalis* has almost completely ceased feeding and laying eggs, although occasionally, gravid or engorged females and a few males are captured. Nearly 3,500 mosquitoes (three genera and six species) were collected and frozen for virus studies.

Isolation of Virus from Mosquitoes. Out of a total of 2,843 *C. tarsalis* tested between June and September 1950, 14 virus isolations have been made; these include 6 Western equine, 1 St. Louis, and 7 unidentified. For the first time a virus (still unidentified) has been isolated from *C. quinquefasciatus*; to date, 5,608 specimens of this species have been tested. No positive isolations were made from the 11,206 *Aedes nigromaculis* and 1,066 *Aedes dorsalis* tested.

Calculation of Vector Infection Rates. Epidemiological studies have been handicapped by a lack of accurate figures on vector infection rates. Up to the present time, crude calculations have been based on the number of virus isolations as compared with total specimens tested, with only occasional consideration being given to variations in pool size and other affecting factors.

Dr. James Watt of the Public Health Service has designed a method of variable pool size sampling which, it appears, will lend itself to statistical evaluation in studies of vector infection rates. Dr. Watt has invited this unit to participate in an evaluation of the technique, and it is proposed that the remaining samples of over 29,000 *C. tarsalis* collected in 1950 be utilized. Results will be reported later.

Transmission Studies. Studies on the relationship of four species of mosquitoes and Western equine and St. Louis encephalitic viruses of this area are under way. The tests are planned to determine whether normal mosquitoes contain nonspecific

neutralizing substances which might affect the detection of virus in routine isolation attempts. In these tests, normal adults of *C. tarsalis*, *C. quinquefasciatus*, *A. nigromaculis*, and *A. franciscanus* were reared from wild larvae and frozen in lots of 10, 25, 50, and 75. Each lot of mosquitoes is to be ground, mixed with various concentrations of virus, and inoculated into mice. Other studies are designed to determine the fate of neutralizing antibodies specific for Western equine and St. Louis viruses. Mosquitoes fed on immune rabbit serum of known neutralizing power are killed at 24-hour intervals and frozen. These samples are to be tested against homologous virus at various concentrations at an early date.

FLY-POLIO INVESTIGATIONS

Poliomyelitis Investigations-Fly Control Programs. Limited control operations in effect at the Charleston, W. Va., and Topeka, Kans., projects ceased with the advent of cold weather in late October. Satisfactory control prevailed in both cities throughout the month, density levels remaining at or below 2.0 flies per grill count.

At Phoenix, Ariz., satisfactory fly control was not obtained in the second quarter. Since the failure to reduce fly densities by residual spray treatment with dieldrin had been attributed in part to the method of application and to insufficient dosages, further tests were undertaken to determine the significance of these factors. Nine blocks were selected in groups of three as follows, each group representing a different sanitation level:

1. Low class residential blocks without alleys, garbage collection, or sewage disposal.
2. Low class residential blocks with alleys, garbage collection, and sewage disposal.
3. Low middle class residential blocks with good garbage collection and sewage disposal but with animal pens.

Of the three blocks in each group, one block received a single application of dieldrin (plus rosin) at a rate of 50 mg./sq. ft.; the second, chlordan at 200 mg./sq. ft.; and the third, DDT at 200 mg./sq. ft. Blocks in types 2 and 3 were encircled by blocks

of relatively low fly densities. In type 1 the blocks of high fly prevalence surrounding the test area received periodic space sprays to minimize infiltration of flies into the treated blocks.

Spraying of all blocks was conducted under the guidance of professional personnel with every effort being made to treat all fly resting foci. As a result of these intensive coverages, the amount of insecticides and the time expended were far in excess of those utilized under normal operating conditions.

Results (figure 1) reveal the complete lack of effectiveness of any one of the three insecticides regardless of the type of block concerned. In the substandard area with pretreatment densities above 80 flies per grill count, premises-wide treatment exerted no suppressive effect upon the fly population, all posttreatment counts being at or above pretreatment levels.

Data for the tests in areas of lesser fly densities (12 to 43 flies per grill count and 4 to 7 flies per grill count) reflect a slight reduction in densities for several days following the DDT and dieldrin treatments in type 2 blocks. Inasmuch as extensive suppressive action of effective insecticides may be mitigated to a large extent in the face of a complete lack of sanitation (type 1), the presumption could be made that the latter was largely responsible for the control failure in the substandard blocks. However, the results with the block types 2 and 3 establish this factor to be of relatively little significance; the basis for the negative findings lies in the lack of residual toxicity of these insecticides to *Musca domestica*.

Analyses of larval survey data for Topeka, Kans., reveals garbage, grass clippings, and dog excrement to be the predominant substrates available for fly breedings in the urbanized areas. Only 0.6 percent of the grass clippings, 7.1 percent of garbage in containers, and 29 percent of scattered garbage were positive for breeding as compared to 75.3 percent infestation of dog stools. The latter, however, produced primarily Sarcophagidae, whereas garbage served as a common source of *M. domestica* and various species of blowflies (*Phaenicia pallescens*,

Phaenicia sericata, *Phormia regina*, and *Callitroga macellaria*). Because house flies and blowflies are the principal flies encountered on the grill and in dwellings and stores, dog excrement as compared to garbage plays a relatively minor role in producing flies which influence the over-all control picture.

As part of the overwintering studies at Charleston, W. Va., routine sampling of six selected stations continued. Despite freezing temperatures, fly larvae and puparia were recovered from all stations throughout November and December. At dumps, adult *Ophyra* appeared to be less affected by cool weather than other species, this fly occurring in numbers at temperatures as low as 40° to 46° F.

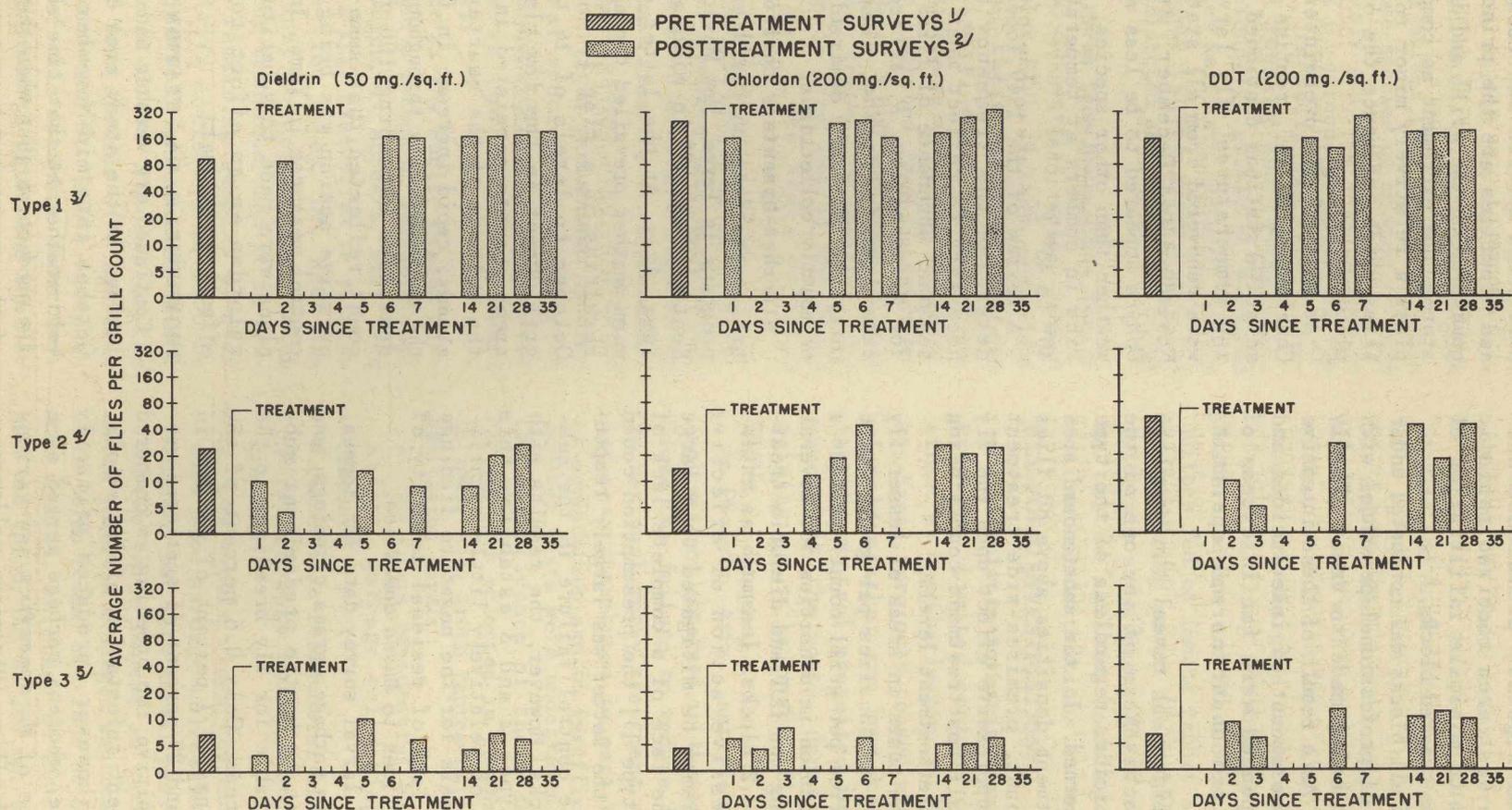
A review of the 1949 Topeka trap data to determine the frequency of collections necessary to reflect most accurately the seasonal abundance of flies indicated that for *M. domestica*, *P. sericata*, *P. pallescens*, and *P. regina*, samples at weekly intervals were more desirable than biweekly or monthly collections.

Diarrhea-Dysentery Control Program. Control operations on the diarrhea-dysentery programs in Texas, New Mexico, Arizona, and Kentucky ceased in midquarter except at Yuma, Ariz. At the latter city, unusually warm weather prevailed throughout the period, resulting in a rise in fly densities in October to levels of 16 to 26 flies per grill count in the low class residential areas. Counts persisted in this range for the balance of the quarter. However, the steady, rapid increase in fly densities of the untreated city throughout the quarter to densities exceeding 100 flies per grill count reflected that some degree of suppressive action was being exerted by the control measures in Yuma. In late December, plans were made to substitute dieldrin for chlordan in an effort to obtain a more effective residual.

THOMASVILLE, GA., STATION:

Continued dry weather and rising fly populations in the study area extended through October into mid-November. The advent of cold weather at that time sharply curtailed fly production just when the population peak of the season had been reached. Because of

Figure 1
EFFECTIVENESS OF DIELDRIN, CHLORDAN, AND DDT AS OUTDOOR RESIDUAL
TREATMENTS IN REDUCING FLY DENSITIES (*M. domestica*) IN NINE BLOCKS
REPRESENTING THREE LEVELS OF ENVIRONMENTAL SANITATION.
(PHOENIX, ARIZONA - AUGUST 23 THROUGH SEPTEMBER 30, 1950)



1/ Average of four daily inspections made within a 2-week period preceding treatment.

2/ Week 1: Three to four inspections, with average of each inspection as indicated; Weeks 2-5 (days 14, 21, etc.): Two to three inspections per week, with weekly averages indicated.

3/ Low class residential blocks without alleys, garbage collection, or sewage disposal.

4/ Low class residential blocks with alleys, garbage collection, and sewage disposal.

