

1945

Brooke

NOTEBOOK FOR

In-Service Orientation and Training Course
In-Service Training Section
Training and Education Division
Office of Malaria Control in War Areas
U. S. Public Health Service
Atlanta, Georgia

ADMINISTRATOR
FEDERAL SECURITY AGENCY

SURGEON GENERAL
DEPUTY SURGEON GENERAL

ADVISORY BOARDS

1. National Advisory Health Council
2. National Advisory Cancer Council
3. Coast Guard Cadet Entrance Physical Examination Boards
4. Coast Guard Recruiting and Promotion Boards
5. Board for Control of Biological Products
6. Federal Board of Hospitalization
7. Other Boards as May be Authorized

CONFERENCES

1. Pan American Sanitary Conferences
2. International Conferences Authorized by Special Acts of Congress
3. Annual Conferences with State and Territorial Health Officers
4. Special Conferences

OFFICE OF THE EXECUTIVE ASSISTANT

- a. Civil Service Personnel Section
- b. Finance and Supply Section
- c. Chief Clerk's Office

BUDGET AND FISCAL OFFICE

- a. Finance and Accounts Section

OFFICE OF THE SURGEON GENERAL

1. Chief Medical Officer
2. United States Coast Guard
3. Division of Commissioned Officers
4. Division of Public Health Methods
5. Dental Division
6. Sanitary Engineering Division
 - a. Stream Pollution Investigations
 - b. Facility Security
 - c. Milk and Food
 - d. Control of Slaughter
 - e. Vessel Sanitation
 - f. Stream Sanitation
 - g. Water and Sewage
7. International health relations

NATIONAL INSTITUTE OF HEALTH

1. Office of the Director
2. National Cancer Institute
3. Division of Infectious Diseases
4. Division of Physiology
5. Biological Control Laboratory
6. Chemistry Laboratory
7. Psychology Laboratory
8. Zoology Laboratory
9. Industrial Hygiene Research Laboratory

BUREAU OF MEDICAL SERVICES

1. Office of Chief of Bureau
 - a. Emergency Medical Section
 - b. Nursing Section
 - c. Hospital Division
 - a. Marine Hospitals and medical relief stations
 - b. Sheepshead Bay Hospital
 - c. Memorial Hospital
 - d. Naval Hospital
 - e. Port South Hospital
 - f. Mental Hygiene studies
 - g. Maritime Quarantine
 - h. Airports Quarantine
 - i. Immigration
 2. Medical Care Services for other Governmental Agencies
 - a. War Shipping Administration
 - b. Office of Indian Affairs
 - c. Bureau of Prisons
 - d. U. S. Employees Compensation Commission
 - e. Coast Guard
 - f. Farm Security Administration
 - g. Office of Vocational Rehabilitation
 - h. Medical Division, Office of Civilian Defense
 - i. Detention Centers
 - j. Public Roads Administration
2. Hospital Division
 - a. Marine Hospitals and medical relief stations
 - b. Sheepshead Bay Hospital
 - c. Memorial Hospital
 - d. Naval Hospital
 - e. Port South Hospital
 - f. Mental Hygiene studies
 - g. Maritime Quarantine
 - h. Airports Quarantine
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 - b. Office of Indian Affairs
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 - d. U. S. Employees Compensation Commission
 - e. Coast Guard
 - f. Farm Security Administration
 - g. Office of Vocational Rehabilitation
 - h. Medical Division, Office of Civilian Defense
 - i. Detention Centers
 - j. Public Roads Administration

