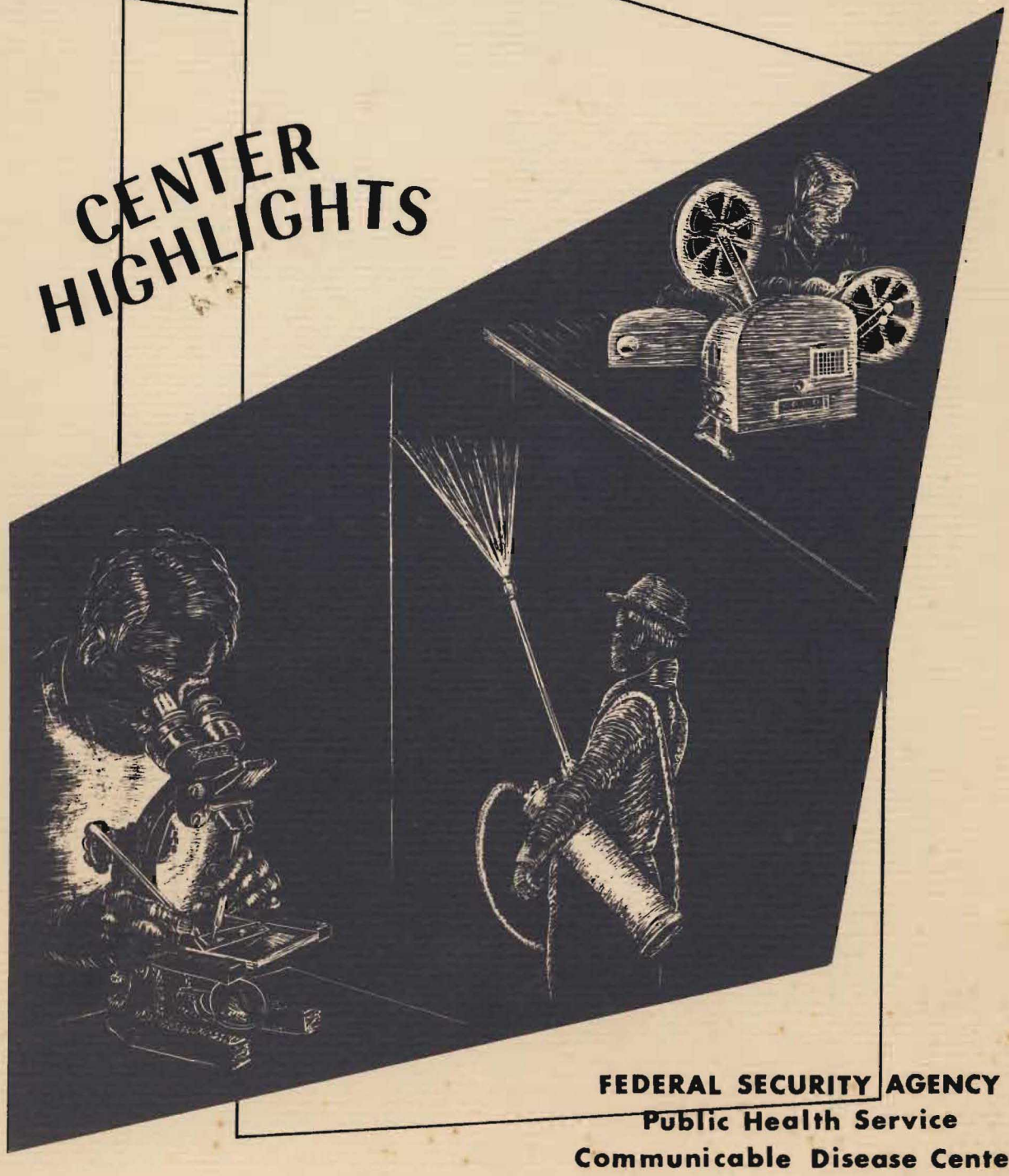
CDC BULLETIN

MARCH - 1950

CENTER HIGHLIGHTS



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

CDC BULLETIN
Vol. IX, No. 3 MARCH-1950

Contents

Material in this bulletin is not for publication

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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-1949

Administrative Services

The adoption of a new standard nomenclature for organizational components of the Center was announced by memorandum on December 6, 1949. The new nomenclature became effective January 1, 1950.

The Classification Act of 1949 became effective October 30, 1949. It abolished the CAF, SP, and P Services and created a General Schedule Service for these positions. A pay increase averaging $140 per annum per employee, was included in the Act.

A representative from the Inspection Division of the Fifth U. S. Civil Service Region reviewed personnel activities for the past year. His report has been received, and the recommendations included therein are now under consideration.

Authority to execute Nonpersonal Service Contracts under Public Law 410 to secure services of fee-basis personnel was granted CDC. This procedure facilitates the filling of certain positions without regard to Civil Service regulations. Contracts are now in process for Training Specialists, Actors, and Light Trap Cooperators.

The register for Insect and Rodent Control Aid positions was established on December 19, 1949. This covers a large number of field positions now held by nonstatus employees.

A nation-wide occupational inventory of nonstatus employees was furnished the Civil Service Commission for the purpose of establishing priorities in scheduling examinations for positions not yet covered in the examining program.

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

Ajello, Libero: The need for mycological diagnostic services in the public health laboratory.

Andrews, Justin M.: Advancing frontiers in insect vector control.

Andrews, Justin M., and Gilbertson, Wesley E.: Final phases of malaria eradication in the United States.

Bellamy, R. Edward: An unusual winter population of *Anopheles quadrimaculatus* Say.

Bellamy, R. Edward, and Repass, Robert P.: Notes on the ova of *Anopheles georgianus* King.

Bradley, George H., and Lyman, F. Earle: Discussion of five years' use of DDT residuals against *Anopheles quadrimaculatus*.

Brooke, M. M.: Amebiasis panel (Dr. Brooke's portion).

Chamberlin, Roy W., and Sikes, Robert K.: A safe way of handling mosquitoes for virus transmission experiments.

Coffey, Joseph H., and Maier, Paul P.: Fly control techniques.

Damon, S. R., and Scruggs, J. H.: Studies on brucellosis in Indiana. IV. Recovery of *Brucella melitensis* from the hog.

Edwards, P. R., Barnes, L. A., and Babcock, Mary C.: The natural occurrence of phase 2 of *Salmonella paratyphi* A.

Fay, R. W.: The toxicological aspect of the selection or induction of DDT-resistance.

Ferguson, Frederick F., and Chen, Yu Ching: Histology of the "excretory system" of the swine nematode, *Ascaris lumbricoides* Linneaus, 1758.

Frohne, William C., Weathersbee, Albert A., Williams, Giles M., and Hart, John W.: Observation on the persistence of *Plasmodium* infections in *Anopheles* mosquitoes in an area of low observed human malaria parasitemia in South Carolina.

Gaines, T. B., Sumerford, W. T., and Hayes, W. J., Jr.: The non-toxicity of urine from rats poisoned with 1080.

Goldman, Morris: An iron alum-picric acid-hematoxylin stain for parasites in tissues.

Goodwin, Melvin H., Jr.: Observations on saurian malaria in southwestern Georgia.

Goodwin, Melvin H., Jr., and Bellamy, R. Edward: Factors influencing variations in populations of *Anopheles quadrimaculatus* Say.

Hendricks, E. L.: Some notes on the relation of ground-water levels to pond levels in limestone sinks of southwestern Georgia.

Hendricks, E. L., and Goodwin, Melvin H., Jr.: Observations on factors influencing water levels in ponds in limestone sinks in southwestern Georgia, with particular reference to breeding places of *Anopheles quadrimaculatus* Say.

Howitt, Beatrice F.: Effect of a nonspecific heat-

labile factor on the neutralization test for Newcastle disease virus in eggs.

Howitt, Beatrice F., and Benefield, Ursula: Use of complement fixation in the differentation of strains of Coxsackie virus.

Johnson, Phyllis T., and Thurman, Ernestine B.: The occurrence of *Aedes (Ochlerotatus) pullatus* (Coquillet), 1904 in California.

Mandel, E. E., Lehman, E. B., and Paris, D. A.: Simple blood tests available to the general practitioner.

Mathis, Willis V., and Quarterman, Kenneth D.: Fieldinvestigations on the use of heavy dosages of several chlorinated hydrocarbons as mosquito larvicides.

Mathis, Willis V., Ferguson, F. F., Upholt, William M., and Quarterman, Kenneth D.: The relative effectiveness of DDT and DDD as anopheline mosquito larvicides under field conditions.

Miller, Seward E.: New concepts in laboratory diagnostic medicine.

Morlan, Harvey B., Hill, Elmer L., and Schubert, Jospeh H.: A serological survey for murine typhus infection in southwest Georgia animals.

Nicholson, H. P., and Vetter, M. H.: A lethal trap for capturing small mammals with their ectoparasites.

Pal, Rajindar, McCauley, Robert H., Jr., and Fay, R. W.: The relationship between physical forms of DDT and biological effectiveness on water surfaces.

Peters, Richard F., Thurman, Deed C., Jr., Markos, Basil G., and Mulhern, Thomas D.: The unfolding program of vector control in California with reference to studies of mosquito biology.

Pratt, Harry D.: Notes on *Anopheles earlei* and other species of the *Anopheles maculipennis* complex.

Quarterman, Kenneth D.: Field studies on the control of DDT-resistant house flies.

Quarterman, Kenneth D., and Jensen, Jens A.: The outdoor residual effectiveness of several new insecticides.

Scudder, Harvey I., and Tarzwell, Clarence M.: Effects of DDT mosquito larviciding on wildlife. Part IV. The effects on terrestrial insect populations of routine DDT larviciding by airplane.

Simmons, Samuel W.: The resistance of flies to DDT.

Simmons, Samuel W., and Upholt, William M.: A resume of disease control with insecticides.

Tarzwell, Clarence M.: Effects of DDT mosquito larviciding on wildlife. Part V. The effects on fishes of the routine manual and airplane application of DDT and other mosquito larvicides.

Thurman, Ernestine B., Haeger, James S., and Mulrennan, John A.: The taxonomy and biology of *Psorophora (Janthinosoma) johnstonii* (Grabham), 1905 (Diptera, Culicidae).

Tierkel, Ernest S., Graves, Lloyd M., Tuggle, H. G., and Wadley, Samuel L.: Effective control of an outbreak of rabies in Memphis and Shelby County, Tennessee.

Tiffany, Elberton J.: Opportunities for staff tra ing during laboratory program reviews.

Some current books recently added to Library:

Advances in carbohydrate chemistry – Vols. 1- 1945, 1946, 1948.

Advances in internal medicine, 1949.

American Public Health Association. Commit on Administrative Practice. Keystones of pub health for Pennsylvania, 1948.

Ayer, N. W., & Son, Inc. Directory of newspap and periodicals, 1949.

Behrendt, H. J. Diagnostic tests for infants children, 1949.

Bradley, G. H. Studies on the *Anophel quadrimaculatus* Say . . . a thesis, June 19

Brown, G. T. Pollen-slide studies, 1949.

Burrowes, William. Jordan's textbook bacteriology, 1949.

Chandler, A. C. Introduction to parasitology, 19

Chang, Kwei. Studies on hookworm diseases Szechwan province, West China, 1949.

Cochrane, R. G. Practical textbook of lepro 1947.

Emmens, C. W. Principles of biological ass 1948.

Faust, E. C. Human helminthology, 1949.

Flesch, Rudolf. Art of readable writing, 1949.

Flesch, Rudolf. New readibility yardstick, 19

Foster, J. W. Chemical activities of fungi, 1949.

Frobisher, Martin. Fundamentals of bacteriolo 1949.

Gale, E. F. Chemical activities of bacteria, 19

Gertsch, W. J. American spiders, 1949.

Glick, David. Techniques of histo- and cy chemistry, 1949.

Graphic arts production yearbook, 1949.

Griffith, J. Q. The rat in laboratory examinati 1949.

Hanna, H. S. Public speaking without fear trembling, 1949.

Heaf, F. R. G. Recent advances in respirat tuberculosis, 1948.

Horsfall, F. L. Diagnosis of viral and ricketts infections, 1949.

Hughes, A. M. Mites associated with stored f products, 1948.

International Poliomyelitis Congre Poliomyelitis, 1949.

Kendall, M. J. Advanced theory of statistics. 1 2 volumes.

Kolmer, J. A. Clinical diagnosis by laborat examination, 1949.

Mills, F. C. Statistical agencies of the fede government, 1949.

Mountin, J. W. Emergency health and sanitat activities, 1949.

Mountin, J. W. Ten years of federal grants-in-a 1948.

Parish, H. J. Bacterial and virus diseases, a sera, toxoids, 1948.

Physicians' desk reference to pharmaceutical specialties and biologicals, 1948.
Price, C. M. Advertising and editorial layout, 1949.
Raisz, E. Z. General cartography, 1948.
Rand, McNally Co. Handy railroad atlas of the U. S., 1948.
Randall, H. M. Infrared determination of organic structure, 1949.
Regan, L. J. Doctor and patient and the law, 1949.
Rhodes, A. J. Textbook of virology, 1949.
Riggins, N. M. Streptomycin and dihydrostreptomycin in tuberculosis, 1949.
Rynearson, E. H. Obesity, 1949.
Salvadori, M. G. Mathematical solution of engineering problems, 1948.
Schenk, E. T. Procedure in taxonomy, 1948.
Schwartz, A. M. Surface active agents, their chemistry and technology, 1949.
Schweitzer, G. K. Radioactive tracer techniques, 1949.
Shadel Sanitarium. Seattle alcoholism; collected papers. Vol. 1, 1948.
Siggia, Sidney. Quantitative organic analysis, 1949.
Souza-Araujo, H. Historia de lepra no Brasil. 1946. 2 volumes.
Stedman, T. L. Stedman's medical dictionary, 1949.
Stieglitz, E. J. Geriatric medicine, 1949.
Swartz, J. H. Elements of medical mycology, 1949.
Touraine, Albert. Les traitements actuels des parasitoses animales de la peau, 1947.
Umbreit, W. W. Manometric techniques and related methods for the study of tissue metabolism, 1949.
U. S. Army Medical Library. Classification: Medicine, 1949.
U. S. Bureau of the Census. Historical statistics of the U. S., 1949.
U. S. Congress. Joint Committee on Printing. Government printing and binding regulations, July 1949.
U. S. Public Health Service. The Chicago-Cook county health survey, 1949.
U. S. Public Health Service. Directory of state and territorial health authorities, 1948.
Waksman, S. A. Streptomycin, its nature and practical application, 1949.
Weaver, H. M. Research story of infantile paralysis, 1948.
Weiss, Edward. Psychosomatic medicine, 1949.
Wheland, G. W. Advanced organic chemistry, 1949.
Yagoda, H. J. Radioactive measurements with nuclear emulsions, 1949.
Yearbook of endocrinology, 1948.
Zacks, David. Photoradiography in search of tuberculosis, 1949.

Audio-Visual Production Services

STORY DEVELOPMENT

Dr. Frank Nelson, S.A. Dental Surgeon, is now devoting a portion of his time to the development of dental public health films, as a consultant to the Project Development Section. This work is sponsored by the Division of Dental Resources in Washington.

PRODUCTION

In the physical sets used by the unit on the stage, there was a change-over from canvas to plywood flats, to give a generally improved, more professional appearance to the sets, and achieve more solid and realistic background results.

An improvement was made in motion picture photography procedure. The general practice change-over was from 16 mm. to 35 mm. in shooting original camera negative. This larger-size negative provides better-quality reproduction, has less grain, and makes possible better optical effects. This allows contact 35 mm. work prints to be made, at high speed on a continuous printer; 35 mm. work prints speed editing due to larger image and easier handling.