5/ Low middle class residential blocks with good garbage and sewage disposal but with animal pens.

the length and severity of the cold period, fly density studies as well as all operational activities were suspended.

Dysentery Studies. As reported previously, chlordan and dieldrin residual sprays had become virtually ineffectual against house fly populations by mid-September. DDT residuals were found to be much more effective than these materials and although DDT failed to give the degree of fly control desired, it was used in all treatment towns for the remainder of the quarter. Figure 2 shows the rising fly indices both outdoors and indoors from mid-September through the remainder of the season.

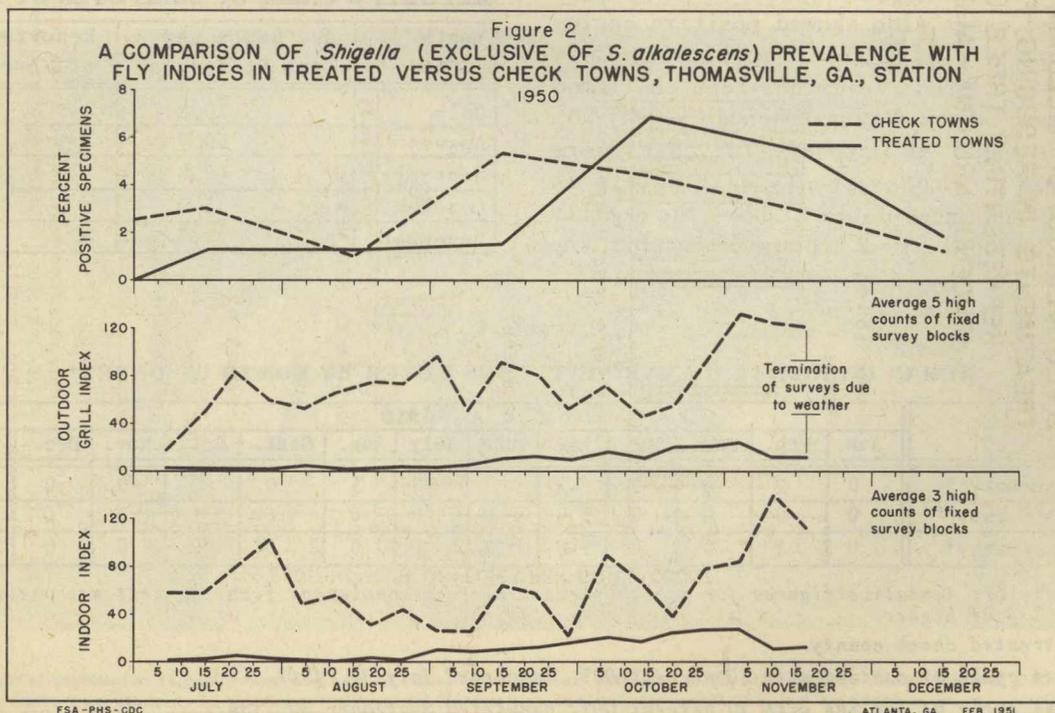
The cessation of field observations in mid-November permitted an intensification in the laboratory aspects of fly ecology and insecticide resistance. Thus far, the F₃ generations of colonies of resistant flies from treated towns still exhibit a very high degree of resistance to chlordan and dieldrin, although DDT resistance is only moderate, as judged by tests at field dosage levels. Studies upon the effects of outdoor environmental temperatures upon fly activities, supplementing those reported in the CDC Bulletin,* paralleled the labo-

ratory studies previously reported as long as temperature changes were rapid. The difference of greatest significance was the increased activity at temperatures under 70° F., when temperature increases were gradual. Initial tests of house fly longevity, under standard conditions of 80° F. and 65 percent relative humidity, resulted in a male mortality curve with a mode of 9 days and maximum of 20 days, and a female mortality curve with a mode of 20 days and a maximum of 32 days. These studies will be continued in an effort to approximate the average ages of fly samples from various sources, and under various temperature conditions.

With the termination of fly control operations, sanitational studies have been intensified in the area. Improvements in cost analysis of Thomasville garbage service as well as in the location of the sanitary landfill, should be forthcoming as a result of these studies.

Epidemiological studies included the revisiting of 4,670 homes in the study area and the processing of 2,093 rectal swab cultures from children under 10 years of age. Of 53 cultures positive for pathogenic *Shigella* spp., 16 were from treated (sprayed) and 15 from untreated towns. Rates for these

*CDC Bulletin IX (5): 34-35, May 1950.



towns, expressed as percentage positive specimens, are depicted in figure 2 which also shows the comparative fly indices. The degree of significance of the possible positive correlation of these correspondingly increased rates has not been determined as yet, but follows the pattern previously established.

A total of 12 positive *Salmonella* cultures was also obtained in the processing of the rectal swab cultures from children. In addition, a total of 2,450 domestic animal fecal samples from residential premises was cultured, yielding 20 positive *Salmonella* cultures, while cultures from 246 small animals from a local veterinary hospital yielded 22 positive cultures. A new *Salmonella* has been isolated from an asymptomatic dog included in the latter group.

A blood serum reference library has been started, to be used in the event of future epidemics in the area, and thus far includes over 300 specimens.

Typhus Studies Investigation. Epidemiological studies of human typhus were continued with two Grady County cases confirmed, making a total of 22 confirmed cases from Grady County for calendar year 1950. An additional case from this county with a history of suspected typhus fever is pending further blood reports. One of the above confirmed cases also showed positive agglutinations of 1/320 for brucellosis. Only one case of typhus fever has been confirmed for Thomas County during calendar year 1950, with the onset in October. Two cases were confirmed in Brooks County with onsets in February and June. Table 3 shows the monthly record of confirmed typhus cases for the

calendar year 1950.

Eye Gnat Conjunctivitis Studies. The study of conjunctivitis in school children begun in October 1949, was completed in December 1950. *Hemophilus aegyptius* (Koch-Weeks) was recovered chiefly from children presenting frank signs of conjunctivitis in the months of September, October, and November.

In the household study of conjunctivitis, 556 individuals were cultured, including 397 cultured previously. *Hemophilus* bacteria were recovered in 225 instances, including 112 *H. aegyptius*, 47 *H. influenzae*, 2 *Moraxella* sp., and 7 with both *H. aegyptius* and *H. influenzae*. In households studied as controls, 127 persons were cultured, and *Hemophilus* including both types was recovered in 16 instances.

The routine prevalence trapping of *Hippelates* was continued through the month of November. The results of the season's trapping, summarized by months, show a peak of abundance in July and August, with a marked decrease in September which may possibly be explained by deficient rainfall. In table 4, it will be seen that the reported cases

Table 4

GNATS TRAPPED AND
REPORTED CASES OF SORE EYES BY MONTHS

Month (1950)	Av. Gnats per Trap Collection	Reported Cases of Sore Eyes
July	70.8	40
August	68.7	83
September	9.3	148
October	15.0	67
November	9.7	5

Table 3

HUMAN INCIDENCE OF MURINE TYPHUS FEVER BY MONTH OF ONSET*

	1950												Total
	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	
Grady County**	0	2	4	2	3	1	3	5	0	2	0	0	22
Thomas County***	0	0	0	0	0	0	0	0	0	1	0	0	1
Brooks County†	0	1	0	0	0	1	0	0	0	0	0	0	2

*These are tentative figures for probably cases where a complement fixation test was positive at 1:4 or higher.

**Untreated check county.

***Last cycle of dusting with 10 percent DDT, completed July 30, 1947.

†Last cycle of dusting with 10 percent DDT, completed September 30, 1947.

of sore eyes reached their peak in September, a month later than the peak of eye gnat abundance.

A colony of *Hippelates pusio* was estab-

lished in the laboratory with human excrement as the larval food. By the end of the year, larvae of the second generation had begun to develop.

LABORATORY SERVICES

MOVING OF LABORATORIES

The Clinical Pathology Section has completed transfer of personnel and equipment from the Veterans' Administration hospital facility at Chamblee, Ga., to new space in a building adjacent to Grady Hospital, Atlanta. Since this move, most activities have been directed to studies of Grady routine techniques, to revision of some of these, and to completion of the Clinical Pathology Ward Manual.

During October the Parasitology Laboratories and teaching facilities were removed from the old quarters at 291 Peachtree St., Atlanta, into two buildings at the Veterans' Administration hospital facility, Chamblee.

Dr. Thomas P. Hughes, formerly with the Rockefeller Foundation, has joined the staff of the Virus and Rickettsia Section as Bacteriologist-in-Charge of the Virus Unit.

WHO INFLUENZA STUDY PROGRAM PARTICIPATION

The Advisory Committee of this program has designated the Virus and Rickettsia Section, Montgomery, Ala., as Regional Laboratory for Alabama, Arkansas, Florida, Georgia, Kentucky, Louisiana, Mississippi, New Mexico, North Carolina, Oklahoma, South Carolina, Tennessee, Texas, Virginia, and other State or local health departments which wish to collaborate with CDC.

As Regional Laboratory, the Montgomery Section: (1) isolates and identifies influenza virus; (2) forwards isolates to the Strain Study Center; (3) selects and advises collaborating laboratories in their Regions and supplies these laboratories with serologic test materials; and (4) reports to the Information Center isolations of influenza virus or other viruses causing unusual outbreaks of infec-



A medical technician is performing analysis of blood for nonprotein nitrogen at the new quarters of the Clinical Pathology Laboratory. Two students of the School of Medical Technology of Grady Memorial Hospital are looking on.

tious disease.

The materials used for laboratory diagnosis of influenza in this program have been supplied from the Virus and Rickettsia Section. Participating laboratories can request materials by direct application to the officer in charge. Since the inception of this program, large amounts of influenza strains A, A-prime, and B, together with their homologous antisera, have been supplied to all the collaborating laboratories. Nearly 500 containers of virus and of antisera have been distributed. Other activities of the Virus and Rickettsia Section are shown in figure 1.

CONSULTATION SERVICES

Program reviews were completed for the Department of Health Laboratories of Indiana, Michigan, South Dakota, Tennessee, and Texas. In answer to a special request from Region VIII, the laboratory facilities of the Kiowa Indian Hospital, at Lawton, Okla., were reviewed.

Evaluation Programs. Official ratings for the National Parasitological Evaluation Program were sent to the State health officers and to the State laboratory directors on December 20 and 22, 1950.

As a referee for the Texas Intra-State Evaluation Program, the Parasitology Section examined 16 test specimens.

Following CDC investigation of reported epidemic amebiasis in certain parishes of Louisiana, that State department of health has announced initiation of an intrastate parasitological program for which the Parasitology Laboratories will serve as referee-consultant.

Several requests from various States have sought the direct participation of Laboratory Services in projected intrastate evaluation programs. Some of these have asked that test specimens be mailed directly from CDC laboratories to individual participants. It is felt that the laboratories should not assist intrastate programs by mailing specimens individually and by scorekeeping for individual States. However, in accordance with precedent participation, any of the Laboratory Services Units will render consultative and referee service and these Units can supply some of the materials for redistribution to individual laboratories.

Iowa Amebiasis Survey. Following a cooperative amebiasis survey of a State hospital with a physician from Epidemiologic Services in September 1950, a laboratory diagnostic survey was undertaken to determine the role of *Endamoeba histo-*

lytica in the epidemic of "enteritis." A staff member from the Parasitology Laboratories spent a week at the hospital to collect fecal specimens and blood samples from 150 inmates. Serologic and parasitological examinations were then made at the Chamblee, Ga., laboratories while samples from each stool specimen were examined by the Iowa State Hygienic Laboratory in Iowa City for bacterial pathogens.

