THE ROLE OF INSECT CONTROL IN ARMY OPERATIONS

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In the presence of an expanding defense establishment one of the most pressing questions facing eligible young entomologists is the part they may expect to play in the event they enter army service. Fortunately, the niche into which entomologists fit has been fairly well defined through experience gained in their widespread utilization during World War II. The entomologist is a member of a team, a preventive medicine team, a team that is charged with the responsibility of protecting the health of troops wherever they may be, under all conditions of climate and environmental sanitation—or the lack of it. Team membership must, of course, vary with the problems encountered in different areas but in general may be thought of as being composed of enlisted preventive medicine technicians, and commissioned officer entomologists, sanitary engineers, parasitologists and medical doctors.

First, a word about the peculiar mission of these teams, peculiar in the sense that the mission differs quite markedly from that of similar teams in civilian life. The Army preventive medicine team has as its objective the prevention of all diseases which result in man-days lost from duty. And the military team cannot approach the problem slowly, relying upon the most efficacious method to achieve the desired objective over a period of time. Rather, the military team must do everything possible to prevent even the first case of a disease, since the occurrence of even one case means that in a sense the team has not performed its mission. Of course, faced with a multiplicity of disease entities, varying widely in their preventability, from smallpox which is relatively easy to prevent, to upper respiratory infections which are relatively difficult to prevent, the theoretical mission of the preventive medicine team is impossible of accomplishment with our present knowledge in the field of preventive medicine. The nearer the team can approach to the prevention of all diseases, the more nearly the team has achieved its objective.

Within the large group of so-called preventable diseases is a relatively large segment of what are broadly, and somewhat inaccurately, termed insect-borne diseases; inaccurate, because such diseases as scrub typhus, transmitted to man by a mite, are included. It is with the prevention of these diseases that the entomologist in the army is most closely associated, but the entomologist should never forget that he is a member of a team, a team whose mission is the prevention of all diseases, a team whose mission may require that he assist in the prevention of non-insect borne diseases. It is not intended that the entomologist be a "jack-of-all-trades and a master of none" but, to paraphrase, that he be a "jack-of-all-trades and a master of one."

Another fact which all too often is overlooked is that the principal problem facing the preventive medicine team today is the efficient implementation of control projects. Given adequate amounts of vaccines, prophylactic drugs, insecticides, pest control equipment, technical personnel and labor, coupled with command support, there is not one insect-borne disease of military importance which cannot be adequately controlled in the field. Granted, some insect-borne diseases are easier to control than are others, and that some control methods are very costly in

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terms of time, money, and equipment. But the fact remains that the diseases can be prevented and that the principal mission of the entomologist on the preventive medicine team is to determine which of many control methods will be the most efficient. He facilitates and supervises the execution of these methods in the field, and develops more efficacious methods where possible, bearing in mind always that the sole reason for his existence as an entomologist in the Army is for the support of the infantry soldier, either directly, by preventing him from becoming infected, or indirectly by preventing other infantry supporting soldiers from becoming infected.

It will be seen, therefore, that an entomologist in the army must have the ability to appreciate his position on the preventive medicine team, the ability to establish good working relationships between himself, his subordinates and his superiors and the general entomological background required for the practice of his specialty. If one or more of these attributes are lacking the entomologist is more hindrance than help to the performance of the mission of the preventive medicine team and in turn, the performance of the mission of the Army Medical Service.

Another salient feature that becomes evident from the above discussion is that the requirements of a major mobilization for entomologists at the PhD degree level are going to be small, at the Master's degree level, somewhat larger; the remainder of the requirement being met by entomologists at the Bachelor's level. Although exact estimates are classified and cannot be released to the general public the percentage figures can be given, and will probably approach the following:

PhD	Degree	10%
MS	"	15–25%
BS	"	65–75%

This does not mean that we may have a higher ratio of PhD entomologists on duty, since it would obviously be better for both the army and the individual to have the PhD working in a job requiring only a BS degree than to have the PhD carrying a rifle in an infantry company. This, gentlemen, at the PhD and Master's level, may be the choice you will be called upon to make: to utilize your broad training in a position calling for a minimum of entomological background, or to enlist or volunteer as an officer in one of the other technical services or in the combat arms, where your broad training would not be utilized at all. It should be pointed out, however, that whether or not you are faced with this decision will be determined either by your own voluntary actions or by policies established by non-defense agencies responsible for the utilization of scientific man-power.

Next, to look for a moment at the actual composition of the preventive medicine team—unfortunately, no two areas in the world are exactly alike, and the composition of the team must be adjusted to meet the problems encountered. For this reason, it has been found necessary to form what might be called sub-teams or building blocks of which the overall teams are made up. These subteams are as follows:

The Preventive Medicine Control Detachment, T/O & E 8–500 LA [2]

The Preventive Medicine Survey Detachment, T/O & E 8–500 LB

and are supplemented and supervised by:

Preventive Medicine Officers	MOS 3005 [3]
Entomologists	MOS 3315
Sanitary Engineers	MOS 7960

The detachments themselves are made up as follows:

a. *Preventive Medicine Control Detachment.*

1 Captain (Entomologist or Sanitary Engineer)
10 enlisted men, of which 6 are preventive medicine technicians and 4 are non-technical enlisted men

[2] Table of Organization and Equipment.
[3] Military occupation specialty.

b. *Preventive Medicine Survey Detachment.*

2 Captains (1 Entomologist and 1 Entomologist, Parasitologist, or Sanitary Engineer)

11 enlisted men, of which 8 are preventive medicine technicians and 3 are non-technical enlisted men.