Color tests were made on the Acme animation camera stand to perfect the technique within the unit of obtaining master prints for filmstrips from 2x2-inch slides. The animation camera stand now provides an additional camera for obtaining color master filmstrips. Prior to perfecting this new technique, only one camera was available for this work. In these and similar tests, the objective is to perfect the means of producing filmstrips of better quality at a faster rate than has been possible within the Service or contractually in the past.

UTILIZATION

New users requested and received 175 copies of CDC Film Catalog-Utilization Guide. Descriptive pages for all films released during the quarter, together with seven utilization guides, were mailed to approximately 1,000 catalog holders to keep their catalogs up to date.

Data and materials regarding all exhibits prepared in the past by CDC were collected and sent to Washington, for inclusion in permanent records of all Public Health Service exhibits and for continuing maintenance of Washington and Audio-Visual Production Services records. This material included photographs of each exhibit, names of consultants, by and for whom prepared, when prepared, and where and by whom displayed.

A questionnaire to aid in the evaluation of the four filmstrips of the series "The Liver – Part I: Normal Histology of the Human Liver" was prepared and sent out with these filmstrips to a number of agencies that requested the filmstrips for evaluation purposes. Distribution of these films (except for evaluation) is being delayed pending the release of the pathology film "The Liver – Part II: Portal Cirrhosis." An evaluation questionnaire also was prepared to aid in evaluating the CDC filmstrip "What Makes the Right Film Right." This questionnaire was answered by 40 members of the Atlanta Film Council who reviewed a pre-release evaluation version of the filmstrip at Emory University. Their answers were statistically compiled to aid in production of a release version of the film.

Film Library distribution-circulation of CDC and other productions for the quarter is shown in the following table:

Month	Motion Pictures CDC	Motion Pictures Outside Sources	Filmstrips CDC	Total
October	139	28	205	372
November	144	29	161	334
December	86	46	144	276
Total	369	103	510	982

COOPERATIVE PROJECT WITH THE ARMY ON RAT-CONTROL FILMS

Work was completed on the 10th and last script for the rat-control film series being produced jointly by the Army Pictorial Services and CDC, at Technical Development Services, Savannah, Ga. Mr. Sidney Lanier, Sanitarian with Training Services, has assisted by conditioning and training the rats so that they perform as required by the scripts. As a result, the Army photographers have been quite successful in obtaining the desired action on the film. At the end of the quarter, however, shooting was behind schedule and it appeared that shooting on the sets at Savannah would not be completed until the middle of March. Life Magazine photographers spent approximately one week in covering the operations at Savannah.

MAJOR PRODUCTIONS RELEASED DURING THE QUARTER

Motion Pictures

4-089.1 The Laboratory Diagnosis of Tuberculosis – Part I, Preparation of a Culture Medium
4-089.2 The Laboratory Diagnosis of Tuberculosis – Part II, Preparation of Sputum Specimens
4-102.0 Preservation of Bacteria by Desiccation *in Vacuo*

Filmstrips

5-086.0 Syphilis Horizons
5-123.2 The Laboratory Diagnosis of Tuberculosis – Part II, Preparation of Sputum Specimens
5-134.0 Field Training for Public Health Workers
5-136.0 Constructing a Farm Pond
5-139.0 Putting Vision Into Education (for Georgia Department of Education)

Exhibits

6-009.0 The Modern Treatment of Leprosy
6-011.0 Epidemiology of Brucellosis

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

Motion Pictures

4-089.4 The Laboratory Diagnosis of Tuberculosis – Part IV, Typing of Tubercle Bacilli by Animal Inoculation
4-104.0 Rat-Proofing Procedures – For PHS Region V

Filmstrips

4-123.4 The Laboratory Diagnosis of Tuberculosis – Part IV, Typing of Tubercle Bacilli by Animal Inoculation
5-127.0 Laboratory Diagnosis of Tinea Capitis in Children

FILM GUIDES RELEASED

G 5-015.0 Identification of U. S. Genera of Adult Female Mosquitoes
G 5-042.0 Identification of U. S. Genera of Mosquito Larvae
G 5-074.0 DDT as a Mosquito Larvicide
G 5-079.0 Fundamentals of Detergents
G 5-097.0 The Identification of Some Common Sucking Lice

Engineering Services

TYPHUS AND RODENT CONTROL ACTIVITIES

Five persons, formerly on plague investigations and newly appointed to domestic rat control positions in western States, were brought to Atlanta for training in domestic rat control methods, Public Health Service policy, and that part of an insect control course having to do with fly control. Typhus and Rodent Control Section personnel participated in the Pest Control Operators Short Course at Virginia Polytechnic Institute, Blacksburg, Va., and in the meetings of the American Association of Economic Entomologists, Tampa, Fla.

Plans were made to transfer the administration of the rodent control programs in Regions IX and X to the Western CDC Laboratory on January 1, 1950.

During the quarter, reviews were made of the rodent control programs in North Carolina, Tennessee, New Jersey, Ohio, and Alabama.

There was a decrease in the number of reported cases of typhus fever (314) for the first quarter fiscal year 1950, as compared with the first quarter fiscal year 1949 (416).

Comparison of activities for second quarter fiscal year 1950 and second quarter fiscal year 1949 shows a slight decrease in the number of premises dusted with DDT (37,765 in 1949 to 37,536 in 1950), and in premises poisoned with poisoned bait (56,189 in 1949 to 49,248 in 1950). On the other hand, there was an increase in establishments ratproofed (1,190 in 1949 to 1,597 in 1950), and in establishments poisoned with poisoned water (9,160 in 1949 to 11,930 in 1950). The most pronounced increase was noticed in the man-hours devoted to sanitation activities in connection with rodent control (1,614 in 1949 to 19,022 in 1950). A large percentage of this increase is in local man-hours, which indicates the interest that has been stimulated by personnel assigned to the States.

Records for the first quarter of fiscal year 1950 show that the average number of man-hours required for evaluation (trapping, combing, and bleeding) was 2.9 per rat. The low average was 1.6 and the high was 10.2. An average of 0.4 man-hours was required to place DDT dust at the average rate of of 2.5 pounds per premises. In typhus control operations, 0.4 man-hours were required to place 0.7 pounds of poisoned bait per premises. An average of 27.6 man-hours was required to ratproof an establishment. An average of 287 man-hours per State was devoted to maintenance of ratproofed projects.

Table 1 is a summary of typhus and rodent control operations for payroll periods 21-26 (October 9 to December 31, 1949), inclusive.

FLY CONTROL ACTIVITIES

By the end of the second quarter, all projects had closed spraying operations for the season. The last spray applications were made as follows:

Muskegon, Mich. – September 24
Troy, N. Y. – October 15
Topeka, Kans. – October 22
Charleston, W. Va. – October 29
Phoenix, Ariz. – November 30

Routine entomological inspections stopped about the same time, with the exception that, in Phoenix, inspections were continued throughout December because of the dieldrin tests. As a whole, spray and inspection work on all projects was continued from 3 to 4 weeks longer than anticipated because of the unusually warm fall season. Equipment and vehicles were cleaned and repaired and stored for the winter. Work was started on the summarization of spraying and entomological data. Sanitation plans were laid and some initial work was started on an educational program for improvement of some of the local sanitation problems.

The Topeka Health Department is devoting 4 man-days per week to the improvement of sanitary conditions in the known high-fly count blocks of the city. The selection of the blocks is based on the last season's sanitary survey and entomological surveys by the project personnel. It is proposed that the current plan be carried on during the winter months and a full-time, locally paid fly control sanitarian be assigned during the summer.

In Charleston, W. Va., the sanitary land fill was started. The Regional Office cooperated in the land fill demonstration by assigning J. A. Sanitary Engineer Leo Weaver to Charleston for approximately 1 week.

Virus specimen collection was continued at the summer schedule throughout October and most of November; that is, approximately 30 sewage samples and 40 fly trappings per week. The winter

Table 1 (a)

TYPHUS CONTROL OPERATIONS
October 9 - December 31, 1949

STATE	ECTOPARASITE CONTROL: Residual Dusting: Cos. Rep.	Premises Dusted	Lb. DDT and Lb./Prem.	M.H. & M.H./Prem. L&LF*	EVALUATION ACTIVITIES: U.S.P.H.S. M.H. L&LF*	Others M.H. L&LF*	RATPROOFING & ERADICATION: Initial Ratproofing: Proj. Rep.	Est. Complete	M.H. & M.H./Est. L&LF*	Init. Erad. M.H. L&LF*	Maint. M.H. L&LF*	RAT REDUCTION: Poison Bait (Food): Cos. Rep.	Est. Poisoned	Lb. Bait & Lb./Est.	M.H. & M.H./Est. L&LF*	Poison Water '1080': Est. Poisoned	Pints Used & Pints/Est.	M.H. & M.H./Est. L&LF*	Cyanogas: Lb. Used	M.H. L&LF*	SUPERVISION: Man Hours U.S.P.H.S.	Others	SANITATION ACTIVITIES: Man Hours U.S.P.H.S.	Others	MAN HOURS SUMMARY: U.S.P.H.S.	Others	Total
Alabama	6	6,963	33,292 / 4.8	2,665 / 0.4	1,480	718	0	0	0 / 0	0	0	6	6,847	4,553 / 0.7	3,792 / 0.6	2,272	4,903 / 2.2	1,352 / 0.6	2,250	1,276	830	440	108	235	4,387	8,509	12,896
Arkansas		0	0 / 0	0 / 0	0	0	2	36	2,805 / 78	382	1,441	1	0	0 / 0	0 / 0	0	0 / 0	0 / 0	21	2	480	0	4	4	960	4,158	5,118
Florida	6	5,135	20,975 / 4.1	2,912 / 0.6	362	300	4	90	1,843 / 21	25	30	4	1,389	916 / 0.7	1,147 / 0.8	630	918 / 1.5	1,057 / 1.7	15	369** / 22	2,512	1,260	867	2,997	5,362	10,341	15,703
Georgia	26	11,568	23,503 / 2.0	5,031 / 0.4	2,474	846	6	79	5,685 / 72	573	120	25	20,523	16,331 / 0.8	7,351 / 0.4	1,094	1,106 / 1	710 / 0.6	1,579	3,087	6,324	682	344	486	13,200	20,513	33,713
Louisiana	3	1,205	2,991 / 2.5	784 / 0.7	272	330	2	28	2,816 / 101	320	0	2	1,385	891 / 0.6	540 / 0.4	469	470 / 1	364 / 0.8	0	0	1,254	880	0	0	3,016	4,544	7,560
Mississippi	1	9,027	2,930 / 0.3	477 / 0.1	1,072	261	0	0	0 / 0	0	0	6	9,096	4,915 / 0.5	2,583 / 0.3	1,621	466 / 0.3	993 / 0.6	0	0	2,480	360	107	71	4,344	4,060	8,404
North Carolina	6	341	458 / 1.3	320 / 0.9	296	40	5	119	4,199 / 35	648	154	9	8,949	6,976 / 0.8	2,596 / 0.3	248	345 / 1.4	433 / 1.7	326	468	440	520	73	147	2,320	8,014	10,334
South Carolina	3	302	880 / 2.9	562 / 1.9	129	213	5	67	1,276 / 19	432	910	2	0	0 / 0	0 / 0	42	32 / 0.8	211 / 5	0	0	2,232	0	0	0	3,672	2,293	5,965
Tennessee	1	289	176 / 0.6	40 / 0.1	113	192	4	193	6,172 / 32	635	502	2	504	2.32 / 0.5	1,760 / 3.5	0	0 / 0	0 / 0	205	347	120	90	0	0	2,088	7,883	9,971
Texas	7	2,512	8,959 / 3.6	3,505 / 1.4	1,359	841	6	167	8,574 / 51	175	0	11	0	0 / 0	0 / 0	4,188	1,912 / 0.5	4,987 / 1.2	4	14	6,920	480	0	0	14,640	12,215	26,855
Virginia					220	454	1	70	103 / 1.5	0	0	1	42	9 / 0.2	21 / 0.5	1,362	219 / 0.2	87 / .06	10	34	1,153	112	0	0	1,373	811	2,184
Total	59	37,342	94,164 / 2.5	16,296 / 0.4	7,777	4,195	35	849	33,473 / 39	3,190	3,157	69	48,735	34,823 / 0.7	19,790 / 0.4	11,926	10,371 / 0.9	10,194 / 0.9	4,410	5,619	24,745	4,824	1,503	3,940	55,362	83,341	138,703

*Labor and labor foreman.
**Rat reduction by trapping.

Table 1 (b)

RODENT CONTROL OPERATIONS
October 9 – December 31, 1949

STATE	ECTOPARASITE CONTROL: Residual Dusting: Cos. Rep.	Premises Dusted	DDT and Lb./Prem.	M.H. & M.H./Prem. L&LF*	DDT Spray: Premises Treated	Gal. & Gal./Prem.	M.H. & M.H./Prem. L&LF*	EVALUATION ACTIVITIES: U.S.P.H.S. M.H. L&LF*	Others M.H. L&LF*	RATPROOFING & ERADICATION: Initial Ratproofing: Proj. Rep.	Est. Complete	M.H. & M.H./Est. L&LF*	Init. Erad. M.H. L&LF*	Maint. M.H. L&LF*	RAT REDUCTION: Poison Bait (Food): Cos. Rep.	Est. Poisoned	Lb. Bait & Lb./Est.	M.H. & M.H./Est. L&LF*	Poison Water '1080': Est. Poisoned	Pints Used & Pints/Est.	M.H. & M.H./Est. L&LF*	Cyanogas: Lb. Used	M.H. L&LF*	SUPERVISION: Man Hours: U.S.P.H.S.	Others	SANITATION ACTIVITIES: Man Hours: U.S.P.H.S.	Others	MAN HOURS SUMMARY: U.S.P.H.S.	Others	Total
California								160																80	0	80	0	320	0	320
Colorado								600		1	79	1,180 15		960				160						32	0	40	220	1,393	1,800	3,192
District of Columbia										1		152			2		10,240 -	2,980						300	440	0	6,531	320	10,083	10,403
Hawaii	2	294**	2,712 9	221 0.8	354	1,148 3.2	346 0.9	2,506	21,316	1				578	3	431***	2,009 4.7	741 1.7	2	3	3	124	98	0	0	3	2,625	2,740	25,689	28,429
Idaho																								0	0	80	24	80	24	104
Illinois																								552	227	78	78	630	305	935
Kentucky																								0	0	280	520	280	520	800
Midwest										3	150	3,096 21												332	636	0	0	332	3,732	4,064
New Jersey																								0	0	480	88	480	88	568
New Mexico								160		1	27	160		200										80	0	400	80	640*	440	1,080
Ohio										1	1	102												256	220	140	1,078	400	1,396	1,796
Utah								6	16	1	208	2,150 10	384		1									208	14	120	80	1,364	1,614	2,978
Washington										1	183	997 5.4	426	252	1	6***	96 16	196 32.7						0	0	0	0	404	1,467	1,871
Wyoming								320	200						1							2	120	0	0	160	160	480	480	960
Oklahoma								204	223															0	0	134	70	338	293	631
Oregon															1	3	22 7	40 13						790	514	30	40	840	574	1,414
Total	2	294***	2,712 9	221 0.8	354	1,148 3.2	346 0.9	3,956	21,755	10	648	7,837 12	810	1,990	9	440	12,367 28	4,117 9.4	2	3	3	126	210	2,630	2,051	2,025	11,594	11,040	48,505	59,545
GRAND TOTAL+	61	37,636	96,876 2.6	16,517 0.4	354	1,148 3.2	346 0.9	11,733	25,950	45	1,497	41,310 27.6	4,000	5,147	78	49,175	47,190 0.9	23,907 2.7	11,928	10,374 0.9	10,197 0.9	4,536	5,829	27,375	6,875	3,528	15,534	66,402	131,846	198,248

*Labor and labor foreman.
**Spray not used in calculating the average for dust.
***Area or dump poisoning – not included to calculate average percent.
+Combines both Typhus and Rodent Control operations.

schedule adopted in December cut sewage sampling to roughly one-half the summer rate, with only sporadic fly-trap collections as weather permitted.