By December 31, no enteric bacterial pathogens had been detected, while incomplete results indicate that approximately half the patients harbor *E. histolytica*. Mass therapy has been advised and laboratory surveillance and posttreatment examination, both serologic and microscopic, have been arranged to evaluate the results.

Diphtheria Diagnostic Methods. In November, at the request of city and State health officers, a representative of Laboratory Services reviewed diphtheria diagnostic methods in the laboratories of the Detroit Department of Health Laboratories. Recommendations in accordance with the epidemiological problem were presented.

Upon request from the Epidemiologic Services of CDC, epidemiological and bacteriological investigations of reported unexpected incidence of diphtheria in the State of Mississippi were made.

A Subunit of the Special Bacteriology Laboratories has been assigned to the Arizona State Department of Health to provide local laboratory facilities for Epidemiologic Services investigations in Phoenix. During the 6 weeks of function, 269 rectal swabs were cultured for enteric pathogens and 20 pharyngeal swabs were cultured; 19 *Shigella*, 9 *Salmonella*, and 43 paracolons or suspected cultures were isolated and returned to Atlanta for final determination.

Streptococcus typing serums were sent to 13 States in answer to 21 requests for 184 ml. of grouping serums and for 612 ml. of typing serums. Three new recipient laboratories were added to the list supplied from CDC. The quantity of serums distributed is nearly double that mailed during the same period 1 year ago.

The distribution of Arizona polyvalent serum and of serums for *Escherichia coli* 055:B5 and for 0111:B4 has resulted in submission of a number of cultures associated with gastroenteritis. Most of the *E. coli* cultures came from infants, born healthy and with enteritis.

During the period October-December, 200 ml. of *Klebsiella* antisera, 5,000 ml. of paracolon ser-

ums, 1,300 ml. of *Shigella* serums, and 8,600 ml. of *E. coli* serums were prepared. During the calendar year 1950, 3,052 enteric cultures and 12,660 ml. of diagnostic serums were distributed.

Arrangements have been made for the Mycology Unit to furnish some diagnostic services to the Alto, Ga., Venereal Disease Rapid Treatment Center.

Candida albicans vaccines were prepared, upon request, for two Veterans' Administration hospitals, a city hospital, and a university hospital.

During the Atlanta Chamber of Commerce Health Week, in collaboration with the local Medical Society and the State and local public health agencies, Clinical Pathology technicians made hemoglobin determinations for more than 600 individuals.

REFERENCE DIAGNOSIS

Two hundred and eighty-two requests were received for diagnostic examination of 509 specimens from 34 States, the District of Columbia, Hawaii, and Canada. In this material, 151 pathogenic fungi were identified, including 2 *Blastomyces dermatitidis* and 1 *Coccidioides immitis* isolations.

A total of 2,171 complement fixation tests for virus antibody on 696 serums submitted from 31 States was completed; neutralization tests for antibodies indicative of the virus encephalitides totaled 369 for 286 serums from 37 States.

Virus isolations were attempted on 4 poliomyelitis specimens from 2 States, on 32 Coxsackie virus specimens from 5 States, and on 25 miscellaneous specimens from 14 States.

Diphtheria surveillance in Georgia based upon examination of routine specimens for diagnosis has shown that diphtheria appeared later than usual this winter, and among the 826 specimens, *Corynebacterium diphtheriae* was not found as frequently as before. A high incidence of *gravis* type found in cultures from one county is of great interest since this type is infrequently found elsewhere in this country. This is the second year an outbreak of *gravis* cases has occurred in this locality. If a similar increase is found next year, carrier surveys would be indicated.

Enteric bacteriology reference diagnosis materials identified during the quarter totaled 1,399 specimens, of which 851 were from humans: 272 *Salmonella*, 152 *Shigella*, 185 paracolon, 49 *alkalescens-dispar*, 127 *E. coli*, and others. *Salmonella* and paracolon made up the majority of 404 cultures from animals; 13 isolates from food included 2 *Salmonella* and 6 paracolon organisms.

TRAINING

Training courses offered by Laboratory Services are shown in table 1. Upon request from the Epidemiologic Services of CDC a special course has been developed to meet the expressed needs of public health nurses. Offered for the first time, the 5-day course was presented by 15 Unit and Section Chiefs from Mycology, Parasitology, Virology, and Bacteriology.

Intended primarily for nurses, the training approach is designed to show: basic reasons for collecting each type of specimen, proper facilities and equipment for collection, steps in actual collection of specimens, disposition of specimens after collection, and action of the nurse on the basis of her evaluation of reports.

Several procedures recently developed in the Parasitology Laboratories were used in the course presented this quarter: (1) Methocel with neutral red to immobilize and stain intestinal flagellates gave good results on cultures from B-D medium but killed organisms from Balamuth's medium; (2) students regularly cultured *Leishmania donovani* in hamster spleen minced into Locke's solution containing 500 units each of penicillin and of streptomycin per ml.; (3) satisfactory staining of fecal protozoa resulted from colloidal iodine wet-mount preparations.

An intensive 2-day course on the superficial and cutaneous fungi was given for the members of the Academy of Dermatologists at their Annual Meeting December 3-4 at Chicago.

A week of instruction in plastics preparation of museum specimens was given to visitors from Mexico and Brazil. Intensive technical instruction in mycological procedures was given for visitors from Cuba, Paraguay, and Venezuela.

METHODOLOGY RESEARCH

Histoplasmosis studies with materials from Tennessee were conducted as follows: gastric mucin procedures were added to indirect methods for the detection of fungi; evaluation of vaseline-coated slides as entrapment media for spores included the study of slides exposed daily in Williamson County, Tenn.

Physiological studies have been completed with *Trichophyton violaceum*; similar studies have been continued in two genera of skin fungi and 175 strains of *C. albicans*. Improvement of diagnostic media is based upon these physiological studies.

Mice were immunized against Coxsackie viruses, types 2 and 4, and developed neutralizing anti-

bodies. Upon challenge, these animals proved to be uniformly susceptible to Lansing strain poliomyelitis. Coxsackie viruses 2 and 4 do not seem to protect mice against Lansing poliomyelitis.

Monkeys which had been inoculated with several strains of Coxsackie viruses showed neutralizing antibodies over periods of as much as 15 weeks when tested against the homologous strains. No

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	Hospi- tals	Univer- sities	Foreign Students*	
Laboratory Diagnosis of Enteric Diseases Part 1 (Second Course)	Oct. 9 to Oct. 13	11	1	7	-	1	2	22
Laboratory Diagnosis of Enteric Diseases Part 2 (Second course)	Oct. 16 to Oct. 27	10	1	6	-	1	3	21
Laboratory Diagnosis of Parasitic Diseases Part 2 (Sixteenth course)	Oct. 9 to Oct. 27	2	1	10	3	-	-	16
Laboratory Diagnosis of Syphilis** (Fourth course)	Oct. 16 to Oct. 27	2	2	1	-	1	1	7
Phage Typing of <i>Salmonella typhosa</i> (Fourth course)	Oct. 30 to Nov. 3	2	-	-	-	-	-	2
Microbiology for Public Health Nurses*** (First course)	Nov. 13 to Nov. 17	-	8	-	-	-	-	8
Laboratory Diagnosis of Rabies† (Fifth course)	Nov. 27 to Dec. 1	4	-	2	-	2	-	8
Preparation and Standard- ization of Serologic Reagents** (First course)	Nov. 27 to Dec. 15	3	-	-	-	-	-	3
Laboratory Diagnosis of Tuberculosis†† (Sixth course)	Dec. 4 to Dec. 15	4	-	5	-	-	3	12

*Foreign students represented the following countries: Brazil, Belgium, Canada, Mexico, and Venezuela.

**Courses given in cooperation with Venereal Disease Research Laboratories, Division of Venereal Disease.

***Course given in cooperation with Epidemiologic Services, CDC.

†Course given in cooperation with Veterinary Public Health Services, CDC.

††Course given in cooperation with Division of Tuberculosis.

antibodies were demonstrable at any time following intranasal instillation of the viruses in monkeys.

E. E. E. Studies. *Aedes aegypti* females were fed upon 6-day-old chicks which had an Eastern equine encephalomyelitis (E. E. E.) viremia. The mosquitoes then were fed on a normal horse after incubation periods of 6 to 10 days. The horse did not develop viremia, nor did it show neutralizing antibodies, although transmission of virus to baby mice was accomplished by feeding similar *Aedes* on them.

New research problems included E. E. E. vector studies with the *Culiseta melanura* strain of virus isolated during Louisiana studies.

Leptospirosis Studies. *Leptospira* species present a number of biological and of purely technical problems to the investigator. A long-time study of survival under varying degrees of refrigeration has begun to provide information on maintenance of cultures and survival potentials at low temperatures.

Strains of *Leptospira* isolated from cattle have been added to the stock collection and determination of their serologic relationships to other strains was begun. Antigens of *Leptospira pomona* and homologous antisera have been produced in small quantities to meet requests for special diagnostic study.

Leptospirosis diagnosis specimens totaled 595 serum and blood samples submitted from 29 States, Alaska, Hawaii, Puerto Rico, and Cuba. Among these, 366 were tested against only *Leptospira icterohaemorrhagiae* and *Leptospira canicola*—17 human serums and 4 dog serums were positive. The positive specimens came from Florida, Georgia, Louisiana, Maryland, Massachusetts, Ohio, Pennsylvania, Tennessee, Alaska, Hawaii, Puerto Rico, and Cuba.

Attention should be directed to certain unexpected findings. In past reports it has been stated that a number of serums reacted with *canicola* (dog strain) antigens at equal or higher titers than with *icterohaemorrhagiae* (rat strains) antigens; this is not the usual finding as reported in the many published reports in the United States. It seems that the results reported here must reflect a preponderance of *canicola* infections or reaction to *Leptospira* strains presently unknown.

Other leptospirosis serums, not described above, were sent from the Virus and Rickettsia Section and represent collections from humans and animals in an area where an outbreak of unusual disease

has been attributed to *L. pomona* infection.

Culture-Diagnosis of Protozoa. Tests with sodium azide and antibiotics to facilitate culture-diagnosis of protozoa in fecal specimens included specimens shipped from the Iowa survey. Twice as many *E. histolytica* were cultured from "azide" specimens as grew from identical source material, untreated.

Projects in Connection with Defense Activities. New projects in the Parasitology and Mycology Section included three problems directly referable to defense activities.

Cooperative studies with Technical Development Services to determine and improve the efficiency of the "continuous recording particle sampler" have been continued.

Bacteriological Research. The bacteriological reference diagnosis service has continued to provide considerable numbers of difficult organisms resembling the tribe *Mimeae*; excellent opportunity is offered to continue studies of the biological properties, serology, and taxonomic and pathogenic relationships of this little-studied group.

Research in the Streptococcus Laboratories was directed toward improvement of techniques for the bulk production of typing serums. After the immunization of 76 rabbits, 3,000 ml. of suitable serum was obtained. Most of this must be absorbed before distribution and there remain a score of strains to which satisfactory immunological response has not been obtained.

Among the 636 *Salmonella* cultures diagnosed, 5 new types were recognized and their antigenic formulas determined.