BUREAU OF STATE SERVICES

1. Office of Chief of Bureau
 - a. Illinois
 - b. Audit
 - c. Merit system
 - d. Ladsen officers
 - e. Interstate Quarantine
 - f. Plague control
 - g. Malaria control, war areas
 - h. Typhus control
 - i. Emergency health and sanitation
 - j. Lethal gas activities
 - k. Tuberculosis control section
 - l. Public health dentistry
 - m. Venereal Disease Division
 - n. Control methods and research
 - o. Consultation service to States
 - p. Hot Springs Training Center
 - q. Rapid treatment centers
 - r. Industrial Hygiene Division
2. States Relations Division
 - a. Interstate Quarantine
 - b. Plague control
 - c. Malaria control, war areas
 - d. Typhus control
 - e. Emergency health and sanitation
 - f. Lethal gas activities
 - g. Tuberculosis control section
 - h. Public health dentistry
 - i. Venereal Disease Division
 - j. Control methods and research
 - k. Consultation service to States
 - l. Hot Springs Training Center
 - m. Rapid treatment centers
 - n. Industrial Hygiene Division
3. Field Operations
 - a. Field operations
 - b. Consultation service to States
 - c. Inspection teams, Government plants

DISTRICT OFFICES

April 17, 1964

IN-SERVICE TRAINING SECTION
Training & Education Division
Office of Malaria Control in War Areas
U. S. Public Health Service
Atlanta, Georgia

(second revision April 15, 1945)

OUTLINE OF IN-SERVICE TRAINING & ORIENTATION COURSE

- I. General Orientation for U. S. Public Health Service Activities. By P. A. San. (R) Herbert Knutson & P. A. Engr. (R) Ernest P. Dubuque.
 - A. History and basic organization of the Service.
 - B. Immediate relationships of PHS officers in the field.
 - C. Extracts of PHS Regulations concerning questions most commonly encountered by MCWA personnel.
 - D. Supplementary readings.
 1. Notes from PHS Orientation Course at Bethesda.
 2. Regulations of the Public Health Service.
 3. Unnumbered Circulars, Memoranda, Circular Letters, etc.
 4. Annual Report of USPHS, 1944.

- II. General Orientation for MCWA Activities. By P. A. Engr. (R) Ernest P. Dubuque and P. A. San. (R) Herbert Knutson.
 - A. History and purpose of the Office of Malaria Control in War Areas.
 - B. Extent of the MCWA program.
 1. Control around military establishments.
 2. Extended malaria control program.
 - C. The Headquarters Office at Atlanta.
 - D. The Public Health Service Districts.
 - E. Operational set-up in States.
 - F. Methods of malaria control in MCWA.
 - G. Results of MCWA program.
 - H. Supplementary readings.
 1. Monthly Reports and Field Bulletins.
 2. Annual Reports for 1942-43 and 1943-44.
 3. Manual of Operations.
 4. Organization Report.
 5. Selected Field and Inter-office Memoranda, Miscellaneous Circular Letters, Circulars, Bulletins, etc.
 6. List of war areas being controlled.
 7. Directory of Professional Personnel.

- III. Orientation for Newly Commissioned Officers. By P. A. San. (R) Herbert Knutson & P. A. Engr. (R) Ernest P. Dubuque.
 - A. Relationships of the PHS to other uniformed Services.
 - B. Military courtesies and customs.
 - C. Uniform Regulations.
 - D. Supplementary literature.
 1. Officer's Guide.
 2. Uniform Regulations of the Public Health Service.
 3. Public Law # 410.