Arrangements were completed with the National Foundation for Infantile Paralysis whereby storage containers and horse serum could be purchased with Foundation funds.

With the onset of cold weather, the pollen count stations in Charleston, Topeka, and Troy were dismantled and stored for the winter. The slides were forwarded to CDC Laboratory Services for examination.

The spraying of the test areas with the new insecticide, dieldrin, was completed in early October, and entomological evaluation was continued until late in December. A complete analysis of the test areas has not yet been made, but certain trends are apparent (table 2).

MALARIA CONTROL ACTIVITIES

Budget cuts have necessitated withdrawal of CDC participation in large-scale malaria control operations from certain States in fiscal year 1951. Discussions were held with the State health departments concerned regarding plans for CDC malaria control personnel and equipment. As a result of these discussions, recommendations have been made (1) that personnel now on duty be encouraged to use as much accumulated leave as possible during the off-season and prior to the end of the present fiscal year; (2) that sufficient funds will be provided the so-called "borderline" States for the retention of one or two professional personnel to assist with State-sponsored malaria control programs and to direct the utilization of CDC equipment and materials; and (3) that CDC vehicles and other equipment assigned to the States, which properly can be employed in malaria control activities, be allowed to remain on such assignment unless needed more urgently on other CDC activities.

In November, Federal specifications covering the purchase of DDT, together with modifications suggested by the Procurement Unit, were reviewed. After revision and clearance by Technical Development Services, the specifications were adopted for use in procurement of this chemical for CDC activities.

States were contacted during the quarter to determine the chemical needs for the remainder of fiscal year 1950. DDT requirements amount to 512,000 pounds; xylene, 200,500 gallons; and Triton, 5,080 gallons. Requisitions have been placed with the Procurement Unit for 50,000 pounds of DDT, 8,000 gallons of xylene, and 850 gallons of emulsifier.

From actual surveys of residual spray operations

Table 2

SUMMARY OF DIELDRIN (COMPOUND 497) TESTS

Test No.	Type of Application	Rate of Application Mg./Sq. Ft.	Sanitation Level	Fly Control Achieved
1	Premises-wide, residential	50	Very poor	Good
2	Premises-wide, residential	10	Very poor	Poor
3	Premises-wide, residential	25	Very poor	Good
4	Garbage and refuse containers and adjacent wall surfaces, residential	25	Moderate to good	Fair
5	Residual application, animal shelters	1	-	Of no value because of failure in method of application
5-a	Residual application, animal shelters (same as in No. 5)	10	-	Fair
6	Residual application, animal shelters	5	-	Good, considering low application rate
7	Chicken farm	10	-	(Test not made - unable to provide suitable protection for chickens)
8	Premises-wide, rendering plant	50	Poor	Good
9	Garbage and refuse containers and approximately 50 sq. ft. of adjacent wall surface, business section	25	Fair	Good

in Alabama, Arkansas, Tennessee, and Texas, and from information submitted from the other residual spray States, a summary of time-motion data was prepared showing percentages of time spent in actual spraying, filling cans, mixing concentrate, and cleaning equipment, and the total potential exposure time of spray crews. This summary was forwarded to Technical Development Services for use in connection with toxicological studies under way.

Seasonal residual spray operations were completed in October except for scattered respraying in three States. Table 3 summarizes residual spray activities for the quarter.

Table 3

SUMMARY OF DDT RESIDUAL SPRAY OPERATIONS
October 1 - December 31, 1949

State	No. Cos.	No. House Spray Applic.	Lb. DDT	Operation Man-Hours			Lb. DDT per Applic.	M.H. per Applic.	M.H. per Lb. DDT
				CDC	Local	Total			
Alabama	-	-	-	3,070	-	3,070	-	-	-
Arkansas	-	-	-	9,450	1,016	10,466	-	-	-
Florida	3	477	803	120	633	753*	1.68	1.58	0.94
				296	-	296**			
Georgia	-	-	-	112	-	112	-	-	-
Kentucky	2	11	23	-	104	104*	2.09	9.45	4.52
					72	72**			
Louisiana	-	-	-	4,600	-	4,600	-	-	-
Mississippi	2	244	110	140	188	328*	0.45	1.34	2.98
				5,140	-	5,140**			
Missouri	-	-	-	-	-	-	-	-	-
North Carolina	-	-	-	1,666	-	1,666	-	-	-
Oklahoma	-	-	-	-	-	-	-	-	-
South Carolina	-	-	-	1,680	-	1,680	-	-	-
Tennessee	-	-	-	72	512	584	-	-	-
Texas	1	19	21	40	32	72*	1.11	3.79	3.43
				3,048	160	3,208**			
Subtotal Continental U.S.	8	751	957	300	957	1,257*	1.27	1.67	1.31
				29,134	1,760	30,894**			
Puerto Rico	-	1,852	732	632	942	1,574*	0.40	0.85	2.15
Grand Total	8	2,603	1,689	932	1,899	2,831*	0.65	1.09	1.68
				29,134	1,760	30,894**			

*Indicates actual man-hours for spraying only.
**Indicates man-hours for mapping, inspection, evaluation, and promotional activities.

Entomologic Services

The 5-year summary of entomological evaluations of the DDT Residual Spray Program, for 13 southeastern States, June 1945 through October 1949, based on a total of 66,007 inspections of sprayed and unsprayed houses, was completed during the quarter. The results in keeping houses free of the malaria mosquito, *Anopheles quadrimaculatus*, were presented in the last quarterly report (CDC Bull., Jan. 1950). The present discussion is concerned with the results of the program in controlling

house-frequenting flies.

The degree of fly control achieved by the program is not impressive compared with that attained against the malaria mosquito. Probably the main reason for this is that in many areas the fly population is so great that even though myriads of flies are killed by the DDT-treated surfaces, it attracts little notice because the flies are being constantly replaced from the outside. Also, unlike mosquitoes, flies rest more frequently on tables, chairs, and other such places which are not normally DDT-sprayed. Another factor is that flies appear to be irritated more than are mosquitoes through contact with DDT, and therefore, unless these flies are detained in a limited space, they may leave DDT-treated surfaces before receiving a lethal dose.

Table 1 summarizes the inside house fly counts obtained during the years 1948 and 1949. It will

Table 1

RESIDUAL SPRAY PROGRAM
Summary of Inside House Fly Counts

Density Group	Average Percentages of Inspections by Fly Density Groups 0-5 Months after Spraying, 1948 and 1949*				
	0 Flies	1-10 Flies	11-50 Flies	51-100 Flies	Over 100 Flies
SPRAYED HOUSES					
1948	25	55	17	2	1
1949	13	47	32	5	3
UNSPRAYED HOUSES					
1948	13	42	31	7	7
1949	9	31	38	13	9

*June 1 - October 31, 1948 and 1949

be noted that in the "0"-density groups of flies, the percentage of sprayed and unsprayed houses in the year 1949 was much less than in 1948. Also, it will readily be seen that in 1949 more sprayed and unsprayed houses fall within the "51-100" fly density group, as well as in the "100-plus" fly density group. From these data it is concluded that the year 1949 had a higher over-all fly population than did 1948. In spite of this situation in 1949, it will be seen that the sprayed houses in the "51-100" and "100-plus" fly density groups totaled only 8 percent as compared to 22 percent for unsprayed houses. Thus a considerable degree of control in sprayed houses is indicated. In brief, these results emphasize the need for good sanitation to obtain adequate fly control, because even though residual sprays may reduce the over-all numbers of flies in treated houses, this control measure does not satisfactorily take care of the problem.

MALARIA INVESTIGATIONS

Newton, Ga. During the quarter more than 2,000 blood films from persons living in the experimental area were examined; five of these films were from persons exhibiting symptoms suggestive of malaria. All findings were negative. Additional blood film surveys were continued in the schools in the experimental area as well as in adjacent sections.

Unusually deficient rainfall during the quarter, accompanied by a great reduction in the amount of surface water in the experimental area, resulted in nearly all ponds being dry during much of this period. This condition caused a rapid DISAPPEARANCE of *Anopheles* mosquitoes in the proximity of the ponds.

A total of 2,156 anopheline mosquitoes were collected for precipitin testing to determine host preference; 1,016 of that number were *quadrimaculatus*. Of these specimens, three "quad" females and four *crucians* females had fed on humans. None of six *punctipennis* females collected had taken human blood. The over-all human feeding ratio, based on data available to date is 0.32 percent. Nearly half of the specimens reacted positively for equine blood, 18 percent for porcine blood, and 17-odd percent for bovine blood.

Studies on saurian, or lizard, malaria continued with field studies being made on the natural occurrence of malaria in a wild population of the southern fence lizard. Blood films of the adult lizards tested so far show 40 percent to be parasitized by a *Plasmodium*, tentatively identified as *P. floridense;* only one of the 21 young lizards in the area was positive; the occurrence of new infections, especially this one in a young lizard, suggests that natural transmission of the parasite has recently commenced.

Manning, S. C. No malaria positive blood films were reported from series collected during the quarter. The densities of both *A. quadrimaculatus* and *crucians* in October were essentially higher in 1949 than in any of the three previous years, but as experienced before, in early November "quads" were virtually absent from stables, and *crucians* abundance was greatly reduced.

Four gland-positive *crucians* were observed this quarter among the 1,890 specimens dissected. No

positives were found among the 987 "quads" dissected. Three of these positives were from sections where human *Plasmodium malariae* incidence was formerly the highest, and one was collected in an area in which no human cases have been found. During the calendar year 1949, five gland-positive specimens of *quadrimaculatus* (from a total of 6,365 dissections) and 14 positive *crucians* (from 14,818 dissections) have occurred, giving an infection rate for *crucians* of 0.09 percent, and for *quadrimaculatus* of 0.08 percent. In attempts to determine whether or not these parasites were of human origin, the sporozoites obtained from the four *crucians* were injected into human paretics at the National Institutes of Health Laboratory in Columbia, S. C. All results were negative.

Studies on the infection of *Culex quinquefasciatus* with *Plasmodium relictum* (see table below) indicated that, although the number of survivors in the various lots were unusually low, the percentage of surviving individuals found infected upon dissection was remarkably high.

In connection with the bird malaria work, 459 blood films were examined, and of 222 such films from wild birds, 75 were found positive for *Plasmodium*. Through the courtesy of Clemson College officials, preliminary attempts have been made to demonstrate morphological characteristics of the different species of sporozoites with the aid of an electron microscope.

A survey of bloods of equine and bovine animals is being made in an attempt to locate the source of sporozoites being found in wild-caught anophelines. To date, 40 percent of the blood films taken have been examined, and all have been negative.

Helena, Ark. The fall survey of blood films in eight schools in Lake Township was completed with 255 blood films (in duplicate) being obtained; all films were negative for malaria parasites.

Of the 671 anophelines dissected during the season, all proved negative for both oocysts and sporozoites of *Plasmodium*. In connection with biological studies, attempts are being made to rear both *quadrimaculatus* and *punctipennis* in the insectary, from ova collected from overwintering females.

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

Yakima Valley (Washington). Progress has been made in reporting on the wild bird serum survey, and only one of some 134 wild birds, representing 20 different species, gave a significant antibody titer to Western equine virus. In an avian malaria survey, only 1.4 percent of the *Culex tarsalis* dissected were found infected with *Plasmodium*.

Kern County (California). Between May and June of 1949, some 4,400 *tarsalis* were collected and tested for virus, and 900 *Aedes dorsalis* were likewise treated. From lots of these mosquitoes caught between June 20 and July 20, eight have proven positive for viruses; seven of these were *tarsalis* and one *dorsalis*. Four of these viruses have been identified as Western equine, and identification of the other four is as yet incomplete.

Of some 30,700 mites collected from the nests of wild birds between April and August 1949, Western equine virus was isolated from one lot collected in late June, from nests of tricolored red-winged blackbirds.

A minor outbreak of encephalitis occurred in man and horses late in the season. Of these, five human cases had been identified as Western equine, six as St. Louis equine, and four tentatively as St. Louis. The onset of the Western equine cases

INFECTION OF CULEX QUINQUEFASCIATUS WITH PLASMODIUM RELICTUM

Lot Number	Mosquitoes Fed	Survivors*	Negative	Positives		Remarks
				Guts	Glands	
1	61	24	0	24	16	8 sacrificed prior to 10 days
2	20	4	0	4	4	
3	49	12	0	12	9	1 sacrificed prior to 10 days
4	58	39	0	39	38	1 sacrificed prior to 10 days
5	85	1	0	1	0	1 sacrificed prior to 10 days
6	19	4	0	4	4	
7	7	6	1	5	5	
8	16	3	0	3	2	Kept at lower temperature than usual
9	9	5	1	4	0	Kept at lower temperature than usual

*This number was still alive at the time of dissection, in the majority at least 14 days and in 1 lot for as long as 20 days after feeding on an infected bird.

between August 30 and October 6 coincided with the occurrence of an unusual late-season rise in population of *tarsalis* mosquitoes. However, there also was a large flight of *Aedes nigromaculis* into the area at the end of August.

In a recent experiment, 23 baby white doves (hybrid sacred) were innoculated with either Western equine or St. Louis virus, and kept in mosquito-free cages which were relatively heavily infested with the mite *Liponyssus sylviarum*. At the end of the season no infection of birds with viruses other than of the type with which they were originally innoculated, was indicated when antibody tests on the sera were made; also, non-innoculated doves and chickens in the cage had no antibody to either virus. Mites from the nests and from the doves, as sampled on four occasions during and after the experiments, were found to contain no virus. Thus no transmission of encephalitis virus by mites has been demonstrated to date in this experiment.

FLY-BORNE DISEASES

With the advent of cold weather, routine field operations ceased in early October at the New York (Troy), Michigan (Muskegon), and Kansas (Topeka) Fly Control Projects. At Charleston, W. Va., full-scale activities continued through October, and at Phoenix, Ariz., the work extended through December 1. The collection of flies for virological studies was continued throughout the second quarter; however, the frequency of trappings was reduced to one collection per subsection each week.