A study of the "O" antigen groups present in the "29911" group of paracolony bacteria was begun; at the present time, 28 "O" groups have been found.

Serology Studies. The study of a "polyantigen" as a screening test for diagnosis of rickettsial infection has been completed; a pooled antigen will detect all rickettsial antibodies in human serums and reacting serums can be specifically tested with single antigens to decrease cost of wholesale testing.

Tuberculosis Research. A total of 519 serum specimens was received as part of a study to evaluate the hemagglutination test as an aid to diagnosis of tuberculosis.

It has been found that centrifugation will yield somewhat larger numbers of tubercle bacilli in sediment than in supernatant fluid. The disproportional

tionate distribution is not, however, great enough to consider centrifugation of digested sputum material (3,000 r.p.m. for 15 min.) as a highly efficient concentration in technique.

The intradermal virulence test for tubercle bacilli appears to reduce time required for the usual test; since four tests can be performed with each guinea pig, the number of animals used can be much reduced. Hamsters are not better than guinea pigs for virulence tests.

For the diagnostic isolation of tubercle bacilli, Peizer medium is not as sensitive as Lowenstein's but larger colonies appear; the time of first evidence of growth is about the same.

To determine persistence of viability and virulence under storage conditions, entire sets of mycobacterial cultures have been preserved in replicate by each of seven methods; specimens will be reanimated from each lot at time intervals up to 3 years.

To reduce the rate of contamination, penicillin at various concentrations has been added to digest concentrates before culture is attempted. Account has been taken of a possible adverse effect of the drug on tubercle bacilli.

To enable a rapid estimation of the proportion of viable cells in BCG vaccines, oxidation-reduction potential measurements will be compared with parallel colony counts on media.

Animal Husbandry Studies. New breeding quarters have been established at Montgomery, Ala., with an expected minimum production of 1,200 mice per week. Under optimum conditions as many as 4,000 mice per week might be expected. This will facilitate the conduct of experimental procedures during the last half of this fiscal year.

COOPERATIVE STUDIES AND SURVEYS

To detect evidence of poliomyelitis, neutralization tests against Lansing virus were performed on 16 serums from four States. Poliomyelitis virus was demonstrated in 6 of 10 fecal specimens from Paulding, Ohio. Two cases involving paralysis were investigated at Columbus, Ga.

For the Midwestern CDC Activities 1,115 neutralization tests against Western equine encephalitis (W.E.E.) and St. Louis encephalomyelitis (St. L.) were performed; virus isolations were tried, unsuccessfully, with 396 vertebrate specimens and with 180 lots of arthropods.

From previous collections of wild bird serums and of mosquitoes collected by the Midwestern CDC Activities at Greeley, Colo., five virus strains

have been obtained; from three wild bird serums and from two lots of mosquitoes, the viruses isolated correspond to Western equine encephalomyelitis virus.

The virus (BTG No. 1) isolated from the blood of a purple grackle shot in Louisiana has been identified as E. E. E. virus.

Neutralization tests on serums from wild birds collected in the Louisiana survey showed evidence of E. E. E. antibodies in two pools of specimens from seven red-winged blackbirds.

Arthropods and bird bloods were taken near Ponchatoula, La., in connection with the continuing project there.

From Mississippi and Louisiana collections, 118 lots of arthropods totaling 3,160 specimens were screened for virus by mouse inoculation. No virus was recovered.

The three mobile plague survey units continued wild rodent survey activities along the eastern border of known infected territory; six counties in Texas were surveyed. None of the specimens from Texas or from Oklahoma, New Mexico, or Washington were positive for plague.

Domestic rodent control activities yielded 3,383 domestic rodents from vessels and from cities in California and Washington. Study of these and their ectoparasites revealed no evidence of plague.

EPIDEMIC AID

An epidemic of disease with central nervous system symptomatology suggestive of encephalitis occurred in Geneva, Ala. Upon request from the State health officer a field crew from the Virus Laboratory investigated this outbreak. Serologic evidence from the laboratories of a consultant indicated that the disease was due to *L. pomona*. Epidemiological follow-up indicated probable source and optimal environmental conditions for transmittal of leptospirosis in a classical manner. This outbreak is the first of leptospirosis with central nervous system symptoms, and the first described outbreak of human *pomona* infection in the United States. Follow-up on this investigation continues with the cooperation of the Bacteriology Section at Chamblee, Ga.

A human case and horse cases of equine encephalomyelitis were investigated in Plaquemines Parish, La., during December.

In Harrison and Hancock Counties, Miss., arthropods were collected in the vicinity of recent equine cases of encephalomyelitis which occurred during October.

SURVEY MATERIALS

DIAGNOSTIC STUDIES ON SURVEY SPECIMENS:

Parasitology. There were 5,632 blood films examined for malaria parasites as follows:

State	Slides	Unsatis.	Positive
Georgia	721	9	0
North Carolina	1,438	2	0
South Carolina	2,657	22	(5) Known pos. as controls
Indo-China	816	56	63
Totals	5,632	89	68

Bacteriology. From Helena, Ark., and from Manning, S. C., 859 mosquitoes were submitted for host-preference determinations. Among these were specimens with fictitious data to serve as laboratory control materials.

Complement fixation tests for murine typhus antibodies in rat serums were conducted with the results shown in table 2.

VENEREAL DISEASE RESEARCH LABORATORY

The Bacteriology Section of this laboratory is now virtually completed and facilities are available for the performance of the Nelson Test. However, until the test has been more adequately standardized, routine specimens will not be ac-

Table 2

TESTS FOR MURINE TYPHUS ANTIBODIES IN RAT SERUMS

State	Serum	No. Positive 1:8	% Positive
Alabama	543	159	29.3
Florida	191	13	6.8
Georgia	770	70	9.1
Hawaii	29	0	-
Illinois	11	0	-
Kentucky	14	0	-
Mississippi	34	9	26.4
Nebraska	15	0	-
South Carolina	2	0	-
Tennessee	3	2	66.6
Totals	1,612	253	15.7

cepted on a large scale, but rather, the attempt will be made to improve the test as it now exists.

Training courses have been scheduled for the calendar year of 1951. The training program offered by the Laboratory includes a course for laboratory directors. A course in the manufacture and standardization of serologic reagents is offered by the Serology Section in addition to the regular 2-week courses in serologic tests for syphilis. For the first time, a course will be offered by the Bacteriology Section in *Treponema pallidum* immobilization.

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.)

TOXICOLOGY

TOXICITY OF DIELDRIN:

Effects of Dermal Applications of Various Formulations. The results of chronic tests remain essentially unchanged. An interesting case history

is reported for a rat that received 161 doses at the rate of 20 mg./kg./day, 5 days a week. Further treatment was discontinued because the animal was observed in a short, violent convulsion. It suffered five observed convulsions of which four occurred after dosing with dieldrin was discontinued. The last convulsion was 120 days after dieldrin was discontinued, and 149 days before death. The rat died on the 501st experimental day, 269 days after dosing was stopped. Autopsy revealed pneumonia with complications. Thus, for the better part of a year this rat survived, in a state of apparent good health although under the stress of intermittent convulsions, many of which

*Abstracted from Technical Development Services Summary of Activities No. 24, October, November, and December, 1950.

undoubtedly were not observed.

Relationship of the Area of Dermal Application to the Intoxication Produced in Rats. In acute and subacute tests weaker solutions applied over a correspondingly greater area produced higher and more rapid mortality than the stronger solutions applied so as to give the same dose of active ingredient. These results suggest that workers may run a disproportionately greater hazard by exposing large areas of their bodies to dieldrin sprays (as when they remove their shirts at work). The results further suggest that laboratory studies involving widely different areas of dermal application are not strictly comparable even when all other conditions are identical.

Median Lethal Dose Values for Wistar Institute Albino Rats Poisoned with Dermal Applications of Dieldrin Solutions. LD₅₀ values were determined using the graphic method of Litchfield and Wilcoxon.* These values were determined for each sex using the compound in the form of simple xylene solutions which were applied at the standard rate of 0.0016 cc. of solution per gram of body weight. By this method, the LD₅₀ of dieldrin applied dermally is 90 mg./kg. for male rats and 72 mg./kg. for female rats.

Physiological Studies of Rats. Earlier stages of this study have been reported under the heading "Weight Loss and Its Cause in Rats."** New tests have been designed in exactly the same way in order to study the metabolic rate of rats and to test the hypothesis formed earlier for indirect evidence that the metabolic rate is not increased by dieldrin poisoning. The results as regards loss of weight, time of death, and liver weight were in conformity with earlier tests. The metabolic rates of the experimental and control rats were strikingly similar and were essentially normal basal rates. The hypothesis was, therefore, confirmed.

Other rats similarly poisoned by 2.5-percent emulsion at 40 mg./kg./day, were sacrificed after the third dose of dieldrin. Liver glycogen was determined by the anthrone method. The data indicated that although there may be some abnormality of carbohydrate metabolism in dieldrin-poisoned animals, the divergence from normal was of a much lesser degree than that of the liver lipid reported earlier in similar tests.

* Litchfield, J. T., and Wilcoxon, F.: A simplified method of evaluating dose-effect experiments. *J. Pharmacol. & Exper. Therap.* 95(2): 99-113 (1949).

** See CDC Bulletins IX(6): 24, June 1950; IX(9): 28, September 1950; IX(12): 32, December 1950.

TOXICITY OF OTHER CHLORINATED HYDROCARBONS:

Toxicity of Chlordan Vapors from Residual Deposits to Infant and Adult Sherman Albino Rats. In general, the results indicate that chlordan vapors arising from the residue of a spray application of 200 mg./sq. ft. in a poorly ventilated modified Peet-Grady chamber for 67 and 81 days did not affect the health, reproduction, or growth of infant or adult rats. This exposure was repeated three times and data from these replications compared favorably. Three generations were produced from the original females over a period of about 9 months.

The mean weight curves of the original adult rats and those born and reared in the chlordan chamber compared very closely with those of rats in the control chamber. A total of 45 litters resulted from 80 matings among the control females as compared with 33 litters from 59 matings among the chlordan females. There were 447 young produced by 45 females in the control chamber and 289 young produced by 33 females in the chlordan chamber. Consequently, the control group gave birth to 9.9 young per litter per female as compared with 8.8 young in the chlordan group.

The average survival of all young to weaning in the chlordan chamber was 87 percent and in the control chamber 76 percent.

By the sixth day from birth, 92 percent of all infant losses had occurred in both chambers. None of the experimental animals died or were observed sick after weaning age (4 weeks).

Effect of Repeated Dermal Applications of DDT Emulsion on Rats. The results of chronic tests remain essentially the same. One rat was sacrificed after it had received 103 doses at the rate of 40 mg./kg./day, 5 days a week. Chemical analysis of the fat showed 339 parts per million of DDT.

Effect on Rats of Repeated Oral Administration of DDT in Vegetable Oil. As a result of these tests, a dosage of 150 mg./kg., given in the form of a 15-percent vegetable oil solution and at the rate of 1 cc. of solution per kilogram of body weight, was selected for subsequent physiological studies.

Physiological Studies on Rats. Experiments were designed in a manner very similar to the physiological studies on dieldrin except that the insecticide was given by stomach tube in a soya oil solution. The experimental animals showed a marked loss of weight but DDT, in contrast to

dieldrin, appeared to exert very little effect on the liver weight. The total liver lipid of the experimental animals was slightly increased over that of the various classes of controls. The phospholipids, too, were increased in the experimental rats over comparable controls. These facts point to the conclusion that either there was a decreased utilization of phospholipid in the livers of DDT-poisoned animals or an increased movement of tissue fat to the liver in the form of phospholipid, or a combination of both factors.