- IV. General Aspects of Malaria Control. By P. A. Engr. (R) Ernest P. Dubuque & P. A. San. (R) Herbert Knutson.
- A. Relationships of malaria to vector.
 - B. Logical approach to malaria control.
 - C. Inter-relationships of entomological, engineering and medical sciences in malaria control work.
 - D. Supplementary readings.
 1. Human Malaria, Symposium AAAS.
 2. Malaria in Europe, Hackett.
 3. Mosquito Control, Herms & Gray.
 4. Fundamentals of Field Malariology & Mosquito Control, USN.
 5. Practical Aspects of Malaria, L. L. Williams, Jr.
 6. The Journal of the National Malaria Society, Vol. III, No. 1, 1944.
 7. Community Education for Malaria Control, USPHS.
 8. Learning about Malaria in our Community, TVA.
 9. Malaria, Public Health & Economic Aspects, L. L. Williams, Jr.
 10. Malaria Quiz for Young Americans, USPHS.
 11. Methods of Controlling Mosquitoes and Malaria, USPHS.
 12. Public Health Nurse in Malaria Control, E. L. Bishop.
 13. This is Ann, U. S. Army.
 14. Strange Ways of Mosquitoes, L. L. Williams, Jr.
 15. Modern Malaria Control, M. D. Hollis.
 16. Problems Created by Returning Malaria Carriers, S. B. Freeborn.
 17. Malaria Control in War Areas in the U. S. by USPHS, N.H. Rector.
 - E. Films.
 1. Malaria (film strip), USPHS.
 2. Malaria: Cause and Control, USA.
 3. Malaria Control, TVA.
 4. Malaria, British Shell Oil Co.
 5. Winged Scourge, Disney.
 6. Malaria, Winthrop.
 7. Criminal at Large (film strip), MCWA.
- V. Entomological Aspects of Malaria Control. By P. A. San. (R) Herbert Knutson.
- A. General facts concerning mosquitoes.
 1. Characteristics.
 2. Position of mosquitoes in zoological classification.
 3. Classification to tribes, genera, species, and subspecies.
 4. General consideration of life cycle and habits.
 - B. Differentiation of culicines and anophelines.
 1. Eggs.
 2. Larvae.
 3. Pupae.
 4. Adults.
 - C. Anopheles identification.
 1. Adults.
 2. Larvae.
 - D. Habits of anophelines (12 U. S. species), breeding habits, larval and adult population trends, flight range, dispersal flights, use of light traps, N.R.P., A.R.P., biting habits, hibernation, resting angle, etc.

- E. Culicine identification.
 - 1. Adults.
 - 2. Larvae.
- F. Habits of the more common and more important culicines.
- G. Entomological services and their part in the control program.
- H. The MCWA entomological program.
 - 1. Limitation of control to three species of anophelines.
 - 2. The "Inspection Project" and the "Inspection and Control Project."
 - 3. Mapping and establishment of stations.
 - a. Maps
 - b. Location of breeding areas and their location and description.
 - c. The "E" station and its value.
 - d. Larval stations, their use and number.
 - e. N.R.P. stations, requisites and types.
 - f. A.R.P. stations, requisites and types.
 - g. Mosquito traps, location, care, etc.
 - 4. Inspection and routine work in the field.
 - a. Larval and pupal collections, relationship to larviciding, technique, number and location of dips, tree hole samplings, filling out Form M-1, M-3, M-7.
 - b. Adult collections, techniques, filling out Form M-2, M-4, M-7.
 - (1) Resting places.
 - (2) Light traps, records, handling, frequency of operation, etc.
 - (3) Biting records, time, technique, etc.
 - 5. Value and use of field forms.
 - 6. Interpretation of entomological data.
 - a. Value of resting place, and larval and pupal records.
 - b. The story told by the M-1, and M-2 forms.
 - c. Problems of interpretation often encountered.
 - d. Value of light traps and biting records.
- I. Equipment and handling of specimens.
 - 1. Field and laboratory equipment.
 - 2. Preserving handling, and shipment of specimens.
- J. Supplementary literature.
 - 1. Entomological Field Handbook, MCWA.
 - 2. The Mosquitoes of the Southeastern States, King, Bradley & McNeel.
 - 3. Key to the Mosquito Larvae of the Southeastern United States, Bradley, Freeborn and Gerberg.
 - 4. Pictorial Key to Anopheline Larvae of U. S., Freeborn, Gerberg and Knutson.
 - 5. Wing and Mouth parts of Female Anopheles of the U. S., MCWA.
 - 6. Key to the Determination of the Adult Female Anopheles of the U. S., MCWA.
 - 7. Mosquito Atlas, Parts I & II, Ross and Roberts.
 - 8. Key to the Anopheline Mosquitoes of the World, Russell, Roachson and Stone.
 - 9. Identification Guide to the Mosquitoes of the Pacific Coast States, Freeborn and Brookman.
 - 10. Key to the Mosquito Larvae of the Pacific Coast, Freeborn and Gerberg.
 - 11. Guide to the Identification of the Common Mosquitoes of the Southeastern United States, Komp.
 - 12. Anopheline Mosquitoes of the Caribbean Region, Komp.