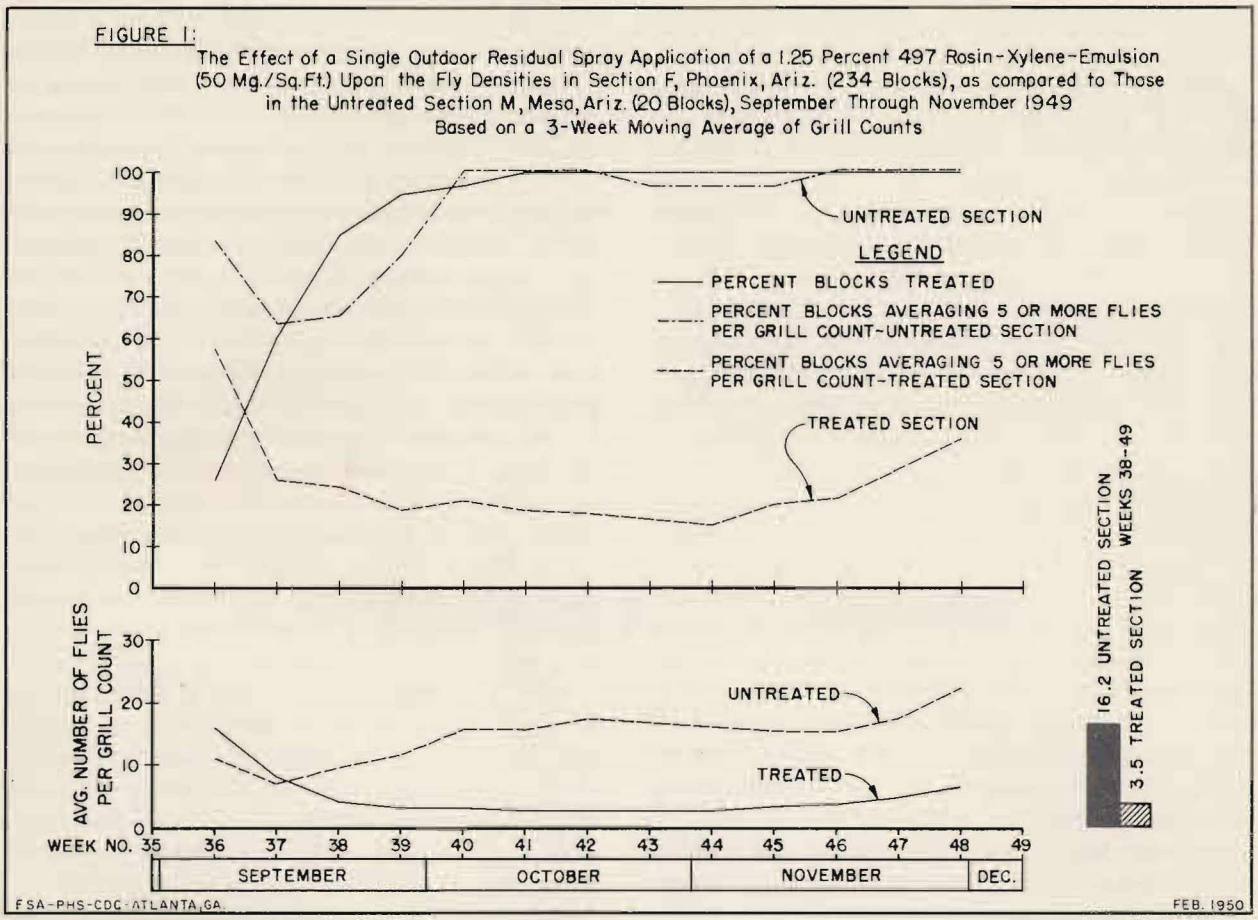
In Phoenix, Ariz., most of the problem fly-breeding areas were utilized in conducting tests with dieldrin (compound 497 — Octalox). The principal experiment involved treatment of 238 blocks in a low-class residential section (F) with a single application of a 1.25 percent dieldrin-rosin-xylene emulsion at the rate of 50 milligrams per square foot. In this experiment, all outdoor surfaces including fences, animal shelters, porches, and privies were sprayed. The treatment, started in late August, was completed by October 1. By the time 85 percent of the total blocks inspected had been treated, the average number of flies per grill count dropped to a level of slightly less than four. Figure 1 indicates the much higher fly densities found in the untreated town as compared to those in the treated area. In brief summary, comparison of fly numbers in the treated versus the untreated areas indicated very effective control had been achieved; based on the total densities for 11 weeks, the reduction amounted to approximately 72 percent.

It is evident from the above that this single residual spray application of 50 milligrams of dieldrin per square foot decreased the fly densities to the extent that adequate control was sustained for a period of 8 to 9 weeks. Considering the matter further and the question of whether this remarkable decline in fly densities can be fully attributed to the dieldrin application, attention must be given to the fact that the test was conducted during the cooler months of the year, when the natural replacement of the fly population in the area normally proceeded at a rather slow rate. The possibility therefore exists that the treatment initially so decimated the fly population that the latter, together with the prolongation of the breeding cycle, had a marked influence on subsequent weekly fly densities. In order to either validate or discount this preliminary evidence, further tests will be made in March 1950.

Additional tests with dieldrin were made at application rates of both 10 and 25 milligrams per square foot, and under various ecological conditions, namely garbage stations, horse stables, rendering plants, stock pens, and horse shelters. In general, it can be stated that the 25-milligram application rate gave almost as effective results as the 50-milligram rate; however, in the case of the 10-milligram application rate, except for one instance the fly control obtained was much less effective for an extended period.

ECTOPARASITE-BORNE DISEASES

Murine Typhus Activities. The effectiveness of 10 percent DDT dust, as reported from 62 counties in nine States, was based on data summarizing records of ectoparasite identification from 2,267 rats, and of successful tests of sera from 1,965 rats (collected in July-August-September 1949). The results of the complement fixation tests on these rat sera show a very slight increase in the percentage of rats in nondusted areas which were positive for typhus, as compared with the same period in 1948. This possibly may be explained by the fact that typhus survey and control operations in some States were extended during 1949 into rural areas in which no previous DDT dusting had been carried on. The over-all results obtained during the quarter show a very satisfactory reduction in the percentage of typhus infection in rats from those premises which had been dusted 31 or more days previously when compared to results obtained from the nondusted premises. In all States where



significant numbers of rats were examined, very substantial reductions occurred in the percentage of rats infected with typhus after DDT dusting.

Data available for analysis on the effectiveness of 5 percent DDT dust from 21 counties in Georgia and from one county in South Carolina (based on ectoparasite identifications from the 1,818 rats collected, and of successful tests of sera from 1,417 rats), indicated that although rat ectoparasites had been reduced somewhat, typhus infection in rats remained essentially the same as before dusting. A comparison of the percentages of rats examined from farms (87 percent of total) and from cities, and of the percentages of each that were positive for typhus, indicates that typhus control is more difficult to obtain on farms than in cities.

Briefly, results observed during this quarter indicate that neither the reduction in the percentage of rats infested, nor in the average number of ectoparasites per rat in the 5 percent DDT-dusted area, can be considered satisfactory when compared to results obtained in 10 percent DDT-dusted areas.

Recently this section, in cooperation with the Statistical Section of Epidemiologic Services and the Typhus and Rodent Control Section of Engineering Services, has considered the desirability of using some index other than the average number of ectoparasites per rat examined in the analysis of typhus control data. There was general agreement that when one criterion only was to be used, the average number of ectoparasites per rat examined would provide the most desirable information. However, when two methods are available they should be (1) the percentage of rats infested, and (2) the average number of ectoparasites per INFESTED rat (rather than per rat examined).

A survey to determine the degree of infestation in rats and the abundance of the oriental rat flea in the St. Louis, Mo., area was conducted throughout the calendar year 1947. Data from this survey,

which have recently been analyzed, indicate that conditions are such that typhus is not likely to become a disease of major importance in that city. It would appear that St. Louis is located in the northern border zone relative to typhus transmission.

Certain supplementary studies by a Plague-Typhus Control Group, with headquarters in Brownfield, Tex., which were conducted from 1946 to June 1949, consisted of the usual trapping, bleeding, and combing of domestic rats to determine typhus infection rates and ectoparasite incidence. Some of these collections were made in connection with DDT dusting projects. Under the usual conditions of precipitation, temperature, and relative humidity occurring in this area, high oriental rat flea infestation and typhus infection in rats would not be expected, nor should high human typhus rates occur. Nevertheless, although *Xenopsylla cheopis* occurred on only 2 percent of rats examined with an average of 0.1 per rat, 17½ percent of the rats were found to be infected with typhus and a total of 133 human typhus cases were reported in the 10 counties covered (having a combined human population of 153,000) during the 10-year period 1939 through 1948, or an average case rate of 0.9 per 10,000 humans per year. These typhus rates do not differ markedly from those in areas where *X. cheopis* rates are much higher.

DYSENTERY VECTOR CONTROL
(Thomasville, Ga.)

In general, the weather conditions throughout the quarter were extremely mild compared with the same period of previous years; relative drought conditions prevailed and fly mortality due to excessive moisture was at a minimum. No new areas of fly breeding due to commercial activities were encountered. Since cool weather reduced fly activities sharply early in November, the operational activities were greatly decreased.

Entomology: A review was begun of the project data on fly density evaluations; but since the bulk of this is in terms of fly grill counts, the degree of accuracy of such counts must be established before further evaluation is indicated. During tests conducted at Pharr, Tex., which were designed to measure the ability of inspectors to count rapidly, it was discovered that in dealing with fly counts of up to 50 individual flies on a grill, the standard error is about 4 percent for experienced men, and 6 percent for those inexperienced; there was a tendency toward the under-estimation of counts in the higher fly numbers. Preliminary data indicate that the grill counts, when properly used, yield a repeatable index figure of the flies found on attractants when fly numbers are within a density range of 0-50 per grill. Counts of more than 50 flies are primarily of interest in studying population trends in relation to other factors, and when applied to operational activities, usually indicate a poor degree of fly control.

Considerable study was made of the daily fluctuations in a number of ecological factors which would affect fly numbers at Thomasville, chief of which usually are temperature, humidity, shade, feeding attractants, winds, ovipositional material, and light. Temperature appears to be the most logical factor which reflects the interaction of all others, and for this reason is receiving considerable attention on the project. From both experiments and extrapolation of inspection data it was confirmed that actual temperatures under 70° F. permitted very little fly activity.

Work is continuing on the use of the number of fly eggs oviposited in breeding media or attractants, as a means of better fly density measurement. Considerable time is also being expended upon the breeding substrates, the two most commonly encountered such media being dishwater-soaked soil, and cow manure.

Operations: Chemical fly control continues both by means of space spray and of residual spray methods. From evaluation data collected, a number of charts have been prepared which indicate quite obvious differences in fly numbers between the chemically untreated towns and the towns which were treated with outdoor DDT sprays. Also, encouraging results on fly reduction are being achieved in the city of Thomasville by the three-times-per-week garbage removal, with little or no supplementary chemical control. It is felt that further reductions can be obtained by better enforcement of city ordinances.

Epidemiology: A total of 2,223 rectal swab cultures from children under 10 years of age and 1,000 from other sources were processed during the quarter. Two "history of illness" revisits were made to residents of all sample blocks in Thomas County and of three-fourths of the sample blocks in Moultrie. These records are now being analyzed.

Typhus Investigations: The study of murine typhus incidence in humans was started in three counties of Georgia in the latter part of 1945; the purpose of the study was to determine the effects

of DDT dusting, on a county-wide basis, in reducing the incidence of human infections. Concurrent objectives were the determining of the effectiveness of DDT dust in controlling one or more of the abundant species of rat ectoparasites; the measuring of any reduction of typhus in rat reservoirs; and the observing of any association between ectoparasite control and reduction of typhus in rat and man. Success of the dusting program is indicated by the fact that between January 1949 and November 1949, 24 human cases of murine typhus fever have been confirmed in the untreated county, whereas only three cases have occurred in the two treated counties, one in one county, and two in the other.

Dr. Dorland D. Davis, of NIH, recently has been assigned to the station to conduct epidemiological and bacteriological study of epidemic acute conjunctivitis, a serious affliction of children in this area. Cultures from the conjunctiva of each eye, and the nostrils and throat, are taken from children in both white and colored schools, supplemented with brief personal histories.

Dr. Richard Dow returned in December from a 4-month detail to the government of Iran, and will continue research on the eye-gnat *(Hippelates)*, an insect probably involved in the mechanical transmission of acute conjunctivitis.

Laboratory Services

In the Office of the Chief, the position of Administrative Staff Representative has been filled by Mr. W. B. Hagins, who was transferred to Atlanta from CDC activities in Louisiana. Sanitary Engineer E. H. Arnold was relieved of his duties with the North Dakota State Department of Health and assigned to the Virus and Rickettsia Section at Montgomery, Ala., as Executive Engineer to assist in the program of the Section.

Dr. M. M. Brooke was named chairman of the subcommittee on Diagnostic Methods for Amebiasis at the November meeting of the American Society of Tropical Medicine. The subcommittee was selected to determine acceptable standards, clinical and laboratory, for the diagnosis of amebiasis.

Dr. E. J. Tiffany has been selected to serve on the committee on Administrative Practice of the Conference of State and Provincial Laboratory Directors.

Dr. R. F. Reider was appointed to serve on the committee on Interstate Reciprocity of Premarital Examinations of the Conference of State and Provincial Laboratory Directors.

CONSULTATION SERVICES

During this quarter reviews were made of the laboratory facilities for the States of Illinois and Indiana. A follow-up program review was made for the State of Georgia.

At Seattle, Wash., in November, a 5-day course of refresher training lectures in parasitology and bacteriology was given. There were 175 registrants for this course, presented under the auspices of the State of Washington Department of Health and the State Society of Clinical Pathologists.

In Austin, Tex., four lectures on enteric bacteriology were given during a refresher course for laboratory technicians. The Texas State Department of Health and the University of Texas sponsored this meeting of 70 students.

A round-table discussion of "Laboratory Diagnosis of Communicable Disease" was conducted for staff members of the Division of Laboratories, North Dakota State Department of Health.

Diagnostic consultation services were supplied to Oregon during an outbreak of diphtheria. As a part of this consultation the epidemiology of diphtheria was discussed at a meeting of the Jackson County Health Department and the Jackson County Medical Society.

TRAINING

The second course in the "Laboratory Diagnosis of Bacterial Diseases, Part 2, General Bacteriology" was held October 31-December 2, 1949, with a total of 22 students attending. Four students came from Veterans Administration hospitals; 8 came from State health departments; 2 from city health departments; 1, Army; 3, private laboratories; 2, U. S. Marine Hospitals; 1 student came from Honolulu and 1 from Chile.

The first 2-week course in advanced enteric bacteriology was held December 5-16, 1949. Of the 16 students, 2 came from Veterans Administra-

tion hospitals; 7 from State health departments; 1, city health department; 1, Army; 1, U. S. Marine Hospital; 1, private laboratory; and 1 came from Honolulu, 1 from Peru, and 1 from Chile.

Three 1-week courses in bacteriophage typing of *Salmonella typhosa* were given by special arrangement, for seven students attending at different times. The first course, October 24-28, 1949, was attended by two students, one from Honolulu and one from Chile. The second course, November 28-December 2, 1949, was attended by four students, two from State health departments, one from a city health department, and one from Peru. The third course was given December 3-9, 1949, with one student from the Army.

At Emory University, staff members of the Laboratory Services presented the course in parasitology, a short course in mycology, and special lectures in bacteriology and biology. Special lectures in bacteriology were given at The Johns Hopkins University and at the University of Oklahoma. A special graduate course in mycology was given for physicians at Chicago, Ill.

EXTENSION SERVICE

Specimens, keys, and charts were sent out each month to 295 laboratories in the United States, Alaska, Hawaii, Canada, and Puerto Rico. The shipments consisted of *Dermacentor variabilis* (American dog tick), *Ornithodoros turicata, Ornithodoros hermsi, Necator americanus* ("New World" hookworm), *Ancylostoma caninum* (dog hookworm), *Plasmodium falciparum,* and *Plasmodium vivax.*

Loan sets of parasitological materials were sent, upon request, to laboratories in Delaware, Florida, Illinois, and Mississippi.

Preserved arthropods, living and preserved protozoa and helminths, pictorial keys, and printed materials – to a total of 501 items – were sent in response to 28 requests from 13 States and Puerto Rico.

EVALUATION PROGRAM

In this quarter two shipments of parasitological specimens were sent to the 42 participating laboratories and to the 3 referees. The 20 specimens included 2 stained PVA-fixed smears, 7 formalin-preserved specimens, and 11 unpreserved specimens.

PARASITOLOGICAL STUDIES

To better identify intestinal parasites in wet-mount preparations, the results from the use of compound stains made up in buffered solution are being studied.

In order to facilitate the diagnosis of leishmaniasis and trypanosomiasis, the survival time of the hemoflagellates in blood and other organs of infected animals is being determined under varying conditions of storage. When these protozoa are to be isolated and maintained in culture, the value of antibiotics added to culture media will be determined.