Determination of Basal Metabolic Rates of Rats. The high basal metabolic rate found in rats poisoned by DDT was undoubtedly due, in large measure, to the body tremor which could be detected even by casual observation of most of the animals. Whether other factors were involved cannot be stated at this time. The basal metabolic rates for control animals fell within the range generally considered normal.

Effects on Rats of Oral Doses of DDT in Combination with a Carbinol. Of rats which received a dosage of 275 mg./kg. DDT in vegetable oil, about two-thirds of the total number on the three tests died within a few days following dosing. Many of these rats developed coarse body trembling and all lost weight before death. When DDT and carbinol (a possible synergist for DDT) were given at the rate of 250 and 25 mg./kg., respectively, in a single combined oral dose, the mortality in three replications reached about 80 percent; this was higher than that shown when DDT was administered alone. Kills were low when DDT and carbinol were given at the rate of 25 and 250 mg./kg., respectively, in a single dose. It would appear that carbinol potentiates the toxic quality of DDT in orally dosed rats.

TOXICITY OF SODIUM MONOFLUOROACETATE:

Further Studies on Antidotes for Sodium Monofluoroacetate (1080) Poisoning in Animals. Selected dogs were dosed orally at the rate of 0.1 mg./kg. with 1080, a dose found to kill most dogs. They then received from two to eight (20 to 40 mg./kg.) doses of hydroxylamine hydrochloride by the same route. The poison was administered to each animal between 8:30 and 9:30 a.m. The antidote was given immediately thereafter and additional doses of antidote were given at 12 p.m. and 4 p.m. of the same day; other doses of antidote were given on the following days at the same schedule depending on the condition of the animal.

The animals were kept under observation for a

period of 6 hours after administration of the poison and were observed daily thereafter for several weeks.

While two of the six animals failed to survive, no convulsions or other specific signs of poisoning were observed in any of the four animals which survived in five tests. These dogs were depressed and showed evidence of methemoglobinemia.

The results of the use of hydroxylamine hydrochloride against 1080 support the observation that anoxia is a prophylactic in this type of poisoning, and that hydroxylamine is capable of rapidly producing methemoglobinemia in the dog. This antidote will be tried on other species.

Clinical and Autopsy Notes on Dog Poisoned with 1080. This healthy male adult dog weighed 10.4 kg. and was given a single oral dose of 1080 at 0.1 mg./kg. at 9:20 a.m. February 15, 1950. Immediately thereafter it was given the first of two oral doses of hydroxylamine hydrochloride at 40 mg./kg. A violent convulsion, typical of 1080 poisoning, developed at 12:20 p.m. This seizure was marked by aimless, clonic jerking of the limbs and copious salivation with the animal remaining on its side. The breathing was deep with a rate of 168 per min. during the early stages. Respiration, at times, was momentarily suspended and was then followed by a succession of rapid, shallow inhalations which became deeper and more rapid with an increase in leg actions. The dog regained its feet in a weakened condition and at this time (1:30 p.m.) was given the second dose of antidote at the same rate. Death came at 1:55 p.m. at the terminus of another seizure.

Autopsy was conducted a few minutes following death and revealed the following: moderate inflammation of gastric mucosa especially in the fundic region, large numbers of tapeworms in the small intestine with slight thickening of intestinal walls, blood clotted in normal manner, serous fluid in pericardial sac, heart worms absent, small hemorrhages throughout the thymus, and slight congestion of brain vessels.

RODENTICIDE STUDIES:

Laboratory Studies with Warfarin in Bait Fed to Rats. The following conclusions may be drawn:

1. Roof rats, as a group, are more resistant to warfarin than are albino Norway rats.
2. The difference in the survival time between the most susceptible roof rats and albino rats is extremely minor at higher and intermediate dosages of warfarin.

3. The difference in the survival time between the more resistant members of random samples of roof rats and of albino rats is considerable even at higher dosages of warfarin. This difference would appear from the laboratory data to average approximately 5 days at the commercially recommended concentration of 0.25 mg. of warfarin per gram of bait.

4. There is much greater variation in the survival time of the most resistant members of both species than in that of the most susceptible.

5. The roof rat shows greater variation in the reaction of individuals to warfarin poisoning than does the albino Norway.

Field Studies of the Use of Warfarin in Solid Baits against Roof Rats. The evaluation of various concentrations of warfarin in bait for control of roof rats is affected by: (1) the apparent individual reactions of roof rats to the poison itself, (2) selection of the most consistently acceptable bait material, and (3) placement of baits where they will most likely be encountered by rats roaming within their normal range. However, there is some indication that warfarin in solid bait at a concentration of less than 0.10 mg./gm. would not be practical for control of roof rats.

INSECTICIDE STUDIES

STUDIES ON FLY RESISTANCE:

Dieldrin Resistance in a Laboratory Strain of the House Fly. Six-hour exposures of adult flies of the F_{10} to F_{12} generations from a colony having 45 percent coverage with deposits of 25 mg. diel-

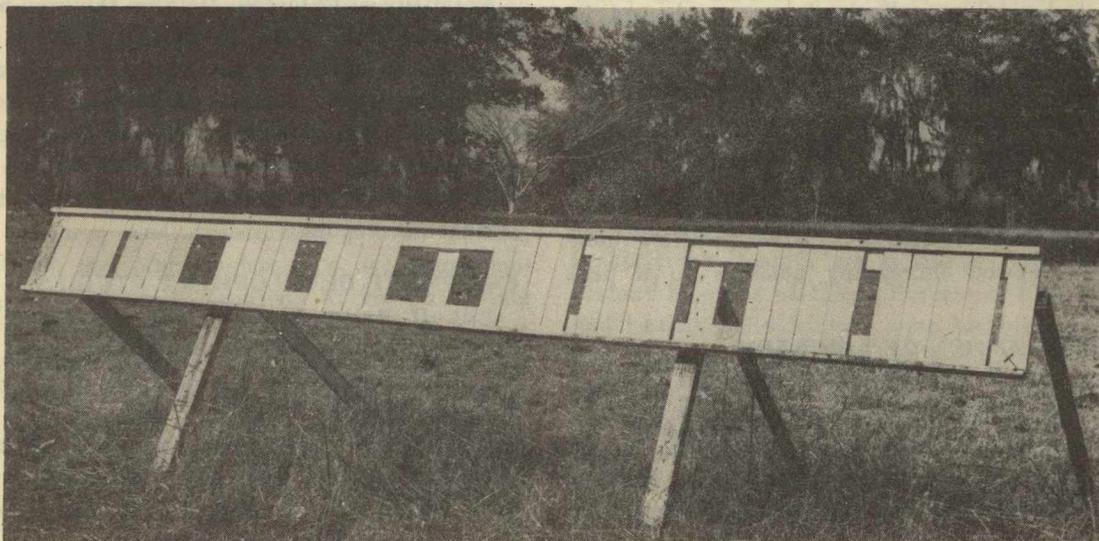
drin per sq. ft. show fluctuation in resistance of the adult males but a consistent high degree of resistance in the adult females beyond the F_{12} generation.

Relative Effectiveness of DDT-DMC Mixtures against Various Resistant Strains of "Musca Domestica." Laboratory exposure of various DDT-resistant strains of the house fly to residual deposits of p-dichlorodiphenyl methylcarbinol (DMC) and DDT combined in various proportions show the length of residual action of the 1:1 DMC-DDT combination to be superior to combinations containing less DMC. Combinations of DMC-DDT tested against nonresistant flies showed less effectiveness with the combined deposits than was obtained by DDT alone.

STUDIES ON VARIOUS INSECTICIDES:

Relative Effectiveness of Various Chlorinated Hydrocarbons against "M. domestica." Test insecticides Q-137 and Dilan showed little effectiveness against normal and resistant strains of the house fly. Three confidential accessions, 39-RL-49, 39-RL-50, and 49-RL-269, have shown considerable residual action against normal flies but were not effective against a local DDT-dieldrin resistant field strain.

Weathering Tests Involving Water-Wettable and Melted DDT Applied on Glass and Plywood Panels. When held inside, deposits of 200 mg. water-wettable DDT per sq.ft. on glass and on plywood panels have given excellent residual action over an 8-week period. Deposits of melted DDT were



WEATHERING RACK TESTING DDT. From left to right are duplicate sets of four panels each: (1) glass with water-wettable DDT, (2) glass with melted DDT, (3) plywood with water-wettable DDT, and (4) plywood with melted DDT.

highly effective on glass but not on plywood panels. Under outside weathering, the water-wettable DDT deposits failed rapidly, while the melted DDT deposits were superior on glass panels but of no value on plywood panels.

Comparative Effectiveness of Outside and Inside Weathering on DDT-Rosin Deposits. Residual deposits of rosin-DDT have shown low effectiveness on glass panels held inside but good effectiveness on glass panels exposed to outside weathering. Tests show that panels with no residual effectiveness after a test period of 18 weeks inside are rapidly activated upon subjection to outside weathering.

STUDIES ON FLY HABITS:

Controlled Populations of Flies. Comparison of counts made at 12 bait stations in a large outdoor fly cage for periods of August 2 to September 21, 1950, and September 21 to November 16, 1950, indicate a decided shift of the population distribution within the cage.

Comparison of various bait materials indicate that a yeast-milk or Diamalt-milk mixture is superior to milk alone in attracting representative numbers of *M. domestica*, *Callitroga macellaria*, and *Phaenicia pallescens* over a 2-day study period. A 10-percent Diamalt-milk solution, adopted as a standard bait was found to attract equal populations of *M. domestica*, *C. macellaria*, and *P. pallescens* in the ratio of 2:1:1 with considerable accuracy in a series of five 2-day study periods.

House flies have shown relatively little difference in numbers at bait stations according to the time of day. *C. macellaria*, however, showed increased numbers toward the middle of the day and *P. pallescens* was present to a greater degree early in the day.

On the basis of recorded air temperatures, *M. domestica* shows indications of peaks of feeding activity around 72° and 90° F. *C. macellaria* was most prevalent between 74° to 84° F., while *P. pallescens* showed increasing numbers to a peak at 90° F.

DISINSECTIZATION OF AIRCRAFT:

Tests with a Field Strain of Resistant Flies. A formulation containing pyrethrum, DDT, and pyrethrum synergists, applied at the rate of 3 gm. per 1,000 cu. ft. in a Peet-Grady chamber gave 65 percent mortality of flies resistant to various halogenated hydrocarbon insecticides. With the pyrethrum omitted, the kill dropped to 0.5 percent and with the DDT omitted the mortality was 41

percent. G-382, containing both DDT and pyrethrum but no synergists, gave a kill of 16 percent.

Test Deodorants in Experimental Formula S-43. Test deodorants were incorporated in aerosol formula S-43 at a concentration of 0.075 percent. Various formulas were sprayed at the rate of 8 gm. per 1,000 cu. ft. in Peet-Grady chambers for human reaction. The original odor of S-43 was masked by Reodorant 20 but a slight irritation of the nose was still noticeable.

Formulations Containing 0.5 Percent Piperonyl Butoxide and Varying Amounts of "264." Formulations containing 2 percent pyrethrum, 3 percent DDT, 0.5 percent piperonyl butoxide, and 1, 2, 4, and 8 percent "264" were tested against *M. domestica* and compared with G-382. All formulas showed higher indices than G-382 with the formula containing 8 percent "264" having an index of 1.18, the highest of the group.