These building blocks are usually allocated to an area on the basis of 1 Survey Detachment to 3 Control Detachments, and are best thought of as being mobile groups of labor crew foreman and field inspectors (enlisted men) and technical supervisors (commissioned officers). The units obtain labor from many sources, among them being natives, military prisoners, prisoners-of-war, or when none of these are available, by means of levies on other troop units.

Those of you who are familiar with the Malaria Survey and Control Detachments of World War II, will recognize the origin of the Preventive Medicine Detachments. As many of you may know, however, small detachments of this type are unsatisfactory from many points of view. They are thrown wholly on the none too tender mercies of the major command to which they are attached and in many instances do not have officers representing them on the Staffs of Corps, Armies, and Base Sections, who will fight their continuing battles of supply and motor vehicle priorities, motor vehicle repair, messing and housing.

Because of the inherent difficulties in the administration and supply of small detachments, steps were initiated to reorganize these units following the close of World War II culminating in the issuance on 12 May 1950 of T/O & E 8–117, Preventive Medicine Company. This company in essence is composed of the technical personnel of 3 Control Detachments, 1 Survey Detachment and a hypothetical Hygiene and Sanitation Detachment, and is allocated to areas requiring the support of one or more Survey Detachments plus 3 or more Control Detachments. A reduced strength column in which one Control Section is eliminated adds to the flexibility of the organization.

The full strength Company includes:

6 officers (2 Captains and 4 Lieutenants) which may be any combination of entomologists and sanitary engineers, as required

1 warrant officer—administrative

59 enlisted men, of which 42 are preventive medicine technicians and 17 are non-technical enlisted men.

This unit is wholly self-sufficient with respect to mess, motor vehicle repair and internal administration by non-technical personnel and has proved to be much more satisfactory than the separate detachments in these respects. Although this company solves many of the problems inherent in the utilization of small detachments, one major problem still remains—that of interested staff representation. This problem is being partially solved by the establishment of Battalion Headquarters under T/O & E 8–26, Medical Battalion Headquarters (Sep). This Headquarters will probably contain one Lieutenant Colonel (MOS 3005, Preventive Medicine Officer), 2 Majors (one Sanitary Engineer and one Entomologist) plus two administrative officers and 25 non-technical enlisted men.

In addition to vacancies in Table of Organization Units for entomologists, vacancies also occur in the Staffs of Base Section, Corps, Army and Theater commanders, where the entomologist is primarily concerned with the technical supervision and administration of approved projects.

A limited number of vacancies also exist in Army Area and Field Laboratories, in Army Medical Service technical schools and in Research and Development activities.

In conclusion it may be stated that the Army Medical Service has developed an extensive career field for the utilization of

entomologists covering the rank span of 2nd Lieutenant to Colonel, a career field in which the entomologist combines entomological and military skills in support of the assigned mission of the Army Medical Service—which is ". . . the conservation of man power—the preservation of the strength of the military forces."

MALARIA CONTROL PROGRAM OF THE TENNESSEE VALLEY AUTHORITY

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The malaria problem confronted TVA as soon as it began planning for development of the Tennessee River. Prior reservoir impoundments in the southeastern United States proved, in virtually every instance, to be ideal breeding grounds for anopheline mosquitoes and resulted in serious epidemics of malaria. This was true of projects constructed in Alabama on the Cahaba River in 1910 and on the Coosa River in 1914. It was also true of reservoirs constructed on the Tennessee River itself at Hales Bar in 1912, at Lake Wilson in 1924, and at Widows Bar in 1926. These unfortunate experiences led to extensive investigations by the United States Public Health Service which are considered to be the starting point of present day knowledge of malaria control on impounded waters. In 1923, Alabama adopted regulations, which have since served as a model for many other states, requiring that any individual or private or municipal corporation apply malaria control measures in impounding water or raising the level of an existing pond.

In the early 1930's, despite advances in knowledge concerning the control of malaria, the disease still constituted one of the most important public health problems of the southeastern United States. For example, in 1934, a malaria survey was made of the proposed basin of Wheeler Reservoir and the area within mosquito flight range (one mile) of its margin. A total of 5,023 blood specimens were collected; of these, 35 per cent were found positive, the maximum rate reaching 65 per cent in 2 counties. In a survey by the Alabama State Health Department a year earlier around Lake Wilson, 23 per cent of the individuals tested were found positive for malaria. It goes without saying that such high malaria incidence results in economic losses which can retard seriously the development of a region.

TVA's plans for creation of a chain of artificial lakes, which presently cover more than 600,000 acres with over 10,000 miles of shoreline, in a region where malaria already existed to a serious degree offered an unprecedented control problem. Moreover, this problem was intensified by the multipurpose character of the system which was to be operated for flood control, navigation, and the generation of power, and would require flexibility in water level changes to meet the needs of all three purposes. No similar development had previously occurred in this country from which to draw experience.

To cope with this problem, TVA assembled a staff with special training in medical malariology, biology, and engineering. They were associated within a single division and given the responsibility of developing a malaria control program for the entire river development. Special consultants were called in from the United States Public Health Service, the Department of Agriculture, the Rockefeller Foundation, universities and other