K. Films.

1. Anopheles Census, MCWA.
2. Anopheles Identification, MCWA.
3. Mosquitoes, USDA.

VI. Engineering Aspects of Malaria Control. By P. A. Engra (R) Ernest P. Dubuque.

A. Survey of malarious area.

1. Reconnaissance.
2. Mapping.
3. Location of watered areas.
4. Correlation between watered areas, map and office records.
5. Establishment of limits of control areas.

B. Easement or Right-of-entry.

C. Drainage.

1. Surveying.
 - a. Topography.
 - b. Locating a ditch.
 - c. Differential levels.
 - d. Profile of a ditch.
 - e. Cross sections.
 - f. Alignment.
 - g. Junctions.
 - h. Grades.
2. Minor drainage.
 - a. Method of construction.
 - b. Costs.
3. Major drainage.
 - a. Methods of construction.
 - b. Machines used.
 - c. Costs.
 - d. Dangers of indiscriminate drainage.
4. Hydraulic dredging.
 - a. When advantageous.
 - b. Methods.
5. Subsurface drainage.
 - a. Methods of construction.
 - b. Costs.
 - c. Advantages over surface structures.
 - d. Disadvantages.
6. Vertical drainage.
 - a. Methods.
 - b. Sanitary dangers.
7. Dynamite drainage.
 - a. Methods.
 - b. Costs.
 - c. Advantages.
 - d. Disadvantages.
8. Filling.
 - a. Natural fill.
 - b. Hydraulic fill.
 - c. Dry fill.
 - d. Sanitary fill.

9. Drainage structure
 - a. Culverts.
 - b. Spillways.
 - c. Tidegates.
 - d. California Cross.
 10. Pumping.
 - a. Small scale.
 - b. Large scale.
 11. Ditch linings.
 - a. Precast.
 - b. Monolithic.
 - c. Rip-rapping.
 - d. Sodding.
- D. Larviciding.
1. Paris Green.
 - a. Specification for paris green and diluent.
 - b. Mixing of dust.
 - c. Hand application.
 - d. Power application.
 - e. Aeroplane application.
 - f. Costs.
 2. Oil.
 - a. Specifications.
 - b. Mixing of fuel and black oil.
 - c. Hand application.
 - d. Power application.
 - e. Automatic applications.
 - f. Costs.
 3. DDT.
 - a. Specifications.
 - b. Preparation.
 - c. Application.
 - d. Costs.
 4. Miscellaneous.
 - a. Pyrethrum.
 - b. Phenols.
 - c. Phenothiazine.
- E. Clearing.
1. Necessity.
 2. Tools.
 3. Methods.
- F. Adult destruction.
1. Types of insecticides.
 2. Methods of use.
 3. Costs.
- G. Water fluctuation.
1. Theory.
 2. Methods.
- H. Fish.
- I. Mosquito proofing.
- J. Animal barriers.
- K. Depopulation.
- L. Repellants.
- M. Bed nets & Head nets.

- N. Checks on control efficiency.
 1. Larval stations and counts.
 2. Adult stations and counts.
 3. Correlation of field stations with records and maps.
 4. Malaria control vs. anopheline control.
- O. Reports.
 1. M-1 and M-3.
 2. M-2 and M-4.
 3. M-7.
 4. Foremen's reports.
 5. Project proposals & progress reports.
- P. Duties of an Area Supervisor.
- Q. Supplementary literature.
 1. Malaria Control for Engineers, Proc. Am. Soc. Civil Engr., 1939.
 2. Malaria Control Drainage, Miss. State Board of Health.
 3. Military Malaria Control, Circular Letter No. 22, USA.
 4. Public Health Mapping Standards, Ga. Dept. of Public Health.
 5. That Drainage Job, MCWA.
 6. Blasting Ditches with Explosives, DuPont.
 7. Hercules Dynamite on the Farm, Hercules.
 8. No Admittance, TVA.
 9. Anti-malaria Ditching by Dynamite, Nelson H. Rector.
 10. Airplane Dusting with Paris Green..., Murray and Knutson.
 11. Engineering Aspects of Mosquito Control, M. D. Hollis.
 12. Impounded Waters (Collection of Papers).
- R. Films.
 1. Paris Green Larviciding, MCWA.
 2. Oil Larviciding, MCWA.
 3. Mosquito Proofing for Malaria Control, MCWA.
 4. Dynamite, MCWA.
 5. Dynamite, USA.
 6. Non-Electric Blasting, USA.
 7. Electric Blasting, USA.
 8. Permanent Ditch Linings (film strip), MCWA.
 9. Selected Scenes of engineering operations: pole and hand drainage, suction dredging, concrete ditch linings, experimental larviciding with DDT.