CHEMICAL STUDIES

Modified Schechter-Haller Method for DDT Analysis. An improvement of that portion of the original Schechter-Haller method dealing with the isolation of the polynitrated product from which the color is developed has been made. It consists of extracting the quenched nitration mixture with benzene, subsequent washing of the benzene solution with alkali, and drying with anhydrous sodium sulfate. The procedure has been found more rapid and less subject to manipulative losses than the original ether extraction method of Schechter and Haller.

Volatility of Chlordan. Data on the loss of chlordan from glass panels indicates that the rate of vaporization at room temperatures changes markedly during the first 3 weeks and is dependent on film thickness. The data are evidence that separation of the mixture occurs to an extent where it must be considered in toxicological studies of chlordan residues or vapors.

EQUIPMENT DEVELOPMENT STUDIES

Cut-off Valve Tests. Three commercially produced spray can shut-off valves have been submitted to laboratory test. A new model of the Spraying Systems Company "Teejet," equipped with xylene-resistant packing and valve seat, froze after 10,000 operating cycles; but after replacement of the stem spring with a stronger unit, the valve functioned successfully through 50,000 cycles. Another model with a stronger valve spring submitted by the manufacturer also successfully withstood

50,000 cycles. A Schrader shut-off valve completed 50,000 cycles without failure or leakage, but lack of a lever locking device would contribute to operator fatigue through a day's use. A valve used by the Italian Malaria Control Organization, despite some desirable features failed before 25,000 cycles were completed.

Low Pressure Cut-off Valve. The problem of pressure control in field spray cans has been given varied treatment and discussion, and it is thought by some operating and field personnel that the most frequent trouble lies in the tendency of many field operators to continue application after the spray can pressure has dropped below a useful point, especially where hand pump cans are used. Generally, the lowest pressures desired are in the range of 25 to 30 p.s.i.

Due primarily to the high cost of constant pressure type spray cans, at least a partial answer is thought to lie in the use of a relatively inexpensive valve which would automatically shut off the flow of insecticidal mixture when the internal pressure dropped to the minimum desirable figure. Accordingly a low pressure cut-off valve was designed and constructed.

This valve, when inserted in the liquid line, cuts off flow at a predetermined minimum pressure. The valve at present is designed to replace the cap on the filler opening of certain existing spray cans.

Air-Scoop Pollen Sampler. Several test flights were made during the ragweed pollen season with the air-scoop pollen sampler. Results indicate that the sampler may be used to obtain information on the horizontal and altitudinal distribution patterns of pollen and dust particles in the atmosphere.

Air-borne Pathogen Studies. A laboratory has been established and routine samples of air-borne pathogens are being collected and cultivated daily. A sieve type sampler and an air flow meter have been designed and constructed. Field studies, using these and other instruments, are being conducted at seven CDC stations at various points in the United States.

Ratproofing Studies. Ratproofing studies have been conducted over a 3-year period to determine the rat resistance of various construction materials. These studies show that provision of a "gnawing edge" permits rats to penetrate certain construction materials with relative ease, but protection of the "gnawing edges" renders many of these products comparatively rat resistant. Rats can penetrate $\frac{1}{4}$ in. plywood, $\frac{5}{8}$ in. celotex siding, $\frac{3}{8}$ in. sheet-

rock, $\frac{3}{4}$ in. marinite (compressed asbestos fiber), and several other similar materials in 8 days or less by attacking the face of the material. Most soft tempered aluminum alloys in sheets ranging from .020 in. to .091 in. can be penetrated in 20 nights or less when raw edges are exposed, but asbestos-cement products and the harder aluminum alloys require longer exposures for penetration; and when the raw edges are protected, these materials provide very good rat protection.

CONTROL METHODS AND EVALUATION

FIELD STUDIES ON ADULT FLY CONTROL:

Fly Resting Habits. Observations of the diurnal and nocturnal resting habits of flies were made during the last half of the summer in rural and urban areas in and near Savannah, Ga. In rural areas 97 percent of the flies observed were house flies and most of them rested during the day on surfaces not usually treated in residual spray operations. During the day from 20 percent to 68 percent of the total flies on the premises were found inside the houses where these were unscreened, as compared to only 0.55 percent found inside screened houses. At night, 88 percent of all flies on unscreened premises were found inside the houses and 7 percent in the lower limbs of trees and shrubs; on screened premises, the flies rested at night during warm weather principally in trees and shrubs and on unscreened porches; but during the colder nights in the fall, they began to rest inside barns.

In urban areas, grasses and weeds, as well as trees and shrubs, served as the principal night resting places for both house flies and blowflies. During the day the flies were dispersed on garbage and the ground where food material was scattered. However, considerable numbers were also observed on weeds and grasses during the day.

Evaluation of Outdoor Space Sprays. Blowflies (*C. macellaria*) were susceptible to most of the insecticides tested, while house flies were resistant to most of them. Rotenone, Lethane 384, and Lethane 384 Special were ineffective against both types of flies. Of those materials which gave satisfactory results against both types of flies, the most promising appeared to be a 5 to 1 combination of DDT and DMC, benzene hexachloride (BHC) (12 or 36 percent gamma), lindane, and pyrethrins with piperonyl butoxide.

Evaluation of Outdoor Residual Spray Formulations. Of 46 residual spray formulations tested under conditions of outdoor weathering, only

those containing DDT or dieldrin exhibited any marked residual qualities. Dieldrin at 50 mg./sq. ft. gave approximately the same results as DDT at 200 mg./sq. ft. The addition of rosin aided the DDT formulations somewhat, but had no detectable effect on the dieldrin formulations. Oily-base formulations of dieldrin were markedly inferior to xylene-base formulations. A dieldrin formulation containing vee-gum as an adhesive gave appreciably better results than other dieldrin formulations.

Mosquito Larvicide Investigations. A single treatment with a water emulsion of dieldrin at the rate of 1 lb. of dieldrin per acre applied on a small, landlocked, fresh-water pond in 1949 has been effective in preventing mosquito production throughout two seasons. Similar treatments applied to four other ponds at midseason in 1950 were still effective at the close of the season.

After two seasons of routine treatments of fish ponds with water emulsions of technical BHC (12 percent gamma isomer) at the rate of 1 lb. of BHC per acre per application, with five applications being made each season at approximately 5-week intervals, there was no apparent reduction in the fish populations which could be attributed to the treatments, nor was any off-taste detected in the meat of the fish.

PHARR, TEX., STUDIES

ENVIRONMENTAL SANITATION:

Relative Fly Population in Sanitation Study Towns. Fly populations in the sanitation study towns of Mission, Edinburg, and Pharr showed an increase as would be expected at this time of year; however, the numbers were not as great as normally experienced, presumably because of the severe drought which has prevailed in the study area.

Premises Sanitation Improvements. Monthly sanitation surveys in the three study towns indicated a general progressive seasonal increase in the number and area of fly attractants, with the exception of Anglo Mission. The trend toward a higher proportion of approved garbage facilities in Mission may be the result of continued efforts by city officials to achieve sanitation improvements.

Analysis of Fly Attractants Recorded in Fly-Grill Data. An analysis was made of the frequency of occurrence of each fly attractant and the average number of flies of all species per occurrence as recorded in the weekly grill counts from Mission, Edinburg, and Pharr during the past 18 months. The fly attractants occurring most frequently in Latin blocks were garbage in containers, dish and wash water on the ground, and scattered garbage; the attractants having the highest average number of flies per grill were meat, goat and sheep excrement, and vegetables. In the Anglo blocks, garbage in containers was the predominant attractant; the attractants having the highest average number of flies per occurrence were rabbit excrement, meat, and seafood wastes.

CHEMICAL FLY CONTROL INVESTIGATIONS:

Day and Night Fly Resting Habits. Studies of day and night fly resting habits were continued to determine preferred resting places and seasonal trends. Ground surfaces (where dish and wash waters had been thrown out) continued to be the principal daytime resting places of house flies and *Phaenicia*. Trees, bushes, and grasses were the principal nighttime resting places for house flies, and grasses and weeds the principal nighttime resting places for *Phaenicia*.

The marked decline in the number of *Drosophila* encountered during the last quarter continued.

TRAINING SERVICES

HEADQUARTERS TRAINING

Table 1 shows Headquarters training courses presented during the quarter.

TRAINING PUBLIC HEALTH PERSONNEL FROM FOREIGN COUNTRIES:

Special observation and training courses were

arranged for 15 public health workers from 12 foreign countries. A break-down is as follows: Alaska, 1; Brazil, 1; Chile, 1; Ecuador, 1; Finland, 1; Greece, 1; India, 1; Israel, 1; Italy, 1; Japan, 1; Mexico, 3; and Venezuela, 2.

Table 1
HEADQUARTERS TRAINING COURSES

Course	Type of Course	Location	Duration (Weeks)	Dates (1950)	Students	
					Organizations Represented	Total
Rat-borne Disease Prevention and Control	Regularly scheduled	Atlanta, Ga.	3	Oct. 2-21	U. S. Air Force, PHS, State and local health depts., and pest control industry	10
Control of Insects of Public Health Importance	Regularly scheduled	Atlanta, Ga.	1	Oct. 23-27	U. S. Air Force, PHS, State and local health depts., and 1 foreign country	18
Insect and Rodent Control	Special	Atlanta, Ga.	1	Nov. 6-10	Engineers attending sanitary engineering course at Columbus, Ga.	14
Domestic Fly Control	Special	Atlanta, Ga.	4 days	Nov. 28 to Dec. 1	Engineering Services, CDC, 2 foreign countries	6
Rodent Control	Special	Atlanta, Ga.	4	Dec. 4-31	Engineering Services, CDC, 1 foreign country, and a sanitary engineer being assigned to Liberia	6
Housing Sanitation	Special	Atlanta, Ga.	4	Sept. 6 to Oct. 6	Joint health dept., Charlottesville, Va.	1
Housing Sanitation	Special	Atlanta, Ga.	3	Sept. 29 to Oct. 19	Board of health, Cincinnati, Ohio	1
Housing Sanitation (Orientation)	Special	Atlanta, Ga.	1 day	Oct. 6	Trainees of Insect and Rodent Control class	5
Housing Sanitation	Special	Oakland, Calif.	4	Oct. 23 to Nov. 17	PHS Region X, State and local health depts., city planning personnel	10
Housing Sanitation (Appraisal Method)	Special	Syracuse, N. Y.	5	Oct. 2 to Nov. 3	Syracuse Dept. of Health	1
Housing Sanitation (Environmental Procedures)	Special	Syracuse, N. Y.	1	Oct. 23-28	Syracuse Housing Authority	1
Housing Sanitation (Orientation)	Special	Syracuse, N. Y.	1 day	Nov. 3	Syracuse University medical students	7
Housing Sanitation (Orientation)	Special	Syracuse, N. Y.	1 day	Nov. 28	Syracuse University medical students	8

OTHER HEADQUARTERS ACTIVITIES
CONFERENCES:

During the week of October 16, 23 training officers from Atlanta headquarters and field training

centers throughout the country assembled for a week's work session. Assignments to committees were made and the work for each committee was outlined for the ensuing year.

The chief, Training Services, presented a report of the activities of the Committee on Field Training during the past year at the annual APHA meeting in St. Louis, October 29—November 2.