A modified Heidehain iron-hematoxylin procedure has been standardized for tissue staining, and the findings reported. The method is not recommended for staining fecal smears.

Balamuth's liquid egg medium with liver extract can be used to isolate and maintain intestinal amebae with results similar to those from the use of Boeck-Drbholav's egg-starch medium.

VIRUS AND RICKETTSIA STUDIES

Mosquitoes *(Culex quinquefasciatus)* and bird mites *(Liponyssus bursa)* have been fed on virus-infected chickens to determine whether the arthropods are vectors of Eastern equine encephalomyelitis. Mosquitoes and mites are to be examined for persistence of virus, for transmission by bite, and for susceptibility to vector-transmitted virus. Similar studies are under way with *L. sylviarum* and are proposed with the new colony of *Dermanyssus gallinae.*

A study of the antigenic relationship of swine, equine, and human influenza has been initiated.

It has been found that some factor or factors in the corn steep liquor medium used as a substrate in the production of penicillin has an antiviral action *in vitro.* The medium is complex, containing a number of natural vitamins, mostly of the B complex group, along with many other organic substances.

Isolation of viruses of the Coxsackie group has been accomplished 90 times in material from 80 different individuals. Many of these isolates have been typed by neutralization and by complement fixation tests; 28 of the isolates are type 4, 8 strains are of type 2, and another 8 belong to type 5. Thus far 5 isolates fall into none of the four types available but still must be tested against Dalldorf's type 3 virus standards.

BACTERIOLOGICAL STUDIES

General Bacteriology. During this quarter a number of activities have been initiated to facilitate services rendered or to fill pressing requests for services not previously available to the States. These activities include the production of pneumococcus and meningococcus typing sera, the development of a centralized diagnostic service for

miscellaneous organisms, running of streptolysin titers, production of antigens by ultrasonic disintegration, beginning development of typing bacteriophages for organisms other than typhoid and paratyphoid bacteria, and the production of technical motion pictures.

Continuation of the *in vitro* virulence test for *Corynebacterium diphtheriae* was marked by solution of most of the difficulties previously associated with testing *minimus* strains.

Through cooperation with the medical staff of an Atlanta hospital the diphtheria-carrier survey and the case-culture study materials are being used for the development and evaluation of primary media for recognition and isolation of diphtheria bacilli.

A small-scale supplemental-serum production program has been started to insure availability of antisera for all the streptococcus types. It was found that restoration of "degenerated" homologous cultures effected satisfactory results with some typing antisera which had been considered unsatisfactory for distribution. Supplemental sera sent to 13 laboratories totaled 450 milliliters. Fifty-eight cultures and extracts were distributed to four States.

Arrangements have been made with a biological manufacturing firm for a cooperative study using a dehydrated medium in place of freshly prepared medium now considered essential for antigen preparation. Results from commercial stock media, a dehydrated medium formulated here, and the standard medium are to be compared.

To develop more efficient diagnostic procedures for leptospirosis three principal studies were made. Media for isolation of organisms for maintenance of strains in usable condition and for antigen production have been compared, and nothing completely satisfactory was found.

In the absence of a reliable agglutination test, attention was directed to the development of a specific complement fixation test for the two commoner species of *Leptospira*.

A detailed study of bacteria in the tribe *Mimeae* was begun during this quarter. Capsular antigens and antisera were completed; comparison of these and the study of somatic antisera are under way.

In nursing research, *in vitro* tests have been made of the killing effect of isopropyl alcohol upon *Escherichia coli*, *Salmonella typhosa*, *Staphylococcus aureus*, and *Streptococcus* strains, during varying time intervals. Control tests, to standardize the procedure, have been run in parallel, using phenol on the same bacterial species and strains.

The problem of mouth-thermometer contamination when used by tuberculosis patients has been the basis for extensive studies to determine the quality and degree of contamination by tubercle bacilli and by non-acidfast bacteria. The decontaminating efficiency of ethyl alcohol for such objects is still under study.

Serology. For the diagnosis of brucellosis, the performance of the slide agglutination test is being compared with results from the tube test which was evaluated in 1948. With either technique, remarkably irregular results are to be expected when human sera are tested. The possible role of blocking antibody phenomena in causing irregular agglutination reactions is under study.

The use of parasitological, mycological, and leptospiral antigens in the complement fixation test is still under critical study in these laboratories. Of 1,340 sera tested 22 percent were positive for amebiasis; 13 percent of 240 tests for trichinosis were positive; 8.5 percent of 76 tests for echinococcosis were positive.

Among human sera, 10 of 710 murine typhus tests were positive; 1 (from Maryland) of 225 sera was positive for Q fever; 2 sera from Maryland, 1 from Georgia, and 1 from Alabama were positive for Rocky Mountain spotted fever (from a total of 219 specimens).

Enteric Bacteriology. In attempts to place *Klebsiella* serological typing on a routine basis, sera for the 14 recognized capsular types were prepared. Broth cultures and alcohol-dried organisms were compared as antigens; both antigens gave satisfactory results.

Antiserum production during the quarter totalled 8,000 milliliters of *Salmonella*, 5,200 milliliters of *Shigella*, and 1,500 milliliters of *E. coli* antisera. The production of *Salmonella* and *Shigella* antisera is nearing completion.

Some 948 cultures were examined, of which 188 were *Salmonella*. Among the *Salmonella* cultures 339 were from man, 187 from animals, and 2 from ratin. Several of the *Salmonella* cultures were from fleas collected in connection with plague studies.

Arizona paracolon type 10:1, 2, 5 was found frequently from fowls, dogs, and cats of the southeastern United States. This type previously has been incriminated in two outbreaks of food "poisoning" in Georgia.

From intestinal tracts of 272 migratory birds,

Salmonella Oranienburg was isolated once (from a meadow lark). This type frequently is isolated from infected humans and animals.

The great need for elementary training in enteric bacteriology, as opposed to advanced serologic diagnosis training, is becoming more evident as larger numbers of students are observed.

Sets of typing 'phages were distributed to selected laboratories for comparative studies.

Evaluation of commercial diagnostic sera and antigens was completed and will be reported soon. Sera and cultures obtained from the U. S. Naval Medical Center gave results entirely comparable to those obtained in the study of sera purchased on the open market.

Tuberculosis. Some evaluation studies on efficiency of techniques and of media used in the diagnosis of tuberculosis have been completed and are to be reported soon. A joint evaluation project with the New York State Department of Health showed close correlation of relative efficiencies. For the isolation of tubercle bacilli, Lowenstein's and Petragnani's media were equally sensitive media and were clearly superior to Trudeau Committee medium and to Dubos' medium, solid or liquid.

Specimens of sputum, gastric washings, urine, and laryngeal swabs, collected simultaneously from each patient, were used to determine the optimal source of material for the detection of tubercle bacilli in humans. Gastric washings consistently yielded the largest number of positive cultures.

Mycology. The identification of pollens from air samples in Arizona, Kansas, and West Virginia has begun, as part of a cooperative study with Engineering Services.

From reference diagnostic material 90 strains of pathogenic fungi were isolated. *Candida albicans* and *Microsporum Audonini* isolations comprised the majority of the species. *Blastomyces dermatitidis* was isolated from the third known human case in Georgia. All three cases have been diagnosed definitely from isolations made by this laboratory.

CLINICAL PATHOLOGY

The studies under way include the correlation of the results from simple blood tests (for creatinine, glucose Hayem's test, NPN) with the usual laboratory studies and with clinical studies. Conjoint studies with Veterans Administration hospitals and Emory University are designed to evaluate methods for determining urea and creatinine and to make comparative studies of inulin and creatinine renal clearance.

A simple "picric acid" test for rapidly determining blood-sugar content was adopted for use in mass screening for diabetes. In cooperation with the Division of Chronic Disease and the Division of Venereal Disease, the clinical pathology laboratory participated in the diabetes survey conducted by the Alabama State Health Department in November. With this method, 5 laboratory aides trained only in a few simple procedures could make 2,000 blood-sugar determinations each day.

It was possible to make evaluation of the "picric acid" technique in participation with a Georgia State Department of Health pilot study of diabetes screening for 700 persons.

WESTERN CDC LABORATORY

During the second quarter, wild-rodent survey activities were limited to a few specimens sent to the laboratory for testing from units operating in the States of Colorado and Washington. One specimen of 123 fleas taken from 21 sagebrush voles, *Lagurus curtatus*, trapped December 13, 1949, in Kittitas County, Wash., was proved to be plague infected. This specimen was of interest because of the season of the year when the infected fleas were collected.

On November 5, 1949, a 7-year-old boy died of bubonic plague at the U. S. Marine Hospital, Fort Stanton, N. Mex. He had been treated with penicillin for a supposed pyogenic infection with enlarged axillary lymph glands the day before his death and sent home to report to the hospital the next morning. He reported back to the hospital as directed and died later that day. This is the third case of plague reported from New Mexico since July 1, 1949.

During this quarter, fleas collected from meadow mice *(Microtus)*, white-footed mice *(Peromyscus)*, and sagebrush voles *(L. curtatus)*, were tested in the laboratory to determine their ability to transmit plague by their bites. Most of the fleas were obtained in Kittitas County, Wash., where plague has been found continuously among these small rodents during the past 3 years and during practically every month in the year. A total of 158 wild rodent fleas of 11 different species were infected with plague. Of this number, 12 fleas of the following species acted as transmitting agents: 5 *Hystrichopsylla dippiei;* 4 *Thrassis gladiolis johnsoni;* 1 *Megabothris abantis;* 1 *Monopsyllus eumolpi;* and

1 *Monopsyllus wagneri.*

Experiments begun in 1948 to determine the effects of *Salmonella enteritidis* and *typhimurium* upon the course of plague infection of fleas were started again toward the end of the present quarter. The 1948 investigations were conducted with *S. enteritidis*, while in the 1949 experiments *S. typhimurium* is being used. Both varieties of *Salmonella* have an inhibiting effect on the normal course of plague infection in fleas even when the latter infection has been well established as evidenced by plague-mass formations. The secondary infection not only reduces the possibility of fleas being transmitting agents of plague but, in many instances, when such fleas become blocked they transmit *Salmonella* instead of plague.

During the second quarter macroscopic autopsy examinations were made of 3,354 domestic rats trapped in San Francisco; 456 guinea pigs were inoculated with 16,147 fleas taken from these and other rats trapped at Pacific Coast ports. None of the examinations showed evidence of plague.

Technical Development Services*

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

TOXICOLOGY

Toxicity of Dieldrin. Twenty-five and 6.25 percent solutions and 6.25, 2.50, 1.25, and 0.62 percent emulsions have been tested using rats, mice, rabbits, dogs, and monkeys for all or part of the formulations. Doses were applied to the clipped skin of the shoulder area at the rate of 400, 100, 40, 20, and 10 milligrams of technical dieldrin per kilogram of body weight. The volume of solution or emulsion applied at a single dose was in all cases equivalent to a dose of 112 cubic centimeters for an average (150-pound) man. All rabbits and mice given a single dose of 25 percent solution died, but one of ten rats, two of five guinea pigs, and all of three monkeys survived the same treatment. Rats were less severely affected by a single dose of 6.25 percent mayonnaise-type emulsion than by a solution of the same concentration given at the same rate of 100 milligrams per kilogram. However, two or more doses of the 6.25 percent mayonnaise-type emulsion were uniformly fatal to rats when the doses were carefully massaged into the skin. One dog of four has died following 11 applications of 1.25 percent emulsion at the rate of 20 milligrams per kilogram while the three remaining have survived an average of 34 doses in good health. Two monkeys have survived an average of 37 doses of the same 1.25 percent preparation. The reaction of rats to 2.5, 1.25, and 0.62 percent emulsions remains the same as reported earlier. The continuing ability of surviving animals to resist increasing total dosage is noteworthy but unexplained. Clinical signs of poisoning in the dog are similar to those described earlier for other animals.

The various groups of rats washed within 5 to 10 minutes after the applications of 25 percent concentrate at the rate of 400 milligrams per kilogram showed a range of mortality from 66 to 90 percent, while unwashed but otherwise comparable rats showed a range of mortality from 90 to 100 percent. The single group of rats washed 5 to 10 minutes after the repeated application of 2.5 percent emulsion showed a mortality of 30 percent, while unwashed but otherwise comparable rats showed a range of mortality of 70 to 100 percent. Washing after 4 or 8 hours and the use of a commercial cream did not protect animals from poisoning. Rats may show convulsive seizures as early as half an hour after the topical application of 25 percent solution. Bioassay was positive on the livers of three rats which died within 4 hours of a single application of 25 percent concentration of dieldrin; the rapidity of absorption is noteworthy.

An ear-dipping technique used in the study of the relation of washing and dermal toxicity proved unsatisfactory. Even so, the results of the experiment tended to confirm the results with rats and the benefit of early washing.

*Abstracted from Technical Development Services Summary of Activities No. 20, October, November, December 1949.

One and one-fourth percent dieldrin emulsion was sprayed under simulated field conditions and compared with 5 percent DDT emulsion and water for its effect on rats, mice, guinea pigs, rabbits, and cats. The animals were exposed 4 hours each work day and were held in the same spatial relationship to the sprayer and spray mist as an operator's head. Mortality was significantly greater among animals exposed to dieldrin than among the other groups. However, the fact that DDT-exposed animals showed typical symptoms as well as an increased mortality as compared to the water-exposed animals is noteworthy. In general, young animals were more susceptible to poisoning than old animals, and females were slightly more susceptible than males.

Toxicity of Chlordan. Twenty-five and 6.25 percent solutions and 2.5 percent emulsion have been tested on rats. Doses were applied to the clipped skin of the shoulder area at the rate of 400, 100, and 80 milligrams per kilogram. Five of 10 animals given a single dose of 25 percent concentrate died and typical convulsions were observed in 1 animal. Two of 15 animals treated with 2.5 percent emulsions died after four and five doses respectively.

Differences in the mortality of control infant rats and of those exposed to the vapors of chlordan from residual deposits were not great. There was no evidence of an adverse effect of chlordan on the fertility of female rats under the conditions of the experiment.

Toxicity of DDT. Twenty-five and 6.25 percent solutions and 2.5 percent emulsion were tested on rats. Doses were applied to the clipped skin of the shoulder area at the rate of 400, 100, and 80 milligrams per kilogram. No signs of DDT poisoning were observed in the one animal which died in this experiment.

Field Observations on the Exposure of Operators. Samples of spray mist contacting the exposed skin of operators were collected on filter paper during inside and outside spraying. The amount of *p,p'* isomer of DDT in each sample was analyzed colorimetrically. Marked variation was observed between individuals and between different trials of the same individual under the same circumstances. Contamination of the arms was greatest and averaged 246 and 34 milligrams per square foot per hour under indoor and outdoor spraying conditions respectively.

Various hazards of contamination of the spray crew by insecticide concentrate and emulsion were observed in the field, at Thomasville, Ga. The amount of spray mist contacting exposed and clothed skin of workers during outdoor operational spraying was measured. The figures for exposed areas are in good agreement with the results obtained under simulated field conditions. The average for all exposed areas of all workers was 23.6 milligrams per square foot per hour as compared to 1.2 milligrams per square foot per work day for clothed areas. The marked protection offered by clothing is noteworthy.

Rodenticide Studies. Continued study of rats previously sublethally poisoned with ANTU and then offered ANTU a second time gave evidence of comparative bait refusal.

Series of 10 adult rats were given five doses of 3.0, 1.0, 0.5, 0.25, and 0.125 milligrams of compound 42 per kilogram of body weight on succeeding days while other series were given five doses of 5.0, 3.0, 1.0, 0.75, and 0.5 milligrams per kilogram on alternate days. All rats were killed by 1.0 milligram per kilogram or by higher doses given on succeeding days, or by 3.0 milligrams per kilogram or higher doses given on alternate days.