- VII. Medical Aspects of Malaria. By Surgeon (R) Wm. S. Boyd.
 - A. Discussion of complexity of the malaria problem.
 1. The complex inter-relationships which involves three living organisms: man, malaria parasite, and mosquito.
 - B. The malaria parasites.
 1. Schizogenous cycle.
 - a. Host for schizogenous cycle.
 - b. Length of time involved.
 - c. Schizogenous forms.
 2. Sporogenous cycle.
 - a. Host for sporogenous cycle.
 - b. Fertilization and developmental forms in mosquito.
 - c. Length of time involved.
 3. Species of plasmodia.
 - a. Plasmodium vivax.
 - b. P. malariae.
 - c. P. falciparum.
 - d. P. ovale.

- e. Species differences.
 - 1. Differences in clinical manifestations.
 - 2. Difference in morphology.
- C. Epidemiology.
 - 1. World distribution of malaria.
 - 2. Present distribution of malaria in the United States.
 - 3. Trend of malaria in the United States.
 - 4. Methods of measuring malaria.
 - a. Direct methods.
 - 1. Mortality reports.
 - 2. Morbidity reports.
 - 3. Blood slide surveys.
 - a. Thick smears.
 - b. Thin smears.
 - 4. Spleen surveys.
 - 5. Complement fixation.
 - b. Indirect methods.
 - 1. Expert opinion.
 - 2. Histories obtained for suspects, etc.
- D. Treatment of malaria.
 - 1. The role of treatment at the present time.
- E. Laboratory identification of thick and thin blood films.
By F. A. Santarian (R) Paul P. Weinstein.
 - 1. Thick films.
 - 2. Thin films.
- F. Supplementary literature.
 - 1. Diagnosis and Prevention of Tropical Diseases, Stitt and Strong.
 - 2. Human Parasitology, Craig & Faust.
 - 3. Life History of the Malaria Parasite (Plasmodium vivax) in man and the Anopheles Mosquito, USPHS.
 - 4. Manual for the Microscopical Diagnosis of Malaria in Man, USPHS.
- G. Films.
 - 1. Clinical Diagnosis of Malaria, USN.
 - 2. Soldier of the Tropics, OWI.

VIII. Extended Malaria Program. By P. A. Engr. (R) Ernest P. Dubuque.

- A. Information on DDT.
 - 1. History.
 - 2. Properties.
 - a. Toxicity.
 - b. Inertness.
 - c. Volatility.
 - d. Solubility.
 - e. Adhesion.
 - f. Effect on insects.
 - g. Effect on animals.
 - h. Duration of effect.
 - 3. Precautions to be taken.
 - a. Food, dishes, open fires, etc.
 - b. Furniture.
 - c. Hat.
 - e. Goggles.
 - f. Respirators.