The chief, Training Resources and Program Development Section, attended meetings in Washington of the Training Committee of the Division of Commissioned Officers which were concerned with planning a 3-month training program for 50 Public Health Service officers who will be assigned to the ECA program in southeast Asia. Final decision was reached on utilizing the Atlanta headquarters Training Services for giving field experience to these medical officers, public health nurses, and sanitary engineer officers.

Personnel of the Housing Sanitation Section held a 4-week course in housing sanitation at Oakland, Calif., for communities in the San Francisco—Oakland Bay area. As a direct result of this training, surveys have been started in the cities of San Jose, San Francisco, and Sacramento.

EXPANSION OF SERVICES:

At the invitation of the Oklahoma State Health Department and the University of Oklahoma, School of Public Health, a conference was held with these agencies for the purpose of discussing plans for formulating a program for field training of public health workers in that State. As a result of these discussions, plans have been made to assign a qualified training officer to Oklahoma in the near future. Field training experience will be offered to graduates from the School of Public Health as well as to personnel employed by the State.

Members of the Insect and Rodent Control Section participated in conferences with Army officials regarding the utilization of CDC facilities for training Army Medical Department Preventive Medicine Company personnel. Detailed plans were made for three types of courses to be held in Atlanta and at Columbus, Ga. It was anticipated that four groups would be trained at Columbus in 4-week sanitation courses, and eight groups would be trained in Atlanta. Courses held at the Atlanta Training Center were to deal with the control of insect vectors and animal reservoirs of disease. The first course, "Control of Animal Reservoirs and Vectors of Disease," was scheduled to be held during the period February 5 to March 2, 1951. Tentative plans were made for holding a course on insect vectors of disease during the period March 5—30, 1951.

The Navy elected to utilize field training centers

at Annapolis, Md.; Denver, Colo.; and Columbus, Ga., for training petty officers in environmental sanitation activities.

TRAINING MATERIALS:

Rat Control Visual Aids. The seven films on rat control, produced jointly by the Army Pictorial Service and CDC are now completed. During the week of October 22 technical assistance was rendered in connection with the final reediting and rewriting of the last two films, "Practical Rat Control, Part II, Ratproofing," and "Rat Ectoparasite Control."

The film "Rural Rat Control" also was completed and should be available in the very near future.

Personnel of Training Services worked with Audio-Visual Production Services toward the completion of a set of slides on sanitary landfills and the development of a poster style flip-chart to be used in summarizing the guided discussion on block sanitation in the insect and rodent control classes.

Since the rat control poster "Saboteur" is out of print, a revision is being made.

EVALUATION

The experimental form of the achievement test for the environmental sanitation field training program was administered by seven training centers to approximately 73 trainees at the close of the fall courses.

FIELD TRAINING

Table 2 shows the courses given by Field Training Centers during the quarter.

Amherst, Mass. The activities of this Center are being expanded. Plans are to offer field training in all public health disciplines.

As has been the custom in the past, environmental sanitation trainees desiring to secure a Massachusetts Babcock testing license were given the opportunity to do so with the cooperation of the Agricultural Experiment Station of the University of Massachusetts. Fourteen hours of instruction were given during evening classes, and eight trainees received licenses.

Columbus, Ga. Personnel of this Center continued to act as technical advisers for the milk production film being made.

Pittsburgh, Pa. Three major changes were made in the course content of the environmental sanitation course: (1) the basic science studies, such

as chemistry and bacteriology, were alternated on half-days rather than having trainees complete one topic at a time; (2) the subjects of allied health activities, such as public health nursing, organization and administration, and public health law were given following the discussion of all environmental functions; and (3) the supervised field experience was gained during a continuous period after the trainees had received all of their academic instruction in environmental sanitation

and allied health activities.

Topeka, Kans. On December 14, a conference was held in Topeka with representatives of the Topeka City-Shawnee County Health Department, the Kansas State Board of Health, Public Health Service Region VII, and Training Services, CDC, to discuss and outline the civil defense program of the Kansas State Board of Health. The Topeka Field Training Center has offered all its facilities to the State program.

Table 2
COURSES PRESENTED BY FIELD TRAINING CENTERS

Course	Type of Course	Location of Center	Duration (Weeks)	Dates (1950)	Students	
					Organizations Represented	Total
Environmental Sanitation	Regularly scheduled	Amherst, Mass.	12	Sept.25 to Dec.15	State and local health depts.	15
Orientation and Presentation of Food-Handler Training Programs	Special	Amherst, Mass.	1	Nov.6-10	Regional, State, and local health depts.	12
Environmental Sanitation	Regularly scheduled	Bloomington, Ill.	12	Sept.25 to Dec.15	State and local health depts.	8
Environmental Sanitation	Regularly scheduled	Buffalo, N. Y.	12	Sept.11 to Dec.2	Local health depts.	16 plus 5 part-time
Sanitary Engineering	Special	Columbus, Ga.	12	Sept.18 to Dec.8	PHS officers, local health depts.	12 plus 3 part-time
Environmental Sanitation	Regularly scheduled	Denver, Colo.	12	Sept.18 to Dec.8	State and local health depts.	4
Milk Seminar*	Special	Denver, Colo.	4 days	Nov.7-10	Idaho State sanitarians	17
Environmental Sanitation	Regularly scheduled	Pittsburgh, Pa.	12	Sept.25 to Dec.22	Pittsburgh, Pa., Department of Health	10
Environmental Sanitation	Regularly scheduled	Topeka, Kans.	12	Aug.21 to Nov.10	State and local health depts., foreign governments	10 plus 6 part-time
Fly and Milk Sanitation Seminar**	Special	Topeka, Kans.	2	Dec.3 to Dec.15	State and local health depts.	Spokane-30 Seattle-70

*Held at Boise, Idaho, in cooperation with Public Health Service Region IX Office.

**Held at Spokane and Seattle, Wash., in cooperation with State Board of Health of Washington and the Public Health Service Region X Office.

STATE FIELD TRAINING (COOPERATIVE ENTERPRISES)

Maryland. The third Maryland field training school for sanitarians was completed December 15, 1950, at the Naval Academy in Annapolis, Md. Certificates were given to the six State sanitarians and six naval personnel who satisfactorily completed the course.

Upon completion of the next course in environmental sanitation, most of the State sanitarians will have attended one of the 12-week courses in this subject. A plan for continued training of sanitarians in Maryland is being developed.

New York. Orientation programs were arranged for three foreign public health workers who were interested in public health education.

Conferences were held with the director of the

office of professional training and State department of education officials to plan for the joint sponsorship of food-handler schools in New York State.

South Carolina. The training officer began plans for training classes for clerical personnel in South Carolina county health departments on the subject "Sanitation Records and Reports."

A Sanitation Records Committee was established to analyze the records used in the several sanitation programs in the State.

A Nursing Records Committee was also set up to aid in analyzing and revising the record and report forms used in the many nursing activities.

The training officer also began revision of prenatal records for the director of the Maternal Child Health Division.

VETERINARY PUBLIC HEALTH SERVICES

RABIES

Texas. Assistance was dispatched to El Paso following a rabies epidemic aid call from the Texas Department of Health in November. A control program was inaugurated in cooperation with the State and local health authorities assisted by the Army, Air Force, and Pan American Sanitary Bureau. Previous to inauguration of this control program, the Pan American Sanitary Bureau had vaccinated 4,000 dogs in the city of Juarez, Mexico. In El Paso about 7,500 dogs were vaccinated including those immunized by veterinary clinicians in their hospitals. It will be necessary for local authorities to continue stray animal control and vaccination measures in the rural part of El Paso County.

Simultaneously with the outbreak in El Paso, there was a major epizootic of rabies in San Antonio. One-fourth of all the cases of rabies reported in the United States between October 1 and December 18 came from San Antonio and Bexar County. The control program was inaugurated on December 18. The success of the program had not been evaluated at the end of the quarter.

With the completion of the El Paso and San Antonio programs, all major foci of rabies in Texas have active control programs. In late December,

rabies appeared in the lower Rio Grande Valley, and control operations are now under way in that area. The State Health Department of Texas is cooperating with the Mexican public health authorities to prevent the disease from spreading across the border.

Puerto Rico. Additional data received from Puerto Rico confirmed an earlier report of the Insular Health Department that rabies had become enzootic in mongooses. It poses a serious problem as effective control of mongooses is difficult. Control and investigative activities which were begun last summer following the epidemic aid call are being continued by the Insular health authorities in cooperation with the Communicable Disease Center.

Other Localities. Rabies continues to be a problem in many parts of the country, and State-wide programs are being organized in South Carolina, Indiana, Iowa, and Arizona. Late in the year an outbreak of rabies in skunks was reported from Minnesota. The importance of interstate control was dramatized by a report of a case of rabies in Portland, Oreg., an area that had been considered free of rabies for the past several years. On investigation it was found that the rabid dog had originated in San Antonio, Tex.

During the calendar year 1950, Indiana reported four human rabies deaths. Among these was one that had a possible incubation period of 5 months. Several areas in Indiana have inaugurated rabies control campaigns.

TRICHINOSIS

An outbreak of trichinosis was reported by Seattle and Washington health authorities on November 24. Dr. M. A. Holmes, CDC veterinarian on loan to the Washington Department of Health, assisted in the investigation of the outbreak which has revealed a total of 17 cases. The investigators believe that there are probably more cases that have not come to their attention. All reports of human disease were traced to one food shop where 15 or 20 different types of sausages are made. The sausage kitchen was found to be in excellent sanitary condition, and all meat and meat products were handled as prescribed by law. In smoking, the inside meat temperature is usually raised to 140° to 160° F., and this temperature will destroy the trichinae. The investigators are of the opinion that these temperature requirements were not fulfilled.

It is estimated that the purchase of the trichinae-contaminated sausages was made in the latter part of October. Most of the pork used in making these sausages is thought to have originated in mid-western packing houses. Western garbage-fed animals come to market intermittently, but they are not available in sufficient numbers to meet the demand; hence pork is imported from the Midwest.

To prevent such outbreaks in the future, the investigators have suggested that all smoke ovens have automatic reporting types of thermometers.

Q FEVER

Vaccination studies have been inaugurated in cooperation with the Rocky Mountain Laboratory. A vaccine capable of stimulating a solid immunity in cattle without appreciable complement-fixing antibody response will be the objective. Several methods of vaccine preparation will also be evaluated. Concurrent with this study more reliable criteria for vaccine potency tests are being investigated.

Twelve head of cattle which had been infected by or exposed to *Coxiella burnetii* were sacrificed and a complete post-mortem examination of each was conducted. Representative tissue specimens were collected at autopsy for testing in guinea pigs. Most of these tests have been completed. One cow with a high complement-fixing antibody titer

yielded *C. burnetii* from the mammary gland and its regional lymphatics. *C. burnetii* was not recovered from cows with a low level of complement-fixing antibody or those with negative complement fixation reactions. A new project to evaluate age and stage of pregnancy as factors affecting susceptibility of cattle to Q fever will be inaugurated.

The Q fever pasteurization studies are continuing. The Division of Sanitation of the Public Health Service has completed arrangements with the Dairy Industry Supply Association to install commercial equipment so plant conditions can be simulated at the School of Veterinary Medicine, University of California, Davis, Calif.