White rats in standard bait acceptance tests with free choice of food were offered baits containing 50, 25, 12.5, 6.25, and 3.125 p.p.m. of compound 42; all rats were killed by baits containing as little as 6.25 p.p.m. of compound 42, but some survived 3.125 p.p.m., and the survival time of rats killed by lower dosages was greater than the survival time of rats on higher dosages.

Field tests have been conducted on 26 previously unreported establishments constituting two city blocks and certain other rat-infested premises. Results with field use of compound 42 continue encouraging but not uniformly so. In general, rats have not been eliminated but have been reduced to such a low level that damage to property has stopped. One cat was killed by compound 42 under operating conditions.

White rats were poisoned with compound 42 in bait to the point of illness and were then offered to cats. Two cats which ate one rat each were not affected. A cat which ate six rats over a period of 8 days died and showed typical pathology at autopsy. One cat which ate five rats over a period of 4 days survived and was apparently unaffected.

EQUIPMENT DEVELOPMENT

Respiratory Exposure Chambers. An exposure chamber was developed and constructed for toxi-

cological studies through respiratory exposure of small animals in atmospheres with toxicants of controlled dosages and particle sizes. A carriage is constructed to hold a separate and removable cage in which animals may be moved in and out of the chamber without disturbance. Sufficient plugged sampling holes are furnished to facilitate withdrawal of atmosphere samples from nearly any desirable point within the chamber.

CHEMICAL STUDIES

Formulations. Of 14 emulsifiers tested in chlordan formulations, 5 were found to be satisfactory. It was necessary to use 4 percent emulsifier in a 25 percent concentrate to obtain stable emulsions.

Analytical. Analyses were run on subcutaneous fat from two men who have been mixing DDT concentrates and spraying emulsions over a period of 5 years. Sample A, 2.24 grams of tissue, contained 91 p.p.m. of the pure *p,p'* DDT isomer. Sample B, 1.211 grams, contained 291 p.p.m. of the *p,p'* isomer.

Tests were made on samples of debris collected from rat runs which had not been dusted in over 2 years. Of the 16 samples analyzed from dusted areas, 14 contained DDT. Samples from nondusted areas gave negative tests. Eleven of the samples from the test areas produced 100 percent mortality against the rat flea, *Xenopsylla cheopis*, while five gave no mortality. None of the samples from the check area produced mortality.

INSECTICIDE STUDIES

Investigational Work on Adult Flies. With 30-minute exposures to deposits of 12.5, 25, and 50 milligrams of benzene hexachloride (95 percent gamma isomer) per square foot, 24-hour mortalities of 50 percent or greater were obtained for 3, 9, and 12 weeks, respectively, in laboratory tests with adult female house flies. Deposits of 200 milligrams of DDT per square foot gave 100 percent mortality for 18 weeks under comparable conditions.

Tests over a 16-week period with deposits of 100 and 200 milligrams of chlordan per square foot showed rapid failure of the 100-milligram deposits in 4 to 7 weeks after spray application. Thirty-minute exposures to deposits of 200 milligrams of chlordan per square foot gave 50 percent or greater 24-hour mortality of adult female house flies for 10 weeks in the laboratory.

Refrigeration of house fly pupae at 44° to 46° F. for 1 to 2 days had little effect on adult emergence. Refrigeration for 11 days reduced emergence to 50 percent. Refrigeration effects were about equal for both sexes. Flies from pupae refrigerated for 5 days showed no weakness.

A DDD insecticidal paint showed little effectiveness against house flies during the first 3 weeks after application. Later exposures 8, 11, and 21 weeks after paint application gave very satisfactory mortalities with 15- and 30-minute exposures.

Field strains of house flies collected at six Texas towns, where DDT resistance was shown in March, 1949, have not shown any reversion of resistance during a 9-month period, although regular DDT control measures were not applied in the towns during this period. Subsamples of two of these strains, held in the insectary, have shown partial reversion in DDT resistance. Two Savannah strains of DDT-resistant flies have shown almost complete loss of resistance over a period of 14 generations under insectary condition.

Results are given from a repeat study on insecticidal resistance in house flies reared in colony cages with portions of the interior treated with 200 milligrams of DDT, methoxychlor, or a 1:1 combination of the two insecticides. **As measured by colony survival** during the first 10 days after adult emergence, marked resistance was produced in one generation with DDT or methoxychlor deposits alone, but more slowly with the combined deposits. Loss of effectiveness was more marked with 5 percent DDT coverage than with 45 percent DDT coverage. **As measured by knock-down susceptibility**, general uniformity of susceptibility was reached with the F_2 to F_7 generations in the 5-percent-DDT-coverage colony and the 45-percent-methoxychlor-coverage colony. Progressive decrease in knock-down susceptibility was shown in the F_2 to F_7 generations from the 45-percent-DDT-coverage colony. No change in knock-down susceptibility was shown by flies in the colony with 45 percent coverage by combined deposits. The relative effectiveness of fresh and aged DDT deposits remained almost the same against resistant and nonresistant strains, showing resistance to be more important than age of insecticidal residues in control measures. **As measured by 24-hour mortality** after 2-hour exposure periods, resistance was produced to each type of insecticidal deposit. With 45 percent DDT coverage, resistance developed more rapidly and to a greater degree than with the 5 percent DDT coverage. With the combined

DDT-methoxychlor deposits, marked resistance was not shown until the F_6 generation. In checks for specificity of resistance, flies of the F_7 generation from the DDT colonies and the methoxychlor colony showed no loss of knock-down susceptibility to the combined deposits. In tests with DDT deposits alone flies of the F_7 generation from the combined-deposits colony showed marked loss of knock-down susceptibility; flies from the methoxychlor colony showed only partial loss of knock-down susceptibility. In tests with methoxychlor deposits, flies of the F_7 generation from the DDT and combined-deposits colonies showed marked loss of knock-down susceptibility. Flies of the F_{10} generation from the 45-percent-DDT-coverage colony were as susceptible to dieldrin deposits as adults of the standard insectary strain. With reciprocal crosses between the DDT-resistant and standard insectary strains of house flies, the F_1 and F_2 generations showed an intermediate degree of knock-down susceptibility between the resistant and standard strains, with the F_2 generation being slightly more resistant than the F_1 generation. Offspring of resistant females were slightly more resistant than offspring from resistant males. In mortality tests, the F_1 and F_2 generations of the crosses were intermediate in resistance to the parent strains, with the F_2 generation being slightly less resistant than the F_1 generation at 30- and 60-minute exposures to residues. The same general picture, but with a greater diversity of results, was shown by the F_1 and F_2 generations from reciprocal crosses between methoxychlor-resistant and standard insectary strains.

The relative effectiveness of dieldrin deposits, after outdoor weathering, was tested against *Musca domestica*, *Callitroga macellaria*, and *Phaenicia pallescens*. Under conditions of outside weathering on glass panels, deposits of 50 milligrams of dieldrin per square foot without rosin showed loss of effectiveness 8 to 12 weeks after application; deposits combined with 0.5 percent rosin and 0.1 percent Triton X-100 were still quite effective after 16 weeks. Combinations of dieldrin with 0.25 and 0.5 percent rosin and 0.1 percent Triton X-155 were less effective. Effective 24-hour mortality of flies exposed for 30-minute periods to dieldrin deposits of 12.5 and 25 milligrams per square foot were obtained for 4 and 8 weeks, respectively.

In a repeat study, 50 percent or greater 24-hour mortality of adult female flies occurred when they were exposed in a Peet-Grady chamber to vapors from dieldrin deposits of 200 milligrams per square foot for 2 hours at 4 weeks, for 3 and 4 hours at 7 weeks, and for 5 and 6 hours at 9 weeks after spray application. Similar experiments with chlordan deposits of 235 milligrams per square foot were relatively the same as previously reported for 200-milligram deposits of this material.

A series of micro-loops of 0.004-inch stainless-steel wire have been made and calibrated for droplet delivery of Deobase and benzene. Preliminary evaluations using single-drop applications of DDT-Deobase solutions to the dorsal surface of the mesothoracic segment of 1-day-old adult *M. domestica* give the following 24-hour mortalities: below 0.05 gamma DDT 0-50 percent male mortality, no female mortality; 0.05 to 0.1 gamma DDT 50-100 percent male mortality, 0-30 percent female mortality; 0.1 to 0.2 gamma DDT 60-100 percent male mortality, 25-80 percent female mortality; and over 0.2 gamma DDT 90-100 percent mortality of both sexes. Using single-drop applications of dieldrin-benzene solutions to the dorsal surface of the mesothoracic segment of 3-day-old *C. macellaria*, the following 24-hour mortalities have been obtained: below 0.01 gamma dieldrin 0-10 percent male mortality, 0-5 percent female mortality; 0.01 to 0.02 gamma dieldrin 30-65 percent male mortality, 5-25 percent female mortality; 0.025 to 0.05 gamma dieldrin 75-100 percent male mortality, 65-90 percent female mortality; and over 0.05 gamma dieldrin 100 percent male mortality, 95-100 percent female mortality.

Using the standard-exposure-chamber technique, adult house flies were exposed to dieldrin deposits to produce a 75 percent selective kill of each sex. Survivors were mated and the F1 generation tested for dieldrin resistance. With this procedure the following difficulties were encountered: (a) The toxic action of dieldrin was slow and necessitated selection rates based on 48-hour, not 24-hour mortalities. (b) Small changes in length of exposure periods produced marked changes in 48-hour mortalities and only periods of 3 minutes or less gave less than complete mortality. (c) Dieldrin residues light enough to produce desired mortalities were transient and showed daily decrease in effectiveness. Parent and F_1 generations selected under these difficulties failed to show conclusive resistance. Using micro-loops and droplet application of dieldrin-Deobase solution on the dorsal

surface of the mesothorax of individual flies, the desired selective kills for a parent and F_1 generations were produced by dosages of 0.003 gamma dieldrin for the males and 0.008 gamma dieldrin for the females. Selective kills by the micro-loop technique produced dieldrin resistance in the F_1 generation.

Investigational Work on House Fly Larvicides. Larvae of *M. domestica* did not develop in standard National Association of Insecticide and Disinfectant Manufacturers rearing-medium when they were placed in garbage cans treated 12 weeks previously with 5 milliliters of 5 percent dieldrin-xylene solution.

Investigational Work on Fleas. Adult *X. cheopis* were exposed for 4 minutes to a 5 percent DDT pyrophyllite dust applied at the rate of 50 milligrams per square foot. In each generation 1-day-old fleas showed consistently lower mortality than those fleas of unknown age, with the increase in mortality beginning with fleas 4 or 5 days old. Twenty-four-hour mortalities of parent-generation fleas 1-day-old averaged between 65-70 percent. The average mortality of 1-day-old fleas of the F_1 generation was approximately 55 percent, with that of the F_2 generation being only about 25 percent. In all cases controls averaged only 2.5 percent mortality with the mortality of 1-day-old fleas being less than half that of unknown-age fleas. Preliminary indications are that DDT resistance is appearing in the F_2 generation.

The rat has been found unsatisfactory as a host animal for the culture of the cat flea, *Ctenocephalides felis*, as adults fed exclusively on the rat survived but failed to produce a second generation. A method for the mass production of *C. felis* using the cat as the host animal has been developed. More than 25,000 adults were produced from a single colony over a 3-week period.

DISINSECTIZATION OF AIRCRAFT

Comparative Insecticidal Effectiveness of Various Aerosol Formulations. Using aerosol formulation G-382 as a standard the following changes were made: (1) the content of 20 percent pyrethrum extract was reduced from 5 percent to 2 percent, (2) lube oil and cyclohexanone were omitted, and (3) combinations of VanDyk 264, Sovacide 544-G, and piperonyl butoxide were tried. With 2 percent piperonyl butoxide, 0, 4, 6, and 8 percent combinations of VanDyk 264 were tried. Best results were shown by the combination of 2 percent piperonyl butoxide and 6 percent VanDyk 264. With 1 percent piperonyl butoxide, 0, 1, 2, 4, 6, and 8 percent VanDyk 264 were tried. Best results were shown by the combination of 1 percent piperonyl butoxide and 8 percent VanDyk 264. When the pyrethrum content was reduced from 2 to 1 percent, even with the best combinations of piperonyl butoxide and VanDyk 264, there was a marked loss of effectiveness.

Effects of Repeated Applications of Aerosols. Preliminary work has been done to determine and to compare any toxic effects on various laboratory animals of repeated exposures in Peet-Grady chambers to Freon 12 alone, to experimental aerosol S-58, and to the standard aerosol G-382. Thirty-four animals (2 rabbits, 2 guinea pigs, 16 rats, and 14 mice) were used in tests with each formulation. During a 42-day period, 168 10-minute exposures to dosages of 5 grams aerosol per 1,000 cubic feet have been made. Although 19 of 102 animals died, deaths were distributed in each of the three chambers. Intercurrent bacterial and fungus infections were considered as the principal causes of death. From the results to date, formula S-58 does not appear any more toxic than the standard aerosol G-382.

CONTROL METHODS AND EVALUATION

Field Investigations on House Fly Control. Completion of tests discussed in the CDC Bulletin, January 1950, indicated that chlordan at a dosage of 100 milligrams per square foot gave effective control of DDT-resistant flies for 8 to 11 weeks; and for 11 to 15 weeks at a dosage rate of 200 milligrams per square foot. Lindane gave effective control for only 2 to 3 weeks when applied at the rate of 25 milligrams per square foot; at 50 milligrams per square foot it was effective for 4 to 8 weeks. Dieldrin at dosages of 12.5 and 25 milligrams per square foot gave good control for 14 to 16 weeks; at 5 milligrams per square foot it was effective for 5 to 7 weeks.

Outdoor surfaces treated in April 1949 with 200 milligrams of technical dieldrin per square foot were still highly effective 36 weeks after treatment. A dosage of 100 milligrams of technical dieldrin per square foot with rosin gave an average 24-hour kill of at least 50 percent of the test flies for all treated surfaces combined for 23 weeks after treatment. On outdoor surfaces sprayed in September 1949, recrystallized dieldrin gave less than 50 percent 24-hour kill of house flies exposed for 30 minutes to the treated surfaces in wall

cages 1 week after treatment, when dosages of 3.125 and 6.25 milligrams per square foot were used. The 25 milligrams-per-square-foot application of recrystallized dieldrin gave higher than 50 percent kills for only 3 weeks, and the 12.5-milligrams-per-square-foot dosages gave higher kills for only 1 week. The 50-milligrams-per-square-foot dosages of recrystallized dieldrin gave about equal results as 200 milligrams of DDT per square foot for 12 weeks after treatment, and somewhat better results thereafter. Homogenized emulsions gave better results than hand-mixed emulsions. DDT with rosin gave higher than 50 percent average kills for 17 weeks as compared to 12 weeks with the standard emulsion without rosin.

Using a technique of placing attractive fly baits at outdoor locations, allowing flies from natural sources to congregate on the baits, spraying the flies with outdoor space sprays, and trapping the treated flies and holding them for 24-hour mortality observations, the relative effectiveness of space sprays of xylene-water emulsions of 5 percent DDT, 5 and 1 percent chlordan, and 0.1 percent dieldrin were tested. Glass plates placed beside the baits were used to measure the recovered dosage of spray applied, using a dye tracer. Dosages of DDT which gave 80 to 95 percent kill of blow flies (*C. macellaria*) produced only 11 to 20 percent kill of house flies, further indicating the strong resistance of DDT shown by the flies in the Savannah area. DDT gave kills above 80 percent for blow flies at recovered dosages above 0.2 pound per acre. Chlordan was generally effective at recovered dosages above 0.06 pound per acre, and dieldrin at recovered dosages above 0.012 pound per acre. Chlordan and dieldrin gave slightly higher kills of house flies than of blow flies.