- B. Calender operational schedule of DDT residual house spraying.
 - 1. Spraying cycle, 3 months.
 - 2. 1 or 2 cycles (varies with latitude).
 - 3. DDT application rate.
- C. Mapping.
 - 1. Methods.
 - 2. Designation of houses.
 - 3. Scale of maps.
- D. Education.
 - 1. Training program personnel.
 - 2. Educating public.
- E. Application of DDT.
 - 1. Mixing.
 - a. Formulae.
 - b. Hand.
 - c. Power.
 - 2. Spraying.
 - a. Rates.
 - b. Nozzles.
 - c. Calibration.
 - d. Pressure.
 - e. Spray pattern.
 - f. Hand.
 - g. Power.
 - 3. Maintenance of equipment.
 - a. Mixers.
 - b. Power sprayers.
 - c. Hand sprayers.
 - d. Trucks.
 - 4. Prior notification of householder.
 - a. Mail.
 - b. Personal.
 - c. Foreman checks just before spraying.
 - 1. Dishes.
 - 2. Food.
 - 3. Furniture.
 - 4. Toys.
 - 5. Fires.
- F. Entomological inspection.
 - 1. Determining effectiveness of DDT residual spray program.
 - 2. Determining duration of effect.
 - 3. Interpretation of the precipitin test results.
 - 4. General plans of inspection.
- G. Progress Reports.
- H. Films.
 - 1. Spray Time (film strip), MCWA.
 - 2. Safe practices in Handling DDT. (film strip), MCWA.
 - 3. Mixing of DDT Emulsion (film strip), MCWA.
 - 4. Hand Spraying of DDT (film strip), MCWA.
 - 5. Power Spraying of DDT (film strip), MCWA.
 - 6. DDT, USN.

- I. Supplementary Literature
 - 1. Manual on DDT Insecticide, Div. of Preventative Medicine, Bureau of Medicine and Surgery, Washington, D. C.
 - 2. Summary of Activities, 1944, of Carter Memorial Laboratory, Savannah, Georgia.
 - 3. Handbook of DDT Residual Spray Operations, MCWA.
 - 4. The Extended Malaria Control Program, MCWA Field Bulletin, January, 1945.

- IX. Aedes aegypti Control. By P. A. San. (R) Herbert Knutson.
 - A. Introduction.
 - B. Dengue and yellow fever.
 - C. Identification of Aedes aegypti and other mosquitoes associated with it.
 - D. Habits and control of aegypti.
 - E. Purposes and objectives of the aegypti program.
 - 1. Immediate control of possible epidemics.
 - 2. Maintenance of populations below the threshold of sanitary importance.
 - 3. Educational campaign.
 - 4. Demonstration of feasibility and economy of small-scale programs.
 - F. Organization and operation of field units.
 - G. Supplementary literature.
 - 1. The Aedes aegypti Program, MCWA.
 - 2. The USPHS War Emergency Program for Control of the A. aegypti, USPHS.
 - 3. Entomological Phases of the Recent Dengue Epidemic in Honolulu, Robert L. Usinger.
 - H. Films.
 - 1. Aedes aegypti Control, MCWA.
 - 2. Life History of the Yellow Fever Mosquito, Eastman.
 - 3. Miss Keeter Goes to Town, MCWA.

- X. Administrative Aspects of Malaria Control. By P. A. Engr. (R) Ernest P. Dubuque.
 - A. Relationships of Headquarters Division of Administration to other Agencies.
 - B. Brief Survey of Administrative duties.
 - C. Payroll.
 - 1. Pay scales.
 - 2. Overtime.
 - 3. Payroll preparation and payment.
 - 4. Tax deductions.
 - 5. Time and attendance report.
 - D. Personnel.
 - 1. Appointments.
 - 2. Change in status.
 - 3. Efficiency ratings.
 - 4. Regulations concerning injuries.
 - 5. Leave.
 - 6. Quarterly personnel reports and monthly leave reports.
 - 7. Separations.
 - E. Procurement and supply - Automotive equipment, regulations and reports.
 - F. Property - Property accounting.
 - G. Travel.
 - H. Vouchers.
 - I. Review Questions and discussions.
 - J. Supplementary literature.
 - 1. General Information on travel.
 - 2. Manual of Operations.