SALMONELLOSIS

Retail Meat Sample Examination. The *Salmonella* studies have been directed toward examination of retail meat samples for *Salmonella* organisms. Through the cooperation of the consultant veterinarian and meat inspectors of the City boards of health, samples of sausages and hamburger from local markets have been collected for examination. Approximately 12 percent of the sausages and 2 percent of the hamburger have revealed *Salmonella*. One particular brand of sausage was positive on several occasions; thus it seemed desirable to study the plant from which it came in an effort to determine the source of contamination. With the cooperation of the Florida Livestock Sanitary Board and the packing house owner, detailed bacteriological studies are in progress. Cultures from various sources in the plant, such as cutting tables, saws, and buckets revealed more than eight types. Slaughtered hogs cultured indicate that the prevalence of *Salmonella* varies widely in different groups. The examination of retail samples will continue and further studies are planned in other packing houses in the State. Detailed bacteriological examination of positive animals is also planned.

In connection with the study of *Salmonella* infection in hogs, blood samples are also being collected from the animals to test for *Brucella* agglutinins. These specimens have been examined in the Immunology Division of the Bureau of Laboratories. Approximately 18 percent of the samples have shown a titer of 1:40 or above.

Kennel Examination. In October the monthly examination of a large greyhound kennel revealed all the dogs were harboring *Salmonella*. With 45 dogs infected, none of which showed clinical symptoms, an excellent group for experimental

therapeutic study was provided. The dogs, each housed in a separate kennel, were divided into groups of five and treated with five different antibiotics. Twenty were held as control animals. Cultures were taken daily for 8 days while the animals were treated and then on the third, sixth, tenth, and seventeenth days after treatment. From the results obtained, it appeared that the dosage and length of treatment was insufficient or that none of the agents were effective against *Salmonella*. Due to the value of the animals under study, a minimum dosage was used.

Studies with Fowl. The number of fowl received for examination for *Salmonella pullorum* and other *Salmonella* has continued to increase. From a total of 44 chickens on which post-mortem cultures were made from the heart, liver, spleen, oviduct, gall bladder, and intestinal contents, *S. pullorum* was isolated from four hens which had shown positive reactions in the field test. *S. pullorum* and *Salmo-*

nella oranienburg were obtained from a 2-week-old chick and *Salmonella bredeny* was obtained from two 3-week-old chicks. Mortality in both these flocks was rather high. From nine turkeys examined, *Salmonella cholerae-suis* was isolated from one, *Salmonella enteritidis* from one, and *Salmonella californica* from three. The turkeys that revealed *S. californica* came from a flock of 1,300 birds in which mortality had been about 24 percent. This group provided material for a therapeutic study. The experimental study is now in progress.

WORLD HEALTH ORGANIZATION REPORT ON ANIMAL DISEASES

The Veterinary Public Health Services assisted the World Health Organization in preparing a report on animal diseases communicable to man and on recommendations that can be put into effect for use by various countries that have these problems.

APHA SANITATION PROGRAM SURVEY

More than 40 full-time health departments, from Connecticut to California, and serving more than five and a half million people, are engaged in a cooperative study with the American Public Health Association in sanitation administration, conducted by the Engineering Section of that organization.

The object of the study is to increase the efficiency of sanitation personnel and of sanitation services in local health departments.

Included in the study are measurements of the work load in each participating community, measurements of the time devoted to each program, and a study of the qualifications needed by sanitation personnel to efficiently carry on modern sanitation activities.

The health departments are divided into three groups: city, county, and suburban.

Program plans include the following:

1. Development of methods for measuring the quality of sanitation programs.

2. Encouraging self-examination and program appraisal for sanitation personnel in order to secure program improvement.

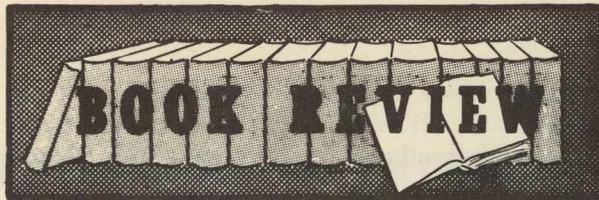
3. Serving as a clearinghouse for information on the quality of programs and of services.

4. Encouraging the determination of bases of acceptability and the establishment of facilities for the testing and appraisal of materials and equipment in the sanitation field.

5. Suggesting criteria for the priority of activities which should be carried out in well-operated sanitation programs and encouraging their recognition and adoption.

6. Pointing out opportunities for more complete services in the control of environment.

7. Helping in the development of training and leadership among sanitation personnel, and bringing to the attention of qualified persons job opportunities in the field of sanitation.



HUMAN HELMINTHOLOGY: A Manual for Physicians, Sanitarians, and Medical Zoologists

by **ERNEST CARROLL FAUST**

Lea and Febiger, Philadelphia, Pa., Third Edition (Illustrated) 1949, 744 pp.

The third edition of Dr. Faust's popular *Human Helminthology* includes much of the new information on parasitology accumulated during the war. This is reflected particularly in those sections dealing with Bancroft's filariasis and schistosomiasis japonica, two of the helminthic diseases which became important military health problems in the Pacific campaigns.

The basic pattern of presentation follows that used in the earlier editions. Following the first section, which deals with general aspects and modern-day concepts of helminthic infections, each important species is considered in detail as to taxonomy, historical background, geographical distribution, structure, life cycle, epidemiology, pathogenesis, symptomatology, diagnosis, treatment, prognosis, and control. A glossary of over 200 medical and zoological terms has been added. Two new sections deal with the pathogenesis and clinical aspects and with the control of helminthic infections. A chapter on leeches has been incorporated. Supplementary and detailed material has been printed in smaller type, making this edition more adaptable as a classroom text. This, combined with the use of a larger printed-page size, has made it possible to include additional material

without increasing the thickness of the book.

One of the most useful features of the book from the standpoint of the medical zoologist is the chapter on scientific nomenclature which includes the International Code of Zoological Nomenclature. Additional explanation of the code has been incorporated in this edition, along with opinions rendered by the International Commission on Zoological Nomenclature and the Committee on Terminology of the American Society of Parasitologists.

The section dealing with anthelmintics has been completely revised and brought up to date. New illustrations have been added and certain older ones improved. Some of the newer, more effective technical procedures have been included in the revised large section on diagnostic methods. The extensive classified bibliography affords an excellent source of references on all of the various aspects of medical helminthology.

Revised editions of accepted and well-known textbooks should offer more than a mere rearrangement or rewording of the subject matter. Dr. Faust has accomplished this to the extent of preparing an edition which will be useful to workers in the field who already own copies of the earlier editions.

A. W. Donaldson, Scientist

CDC TRAINING COURSES

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

TRAINING SERVICES

1. ENVIRONMENTAL SANITATION FIELD TRAINING. April 9 to June 30, 1951. Twelve weeks. Buffalo, N. Y.

2. SPECIAL TRAINING PROGRAM IN MILK PLANT SANITATION. May 7-11, and May 14-18, 1951. One week. Columbus, Ga.

3. SPECIAL TRAINING PROGRAM IN MILK AND RESTAURANT SANITATION. May 28 to June 9, 1951. Two weeks. Topeka, Kans.

4. TOPICAL SHORT COURSES - WATER AND SEWAGE LABORATORY PROCEDURES. April 2-6, 1951. One week. Amherst, Mass.

5. TOPICAL SHORT COURSES - RODENT CONTROL (DECENTRALIZED). April 23-27, 1951. One week. Amherst, Mass.

6. FIELD SURVEY AND EVALUATION METHODS IN HOUSING SANITATION. April 30 to June 2, 1951. Five weeks. Syracuse, N. Y.

7. FIELD SURVEY AND EVALUATION METHODS FOR MEASURING QUALITY OF HOUSING ENVIRONMENT. April 9-13, 1951. One week. Atlanta, Ga.

8. FIELD SURVEY AND EVALUATION METHODS FOR MEASURING QUALITY OF HOUSING ENVIRONMENT. April 21-26, 1951. One week. Syracuse, N. Y.

9. SPECIAL TRAINING IN INSECT CONTROL. April 2-13, 1951. Ten days. Atlanta, Ga.

10. FLY CONTROL. May 7-11, 1951. One week. Atlanta, Ga.

11. ORIENTATION COURSE FOR SANITATION ENGINEERS IN WATER POLLUTION AND INDUSTRIAL WASTE SURVEY METHODS. April 2 to May 4, 1951. Five weeks. Cincinnati, Ohio.

12. BASIC COURSE IN RADIOLOGICAL HEALTH INSTRUMENTATION. April 2-20 and May 6-25, 1951. Three weeks. Cincinnati, Ohio.

LABORATORY SERVICES

1. LABORATORY DIAGNOSIS OF ENTERIC DISEASES. Part 2, Advanced Enteric Bacteriology, April 2-13, 1951. Two weeks. Chamblee, Ga.

2. LABORATORY DIAGNOSIS OF MYCOTIC DISEASES. Part 1, Cutaneous and Subcutaneous Fungi, April 16-27, and Part 2, Systemic Fungi, April 30 to May 11, 1951. Two weeks. May 14-18, 1951. One week (Directors). Chamblee, Ga.

3. LABORATORY DIAGNOSIS OF TUBERCULOSIS. April 16-27 and April 30 to May 11, 1951. Two weeks. May 14-18, 1951. One week (Directors). Chamblee, Ga.

4. LABORATORY DIAGNOSIS OF SYPHILIS. April 16-27, 1951. Two weeks. Chamblee, Ga.

5. LABORATORY DIAGNOSIS OF VIRUS DISEASES. April 16 to May 11, 1951. Four weeks. May 21-25, 1951. One week (Directors). Montgomery, Ala.

6. LABORATORY DIAGNOSIS OF VENEREAL DISEASES. May 7-11, 1951. One week (Directors). Chamblee, Ga.

7. "TREPONEMA PALLIDUM" IMMOBILIZATION. May 14-18, 1951. One week (Directors). Chamblee, Ga.

8. CLINICAL CHEMISTRY. Part 1, Introductory and General Procedures, May 14-18, 1951. One week. Part 2, Quantitative Analyses, May 21 to June 1, 1951. Two weeks. Atlanta, Ga.

9. LABORATORY DIAGNOSIS OF PARASITIC DISEASES. May 21-25, 1951. One week (Directors). Chamblee, Ga.

10. LABORATORY DIAGNOSIS OF BACTERIAL DISEASES. May 21-25, 1951. One week (Directors). Chamblee, Ga.

VETERINARY PUBLIC HEALTH SERVICES

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

RECENT PUBLICATIONS BY CDC PERSONNEL

Pratt, H. D., and Lane, J. E.: Rediscovery of *Tarsopterygia coloradensis* (Baker) in Colorado. Proc. Ent. Soc. Wash. 52(6): 305-307 (1950)

Stenburg, R. L., and Hall, L. B.: A continuous recording particle sampler. Inclusion in the mimeographed proceedings of the Northeastern Weed Control Conference. 1-7 (1950)

Thurman, E. B., and Winkler, E. C.: A new species of mosquito in California, *Aedes (Ochlerotatus) bicristatus*. 52(5): 237-250 (1950)

Tisdale, E. S.: Supplementary field training of sanitary engineers for a public health career. Civil Engineering Bulletin. 16(1): 9-12 (1950)

TRAINING COURSES BULLETINS

The "Bulletin of Field Training Programs" and the "Bulletin of Laboratory Refresher Training Courses" for the calendar year 1951 have been issued and copies are now available. Requests for these publications should be addressed to:

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

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