Insectary-reared adult house flies were released into unoccupied rooms of concrete-block construction which had been treated with several residual spray formulations to measure the knock-down effectiveness of the formulations at monthly intervals after treatment. DDT with rosin gave the best results. Homogenized emulsions of DDT gave better results than hand-mixed emulsions. Methoxychlor was less effective than DDT. Dieldrin also gave slower knock-downs than DDT, but other tests indicate that short exposures of flies to dieldrin produce high mortalities, so that rate of knock-down is not a reliable index to the effectiveness of this insecticide.

Mosquito Larvicide Investigations. Further observations on tests which were incomplete at the end of last quarter indicated that in small land-locked ponds, the application of residual larvicides gave effective control of anopheline and culicine mosquito larvae as follows: DDT at 3 pounds per acre — 13 to 23 weeks; DDT with rosin at 3 pounds per acre — 10 to 25 weeks; technical benzene hexachloride (12 percent gamma isomer) at 1 pound per acre — 3 to 8 weeks; dieldrin at 1 pound per acre — 25 weeks; dieldrin at 0.5 pound per acre — 11 to 13 weeks; dieldrin at 0.25 pound per acre — 8-12 weeks; and toxaphene at 1 pound per acre — 4 to 6 weeks.

In preflood treatments, effective mosquito larval control was obtained for the following periods after the ponds flooded: DDT at 1 pound per acre, 3 to 4 weeks; DDT at 3 pounds per acre, 5 to 17 weeks; DDT with rosin at 3 pounds per acre, 9 to 17 weeks; dieldrin at 3 pounds per acre, 18 weeks; toxaphene at 3 pounds per acre, 4 to 5 weeks; and DDD at 3 pounds per acre, 14 to 17 weeks.

In ponds treated routinely at 5-week intervals with five treatments of technical benzene hexachloride (12 percent gamma isomer) at the rate of 1 pound of technical BHC per acre per application, this material had no appreciable effect on the fish present in the treated ponds.

PHARR, TEXAS, SECTION

Chemical Fly Control Investigations. Mixtures of dieldrin with water-white rosin adhesive were applied to the principal outdoor fly resting places in five towns at dosages of 100, 50, 25, and 10 milligrams of dieldrin per square foot of treated surface. Two towns treated at 100-milligram dosages showed satisfactory reduction of fly populations for periods of about 10 and 14 weeks. Satisfactory control was being maintained through the 10th week with a 50-milligrams-per-square-foot dosage and through the 8th week with 25- and 10-milligram dosages; and observations were continuing.

Single applications of dieldrin as a fog and as a wet mist were observed in Alamo (Pop. 3,800) with a Todd TIFA machine. Fog was applied from streets and alleys. Seven and one-half pounds of dieldrin were applied as a 5 percent fuel-oil solution. A temporary reduction in fly population was noted. About 4 months later, the town again was treated using the same equipment. Seventeen pounds of dieldrin were applied as a wet mist of 5 percent water emulsion. Treatment was made

from alleys only. This application materially reduced the populations and has maintained them at a low level for about 3 weeks, with observations continuing.

Environmental Sanitation Studies. A summary of type, frequency, and surface area of fly attractant and breeding sources has been completed for Anglo and Latin areas in Pharr (Pop. 9,300), Mission (Pop. 10,200), and Edinburg (Pop. 12,000). It is based on a survey of 1,192 Anglo premises-months. Dish and laundry water wastes occurred most frequently. They were found in 59 per 100 Latin premises. Garbage in containers was a fly attractant in 23 per 100 Anglo premises and 25 per 100 Latin premises. Exposed human excrement was a fly attractant in 5 per 100 Latin premises. It did not occur on Anglo premises. Three fly breeding materials were found on Anglo premises as compared to 15 on Latin premises. The most important single fly breeding material on both Latin and Anglo premises was garbage in containers.

Weekly grill counts show that flies can be almost completely eliminated from a city dump by a properly supervised and operated sanitary landfill method of garbage disposal.

Training Services

FIELD TRAINING

Amherst, Mass. This station was activated on November 1, 1949, although much of the ground work had been completed prior to that time. J. A. Sanitarian Irving H. Schlafman and Herbert W. Haas, Sanitary Engineer, are assigned to this station.

The first course in environmental sanitation will begin January 3, 1950, with 12 men from Massachusetts enrolled.

Mr. Schlafman presented a paper on the "Training Program of the New England Field Training Center" at a meeting of the Western Massachusetts Public Health Association held in Deerfield, Mass., on Dec. 7.

Cincinnati, Ohio. An advanced training course for State chemists primarily concerned with water pollution investigations was conducted November 7-18. The course was attended by 23 persons.

Plans have been made for five courses to be conducted during the calendar year 1950. In addition, training in radiological health will be offered.

Columbus, Ga. Nineteen trainees received certificates for completion of the environmental sanitation course. Ten additional trainees received individual training during the quarter.

Denver, Colo. Certificates were awarded to five trainees who completed the 12-week fall course in environmental sanitation. A short course in insect and rodent control for representatives of small communities will be held February 27 to March 4, 1950. This course is being sponsored by the Colorado Municipal League and the Colorado Department of Public Health with the cooperating agencies of the U. S. Fish and Wildlife Service, Denver Health Department, and this station.

Pittsburgh, Pa. Karl M. Mason, Sanitary Engineer Training Officer, reported to the new regional field training station at Pittsburgh, Pa., on October 15, 1949. Subsequently he spent several weeks on orientation at Columbus, Ga., and at the Headquarters Training Services at Atlanta.

The Bureau of Sanitation, Pittsburgh City Health Department, is planning to institute a generalized sanitation program on a district basis, exclusive of milk and industrial hygiene, and the first students of the field training center will be assigned to these districts upon completion of their basic training.

The Training Officer cooperated with the Ohio State Department of Health, the Public Health Service Regional Office at Cleveland, and the Topeka Field Training Center in developing a 3-day course in high-temperature, short-time pasteurization for district milk sanitarians in Ohio.

Savannah, Ga. Three health educators received certificates on September 10 for satisfactory completion of the 12-week field training program in public health education.

This field training station was closed at the conclusion of the course September 10, 1949. Most of the equipment was transferred and the Training Officer was given a new assignment with the New York State Health Department.

Topeka, Kans. Ten men completed the 3-month course in environmental sanitation ending November

12, 1949. Eleven persons attended sessions of the school on specialized subjects.

During the period November 1-3, the Training Officer assisted Region V with three sanitation short courses for dining car supervisors. This course was held at Chicago, Ill., with approximately 90 persons in attendance.

In cooperation with the senior high school faculty, the Training Officer presented two 1-hour courses per week for 7 weeks to a class of approximately 30 girls. He presented the section on environmental sanitation.

Troy, N. Y. The fifth 12-week course for sanitary inspectors was completed on December 9. Eight men attended the course.

Personnel of this station assisted in developing a 1-day course for swimming pool operators in Syracuse, N. Y.

STATE FIELD TRAINING

(Cooperative Enterprises)

Kentucky. Mr. Melvin Goldman, who has been in training at Columbus, Ga., has been assigned to the State of Kentucky. He will assist Kentucky with orientation and topical courses in environmental sanitation at Louisville, Ky.

Maryland. J. A. Sanitarian John Sullivan, who has been in charge of field training activities at Albany, Ga., was transferred to Upper Marlboro, Md., to assist the State in organizing and conducting field training courses for sanitarians. A tentative schedule for the first course has been prepared, including suggested personnel to lecture on specific subjects. This course was scheduled to begin February 20.

North Carolina. Mr. William C. Gibson, Sanitation Educational Director, has moved forward rapidly in his program for the training of sanitarians in North Carolina. In cooperation with the State Health Department, six areas have been selected and developed for giving closely supervised field experience. Through a plan developed by the State and the University of North Carolina, under the leadership of Mr. Gibson, 42 sanitarians will complete their field training during a 12-month period.

Two trainee groups consisting of a total of 23 men have been processed under the training program for sanitarians which was established in North Carolina last July. Future classes are scheduled for January 16 to March 11, April 10 to June 3, and September 11 to November 4. In addition, a series of short courses for sanitarians will be conducted during fiscal year 1950 in milk production and control, insect and rodent control, and food production and control.

In addition, an 11-week program of training for registered nurses in public health has been developed as a cooperative effort of the State Board of Health, School of Public Health, and 10 participating local health departments. Twenty nurses, not eligible for admission to the regular course of study in public health nursing at the School of Public Health, were to initiate this program on January 3, 1950.

The W. K. Kellogg Foundation has granted the School of Public Health a sum of money for the development of a program of continuing education for groups related to the public health field. The proposed program will function under a faculty advisory committee. The initial program will be a seminar for health officers on communicable diseases, held in Chapel Hill on February 10 and 11. This program is the result of a request from the Health Officers Section of the North Carolina Public Health Association, and probably will be followed by others on subjects of special interest to health officers. Another project will be an institute and workshop on housing, probably to be held in March.

South Carolina. The Records Training Officer assigned to the South Carolina State Board of Health addressed the regular district meeting of county sanitarians of the Pee Dee District in Manning, S. C. The subject of this discussion was "Some Uses of Data in Our Sanitation Records." There were about 25 county sanitarians present. Through such discussions, a definite records consciousness is being developed among the sanitarians in South Carolina.

New record systems were installed at the Spartanburg Cancer Clinic, the Cancer Clinic in Greenville Hospital, and the Anderson Hospital Cancer Clinic. Cancer clinic records were installed at Roper Hospital Cancer Clinic in Charleston, S. C.

HEADQUARTERS TRAINING

A special 1-week insect control course was conducted October 17-21 immediately following the consummation of the fall rat control course. This course was especially designed for rat control personnel, and was attended by 10 sanitarians.

Training Services personnel conducted a 5-day insect and rodent control field training program at Columbus, Ga., during the period October 24-28. This course was attended by 30 sanitarians who

were enrolled in the 11-week environmental sanitation course given by the Columbus Field Training Station.

A 5-day insect and rodent control course was given in New Orleans November 7-11. The trainees were sanitarians taking the regular 11-week course at the Louisiana Department of Public Health Training Station.

A 5-day field training program in fly control was conducted for sanitarians in upper-central Florida November 28 to December 2.

Special observation and training courses were arranged for 10 public health visitors from seven foreign countries who came to Training Services during the quarter.

A 5-week course in "Appraisal Method for Measuring the Quality of Housing" was completed October 28. Two trainees received certificates for attending the course.

The Chief of the Training Services, through conferences with State and local health officials at Albany and Syracuse, N. Y., drew up specific agreements with reference to the development and operation of a new regional field training center in housing at Syracuse, N. Y. S. A. Sanitarian (R) Emil A. Tiboni has been assigned from CDC to have charge of the housing training activities.

By the end of the second quarter, copies of the new Communicable Disease Center publication, "Rat-Borne Disease Prevention and Control," had been distributed to most Federal, State, and key local public health workers engaged in rat control work. The initial supply of 5,000 copies now is virtually exhausted. In December, arrangements were made for the printing of an additional 5,000 copies of this manual.

Veterinary Public Health Services

RABIES CONTROL

Methodology research in rabies diagnosis and animal immunity is progressing at the Montgomery, Ala., laboratory. As a result of new and standardized diagnostic techniques disseminated to public health laboratories in the field through consultation and through the organized CDC short courses, various States are beginning to enjoy improved rabies reporting.

Preparation and preliminary testing of vaccines for a large canine duration-of-immunity experiment were accomplished during this quarter. After tests for infectivity titer, laboratory potency, innocuity, and sterility were performed on a field of seven candidate experimental vaccines, four were chosen for the 3-year comparative prophylactic vaccination study in a group of 350 dogs. Prevaccination serum neutralization tests were performed on all dogs selected for the experiment. The vaccines to be used are: (1) phenolized market-type vaccine, (2) ultraviolet irradiated vaccine, (3) Flury chick-embryo vaccine, and (4) ether-benzene-extracted, calcium-washed vaccine.

At the close of the quarter, the Rabies Control Section, under the direction of Dr. E. S. Tierkel, was transferred from Montgomery, Ala., to the headquarters office of the Veterinary Public Health Services at CDC, Atlanta, Ga. The laboratory work on rabies has been incorporated into the newly formed Veterinary Unit under Dr. R. E. Kissling and Dr. Harry Rubin at the Virus Laboratory in Montgomery. Research activities at this unit will continue in close cooperation with the office of Veterinary Public Health Services. All field activities concerned with the national rabies control program will be directed from the Atlanta office, and all inquiries and requests from State and local agencies concerning rabies control activities should be addressed to the Communicable Disease Center in Atlanta.

The third scheduled 1-week course in the "Laboratory Diagnosis of Rabies" was given November 14-18 at the laboratories of the CDC in Atlanta. Enrollment included students from health departments in Virginia, Pennsylvania, Georgia, Florida, and Massachusetts; from the U. S. Army and the U. S. Air Force; and from Mexico and Peru. Six students from the latter two countries attended as the first step in a cooperative agreement with the Pan American Sanitary Bureau for training and coordinating rabies control activities with Latin American countries.

Consultation services in laboratory diagnosis and control programing were received from health departments and individuals in Argentina, Puerto Rico, Maryland, New York, Maine, Pennsylvania,

Tennessee, North Carolina, Connecticut, Illinois, Alabama, and Delaware.

The Florida rabies control program under the direction of Dr. James E. Scatterday, public health veterinarian with the Florida State Board of Health, has enjoyed a very successful year. Rabies incidence was reduced from 333 in 1948 to 75 in 1949. In Indiana a special rabies control committee was formed to study existing control machinery and submit recommendations for recodification of present legislation. As a result of a small outbreak of rabies in Denver, Colo., a rabies advisory board was created consisting of community leaders and representatives of the Denver and Colorado health departments. Measures for strengthening rabies control activities in this area are now in operation.

In Texas, effective rabies control programs have accomplished excellent results in Travis County (Austin), Dallas (where a severe epizootic was halted), and El Paso. Similar programs are well on the way in the Waco, San Antonio, and Houston areas. Ways and means of most effectively combatting the slowly spreading wave of fox rabies in east Texas now are being studied. The westward movement of the disease in the foxes of east Texas has been slowed by individual trapping and poisoning activities in the affected counties. A unified wildlife control campaign now is being planned.

OFFICER TRAINING ACTIVITIES

Dr. Raymond Fagan and Dr. Herbert Stoenner completed the 6-week course in radiological defense at the Naval Radiological Defense School, Treasure Island, Calif. Dr. Ernest Tierkel and Dr. Arthur Wolff completed the 3-week course in military biology and the medical aspects of radiological and chemical warfare at the Naval Officers Indoctrination School, Army Chemical Center, Maryland.

BRUCELLOSIS

A laboratory survey in Texas has shown that brucellosis-free milk is produced where testing is required by local ordinances. As yet this does not apply to some of the larger milk-sheds of the State. The dairy industry is interested in participating in the four-point program for controlling the disease in dairy herds. Infection rates of approximately 5 percent were shown in hogs in Fort Worth, Dallas, and San Antonio, and in east Texas areas. A program for elimination of swine brucellosis will be undertaken with a system of herd testing and slaughter, with breeding replacement of disease-free stock. The same plan of attack is being used for infected goat herds in the State. Surveys have shown about 75 percent of the human brucellosis cases in Texas are due to contact with infected animals or their products; the remaining 25 percent to ingestion of infected milk.

In Indiana new work was begun for the organization of three additional township surveys in connection with the brucellosis study project. This will increase by 50 percent the area thus far covered. Of the areas selected, two are of the type in which swine breeding predominates, and the third is a predominantly dairy cattle area. Epidemiological testing surveys of the human and animal population in these areas will be carried out. In order to supplement the data available on occupational infections of brucellosis in another phase of the study, serological surveys of locker-plant employees were begun.