- XI. Field Training. By P. A. San. (R) Herbert Knutson & P. A. Engr. (R) Ernest P. Dubuque.
- A. Atlanta area.
 - 1. Preliminary survey.
 - 2. Mapping.
 - 3. Reconnaissance report.
 - 4. Submission of project proposal.
 - 5. Setting up additional stations.
 - 6. Drainage engineering practices.
 - 7. Oil & paris green larviciding.
 - 8. Reinspection following control measures.
 - 9. Progress report.
 - 10. DDT residual spraying.
 - B. Valdosta area - study of area in operation.
 - C. Savannah.
 - 1. Special training in yellow fever and dengue fever control.
 - 2. Visit to Carter Memorial Laboratory.
 - D. Emory University Field Station (Baker Co., Ga.).
 - 1. Area orientation and mapping.
 - 2. Correlation of epidemiological data.
 - 3. Study of A. quadrimaculatus habitats.
 - 4. DDT residual spraying projects.
- XII. Short conferences will be arranged with the professional personnel of the various Divisions and Sections in order to become acquainted with the personnel and activities of the Headquarters Office.
- XIII. Test and discussions of 205 review questions.
- XIV. Studies of the Other Arthropod-borne Diseases and Their Vectors, for Officers Assigned to Foreign Duty. By P. A. San. (R) Herbert Knutson.
- A. Parasites and parasitism.
 - B. Types of diseases caused and transmitted by arthropods.
 - C. Classification and life history of insects and other arthropods.
 - D. Characteristics, life history, distribution, determination of genera and species, role in transmission of human diseases and/or role as a human pest, control, etc., of the following:
 - 1. Lice (Asiatic relapsing fever, typhus fever, trench fever).
 - 2. Fleas (bubonic plague, sylvatic plague, endemic typhus).
 - 3. Gnats.
 - a. Buffalo gnats (onchocerciasis).
 - b. Sand flies (sand-fly fever, kala-azar, oriental sore, etc.).
 - c. Eye gnats (conjunctivitis, yaws).
 - 4. Mosquitoes, exclusive of malaria, dengue fever and yellow fever (filariasis, equine encephalomyelitis, human encephalitis).
 - 5. Horse flies, deer flies and snipe flies (anthrax, tularemia, loa-loa, etc.).
 - 6. House flies and closely related non-blood-sucking muscoids. (gastro-intestinal diseases, possible carrier of yaws, eggs of parasitic worms, plague, T. B., intestinal protozoa, etc.).

7. Blood-sucking muscids.
 - a. Tse-tse fly (sleeping sickness).
 - b. Stable fly.
 - c. Others.
 8. Myiasis (intestinal, gastric, urinary, dermal, dermal creeping, etc., stomach bots, warbles, etc.).
 9. Bugs.
 - a. Bed bugs.
 - b. Reduviids (Chagas' disease).
 10. Cockroaches.
 11. Beetles.
 12. Ticks.
 - a. Ixodids (Rocky Mountain spotted fever, Colorado tick fever, tularemia, paralysis).
 - b. Argasids (relapsing fever).
 13. Mites.
 - a. Mange or itch mites (human itch, mange).
 - b. Scab mites (scabies).
 - c. Follicle mites.
 - d. Louse-like mites.
 - e. Flour and meal mites (grocer's itch).
 - f. Harvest mites or chiggers (tsutsugamushi fever).
 14. Poisonous arthropods.
 - a. Stinging insects.
 - b. Biting insects.
 - c. Urticarial hairs.
 - d. Blister beetles.
 - e. Spiders.
 - f. Ticks.
 - g. Scorpions.
 - h. Centipedes.
- E. Films.
1. The Fly - USA
 2. The Louse - USA.

XV. Accounts of foreign experiences.

- A. Experiences with Typhus Commission, By Sr. Surgeon Alexander G. Gilliam.
- B. Malaria Control Activities in Burma, China and India, By Sanitary Engineer (R) Lawrence B. Hall.
- C. Malaria & Dengue Control in the South Pacific, By Dr. R. H. Daggy.
- D. Dengue Control in Hawaii, By P. A. Engineer (R) Wesley E. Gilbertson & P. A. Sanitarian (R) R. L. Usinger.
- E. Malaria Control and DDT Research in Puerto Rico, By P. A. Engineer (R) Gordon R. Christensen.
- F. Observations on Malaria Control Activities in Panama, By P. A. Sanitarian (R) Herbert Knutson,
- G. Experiences in Malaria Control in Haiti, Central & South America, By Sanitarian (R) Ralph S. Howard, Jr.

Completion of course and assignment.

UNITED STATES PUBLIC HEALTH SERVICE
MALARIA CONTROL IN WAR AREAS

UNITED STATES PUBLIC HEALTH SERVICE DISTRICTS



NAVAL DISTRICTS

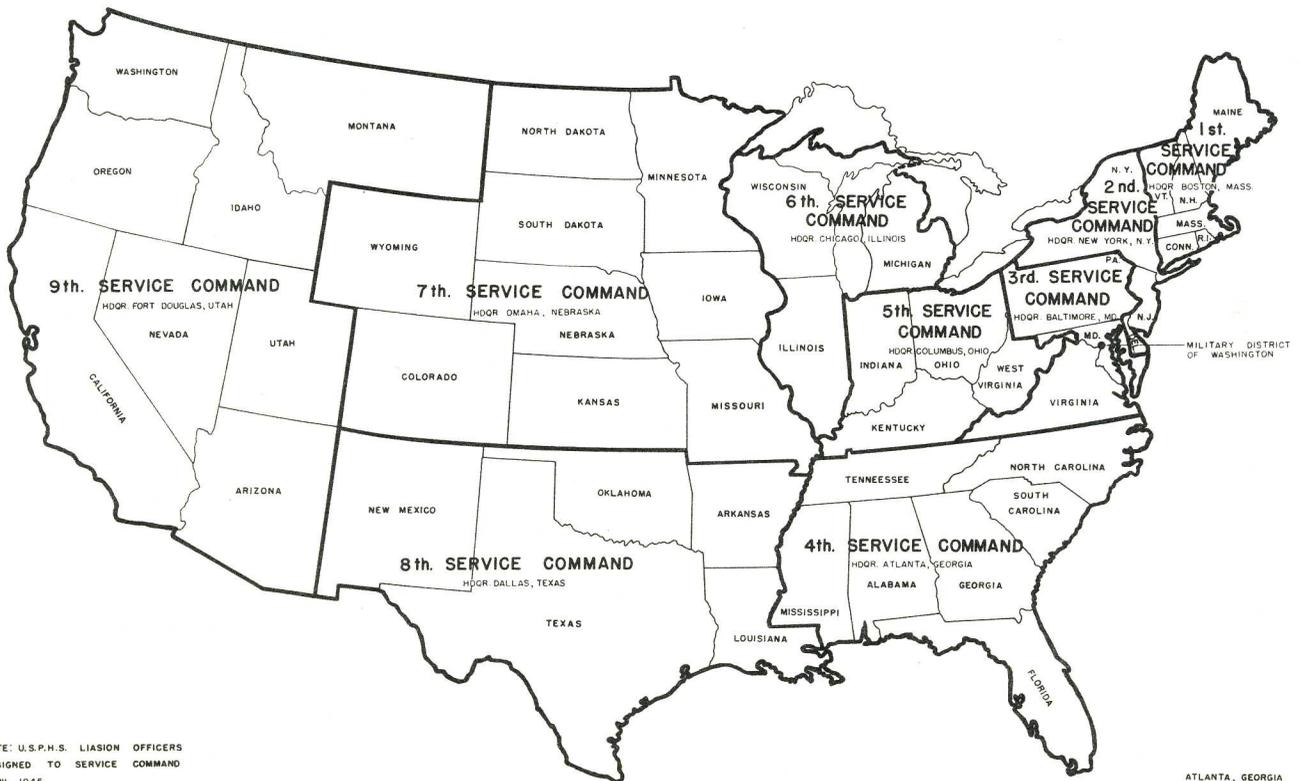


UNITED STATES PUBLIC HEALTH SERVICE
MALARIA CONTROL IN WAR AREAS

UNITED STATES PUBLIC HEALTH SERVICE DISTRICTS



ARMY SERVICE COMMANDS



NOTE: U.S.P.H.S. LIASION OFFICERS
ASSIGNED TO SERVICE COMMAND
APRIL, 1945

ATLANTA, GEORGIA

MALARIA CONTROL IN WAR AREAS

LINES OF AUTHORITY AND INTERRELATIONS