In Florida, the *Brucella* ring test is being performed on all samples of raw and pasteurized milk received in the laboratory. An improved method of antigen preparation by supravital staining, using tetrazolium recently described by Wood, is being studied. Antigen prepared by this procedure will be compared with the hematoxylin-stained antigen now employed.

BOVINE TUBERCULOSIS

A joint meeting in Indiana, sponsored by the State Board of Health, State Veterinarian's Office, U. S. Bureau of Animal Industry, and National Tuberculosis Association, was held to consider the problem of bovine tuberculosis and extrapulmonary tuberculosis of humans in that State. The new BAI directive which states that no area will be reaccredited after January 1, 1951, as a modified bovine tuberculosis-free area was explained. It was decided to gather data on the incidence of tuberculosis in cattle and extrapulmonary tuberculosis in man. A new case-finding procedure was begun in Indiana. Tuberculosis in animals diagnosed on post-mortem inspection in Federally-inspected plants is reported to the veterinarian-in-charge in the area of origin. Field veterinarians then test the animals on the farms of origin and all positive reactions are reported to the State Board of Health. Working through the local health officer, "patch tests" are made on all people having had contact with these animals.

INFLUENZA TYPING CENTER

The XIVth International Veterinary Congress and the World Health Organization have been designating various laboratories throughout the world

for the typing of influenza virus. The Montgomery CDC Virus Laboratory has been designated as one of these centers, and work in the Veterinary Unit there has begun on studies to ascertain the immunological, pathological, and virological relationships of human, swine, and equine strains of influenza virus.

Q FEVER STUDIES

In Riverside County, Calif., 905 animals were surveyed, with positive *Coxiella burneti* infection shown in 149 animals. One goat dairy of 53 animals showed 18 with significant Q fever titers. It is interesting to note that one Riverside County farm with 67 animals showed no titers for Q fever organisms. No new animals have been brought onto the premises of this farm in the past 21 years. San Diego County presently is being surveyed.

In the cooperative projects with the National Institutes of Health some of the earlier vaccination studies were pursued with, as yet, no significant results. Intensive studies on body fluids and fetal membranes are continuing. From specimens collected in California, the Bethesda laboratory reports indicate that fetal and maternal membranes and their contents are a rich source of *Coxiella* organisms.

Transmission and infectivity studies of Q fever in dairy cattle are being continued by the Veterinary Unit at the Hamilton, Mont., laboratory.

WASHINGTON STATE PROGRAM STARTED

A complete veterinary public health program under Dr. Monroe A. Holmes was begun in the Washington State Health Department. Emphasis in this program will be on the control of the diseases of animals communicable to man, and much of the work will be associated with the Columbia River Basin Project. The work will be performed with the cooperation of all veterinary, health, agriculture, wildlife, and reclamation agencies in the State. Preliminary epidemiological surveys have been carried out in the domestic livestock population of this area. Plans are being drawn to obtain continuous sampling material to be used in determining statistical base lines of animal diseases. Stress will be laid on such diseases as equine encephalomyelitis, brucellosis, tularemia, plague, anthrax, and tuberculosis. Corollary surveys on Q fever and histoplasmosis also will be considered.

MISCELLANEOUS

Histoplasmosis reactors in cattle still are being uncovered by the Histoplasmosis Unit in Kansas. Attempts to isolate *Histoplasma capsulatum* from lactating reactors are still unsuccessful. In Florida, survey operations on creeping eruption are continuing; 68.5 percent infestation with *Ancylostoma braziliense* has been found in surveys of dogs from five Florida city pounds. An outbreak of equine encephalomyelitis in Colorado was investigated by the CDC Midwestern Office. The Veterinary Public Health Unit of the Colorado State Health Department is planning to divide the State into veterinary districts for better administration of veterinary public health activities. Investigations into the illegal importation of psittacine birds from Mexico to California are being made. In Texas, surveys have shown that trichinosis is a serious public health menace in areas where hogs are fed uncooked garbage; an educational campaign on the hazards of feeding raw garbage to swine has been started; grain-fed hog herds have been shown to be trichinosis-free.

PICTORIAL REVIEW

Aedes Aegypti Control

PRODUCTION NO.: CDC 4-011.1, Released 1946

DATA: Motion Picture; 16 mm., Sound, Black & White; Length: 658 Feet; Time: 18 Minutes

GRAPHIC FORM: General Photography and Animation

PURPOSE

To aid in teaching proper methods of inspection and control of *Aedes aegypti* breeding places in order to prevent occurrence of dengue and yellow fever.

AUDIENCE

Public Health Service field personnel and others involved in dengue and yellow fever control programs.

CONTENT

Motivating introduction showing how air travel has eliminated distance as an effective barrier to dengue and yellow fever; the habitat and life cycle of the *Aedes aegypti* mosquito, the carrier of dengue and yellow fever; the work of the inspector, including equipment and technique of inspections and reports; follow-up of inspector's report, including duties of clean-up crews, maritime crews for boats, and emphasis on location and treatment of heavy foci.

COMMENTS

Related films are CDC 4-016, "It's Up To You," and CDC 4-023.1, "Miss Keeter Goes to Town."

It's Up To You

PRODUCTION NO.: CDC 4-016, Released 1945

DATA: Motion Picture; 16 mm., Sound, Black & White or Color; Length: 626 Feet; Time: 17 Minutes

GRAPHIC FORM: General Photography, Drawings, and Photomicrography

PURPOSE

To illustrate a representative community campaign to control *Aedes aegypti* mosquitoes in order to prevent dengue and yellow fever.

AUDIENCE

Public Health Service personnel and other groups interested in *Aedes aegypti* control.

CONTENT

Record of procedures in a city confronted with an epidemic of dengue and yellow fever; the carrier of dengue and yellow fever, the *Aedes aegypti* mosquito; the work of the health department and other agencies in planning and executing an antimosquito campaign; protective measures used to free the city of *Aedes aegypti*; recapitulation of program.

COMMENTS

A Spanish language version, CDC 4-016.1, "Le Toca A Ud," is also available.

CDC PERIODICAL PUBLICATIONS

Until January, 1950, the CDC Bulletin and its predecessor publications carried no information relative to volume and number of issue.

However, beginning with the January issue, it now carries that information – the January Bulletin being Volume IX, Number 1; the February Bulletin being Volume IX, Number 2, and this Bulletin being Volume IX, Number 3.

The present volume number was determined by tracing the Bulletin back to its first issue – which was known as the Organization Report in Lieu of Monthly Report of Malaria Control in War Areas.

Since that first publication, in 1942, the present CDC Bulletin has been called by a variety of names.

For the convenience of CDC personnel and others interested in referring to specific issues of MCWA and CDC periodicals, the Bulletin publishes herewith a complete list of those publications with volumes and numbers.

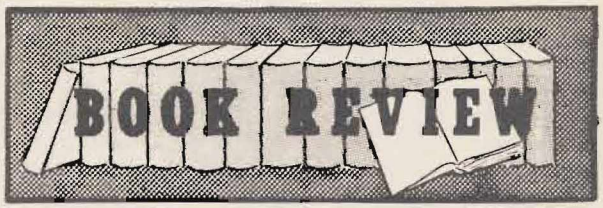
VOLUME	NUMBER	YEAR	MONTH	TITLE
I	1.	1942	March – June	Organization Report in Lieu of Monthly Report of Malaria Control in War Areas
	2.		July	MCWA Monthly Progress Report
	3.		August	MCWA Monthly Report
	4.		September	
	5.		October	
	6.		November	
	7.		December	
II	1.	1943	January	
	2.		February	
	3.		March	
	4.		April	
	5.		May	
	6.		June	
	7.		July	
	8.		August	
	9.		September	
	10.		October	
	11.		November	
	12.		December	
III	1.	1944	January	
	2.		February	
	3.		March	
	4.		July	MCWA Field Bulletin*
	5.		August	
	6.		September	
	7.		October	
	8.		November	
	9.		December	
IV	1.	1945	January	
	2.		February	
	3.		March	
	4.		April	
	5.		May	
	6.		June	
	7.		July	
	8.		August – September	
	9.		October – November – December	

*Summarizes field activities for April, May, June 1944.

(continued on page 32)

Veterinary Clinical Parasitology

by Edward A. Benbrook and Margaret W. Sloss. 1948, pp. 1–187. Iowa State College Press, Ames, Iowa.



The most valuable feature of this book is the collection of many good photomicrographs of parasites of veterinary importance. Since it is strictly concerned with the clinical aspects of the subject, only the diagnostic stages of the parasites are illustrated. Usually each intestinal organism is presented in photographs taken at two magnifications, 100x and 410x. This makes it possible to compare the relative sizes of the organisms under the low power and high dry of the compound microscope. The photographs of the ectoparasites were taken at lower magnification.

In all, there are approximately 240 photographs, each of which occupies one-half a page.

Except for description of techniques, very little text material in the first half of the book deals with intestinal parasites. For this reason it would appear that the title is too broad for the material presented. The term "atlas" or "illustrated guide" would have been appropriate to qualify the title. Even as a guide it would be more complete and useful if the authors had included descriptions of the diagnostic stages, host parasite lists, and perhaps notes on pathogenicity.

The text material on the ectoparasites is more complete. In most instances there is a general description of each genus including morphological characteristics and effect of the parasite upon the host. The description of the genus is followed by a list of species with the names of the hosts that they parasitize. There is also a table to the characteristics of the mange and scab mites, accompanied by 10 clear outline drawings to illustrate the male and female characters described.

The book has been planned so that other chapters can be added as needed and as the illustrative material becomes available. It now deals with only three groups – intestinal parasites, lice, and mites. At the end of the book there are reference lists for each chapter, and a detailed index.

M. M. Brooke, S. A. Scientist

(continued from page 31)

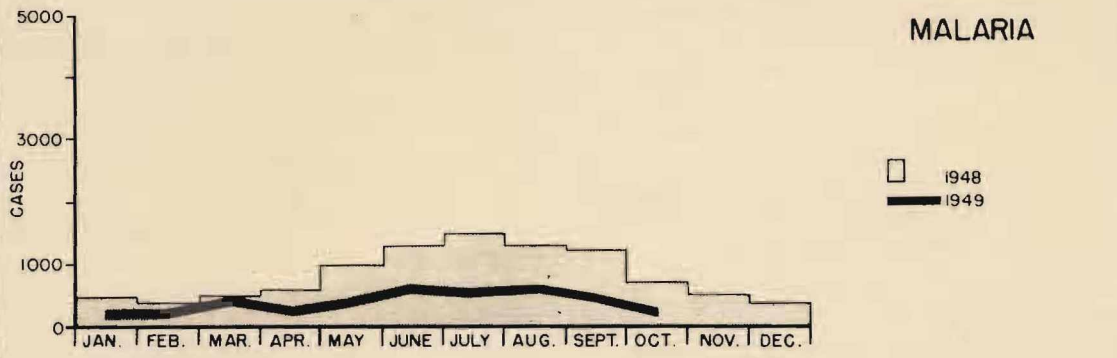
CDC PERIODICAL PUBLICATIONS

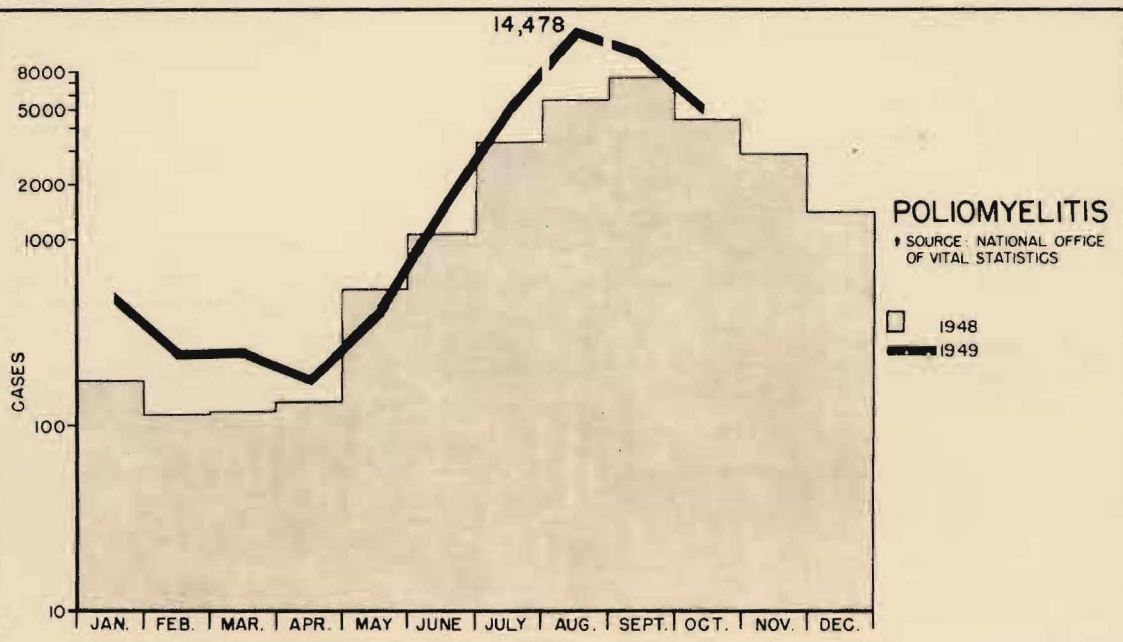
VOLUME	NUMBER	YEAR	MONTH	TITLE
V	1.	1946	January – February – March	
	2.		April – May – June	
	3.		July – August – September	CDC Bulletin
	4.		October – November – December	
VI	1.	1947	January – February – March	
	2.		April – May – June	
	3.		July – August – September	
	4.		October – November – December	
VII	1.	1948	January – February – March	
	2.		April – May – June	
	3.		July – August – September	
	4.		October – November – December	
VIII	1.	1949	January – February – March	
	2.		April – May – June	
	3.		July – August – September	
	4.		October – November – December	
IX	1.	1950	January	
	2.		February	
	3.		March	

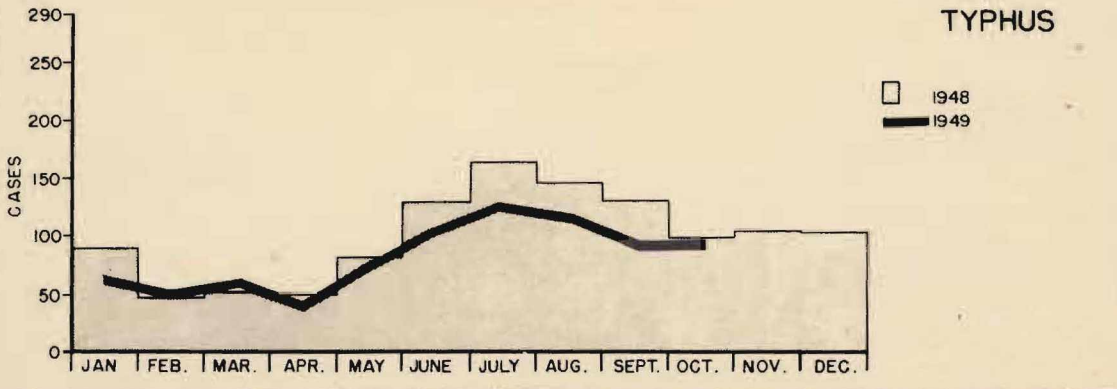
U. S. GOVERNMENT PRINTING OFFICE : O—1950

MORBIDITY TOTALS FOR THE UNITED STATES *
MALARIA, POLIOMYELITIS, TYPHUS

1948 - INCOMPLETE 1949 - AS REPORTED







FSA PHS CDC ATLANTA, GEORGIA

* DATA ARE TENTATIVE AND INCOMPLETE